NATIONAL PARK SERVICE
U.S. DEPARTMENT OF THE INTERIOR

LIBERTY ENLIGHTENING THE WORLD: THE STATUE OF LIBERTY NATIONAL MONUMENT

NEW YORK

HISTORIC STRUCTURE REPORT

LIBERTY ENLIGHTENING THE WORLD

STATUE OF LIBERTY

NATIONAL MONUMENT

HISTORIC STRUCTURE REPORT

MAY 2011

The architects thank the many National Park Service representatives from the Denver Service Center, the Statue of Liberty National Monument, the Historic American Buildings Survey/Historic American Engineering Record, the Northeast Region, and the United States Park Police. George Tselos and Barry Moreno of the reference library provided images, drawings, and documents over numerous visits; Richard Holmes escorted the architectural team on every site visit and arranged for access to the Statue; and Diana Pardue, Chief of the Museum Services Division, facilitated access to collections and the Statue. The historic documents assembled over many years by Carole Perrault were invaluable in compiling the history section of this report.

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The cover image is taken from Charles Graham's engraving of the unveiling of the Statue of Liberty. Harper's Weekly, *November 6, 1886. [Harpweek digital database, accessed at New York Public Library]*

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EXECUTIVE SUMMARY

In December 2009, the National Park Service Denver Service Center contracted with John G. Waite Associates, Architects (JGWA) for the Historic Structure Report (HSR)for the Statue of Liberty Enlightening the World, Statue of Liberty National Monument. The goal of the report was to identify and document the original appearance, historic evolution, physical description, physical conditions, and character-defining features of the Statue of Liberty and the pedestal. Part 1-Developmental History would evaluate all architectural elements of the Statue and the pedestal for their historic integrity. “Part 2 - Treatment and Use” was not included in the scope of this project.

Specific questions guided the research for this report. The following Executive Summary summarizes the findings for each of these questions.

EVOLUTION OF THE ORIGINAL CONSTRUCTION AND THE SUBSEQUENT TREATMENTS/IMPACTS TO THE PRESENT TIME; ORIGINAL BUILDING FOOTPRINTS AND THE TIME FRAMES FOR ADDITIONS/REMOVALS

The narrative history chapters in this report describe, in detail, the evolution of the foundation, pedestal, and Statue. Following those chapters, a series of diagrams outline the major changes to the floor plan of the foundation and pedestal, and a series of sketches show the changes to the exterior.

The evolution of the Statue of Liberty can be broken down to seven major campaigns.

- The initial construction in 1886.
- The installation of the first cast-iron stair in 1888.
- The new entrance steps at the east side of the monument, stone facing on the exposed section of foundation, and the installation of the first elevator in 1907.
- The extensive interior renovation by the National Park Service in 1937-38, including a new stair system and elevator.
- The construction of the American Museum of Immigration (AMI) in 1967.
- The restoration, including replacement of the Statue’s interior armature, a new stair system; and new elevators in 1984-86.
- Security and life-safety improvements following the terrorist attack on the World Trade Center on September 11, 2001.

After the initial construction, nearly all of the modifications to the Statue and its pedestal were undertaken to improve access to and through the site.

SURVIVING HISTORIC MATERIAL

The character-defining features chapter outlines the surviving important historic material in detail. In general, the Statue, the pedestal, and the foundation retain:

- original construction materials: the original concrete foundation; the Leetes Island, Connecticut granite used for facing the pedestal; the copper sheet metal skin of the Statue.
- original openings: the four openings in the base of the foundation (at 1P); the exterior doorways at 3P and 4P; and the exterior doorways and blind openings at 6P.
- original platform levels: despite the many changes to the interior stairs and elevators, the original platform levels at 1P, 3P, 4P and 6P all continue to relate to the exterior levels of the pedestal and the way it functioned historically.
- original structural framing for the Statue: the two levels of massive cross-beams in the pedestal; and the vertical tension bars connecting those cross-beams to the structure of the Statue.
- the four corridors at level 1P with their barrel-vaulted ceilings.
- the remaining volume of original 10-foot square shaft in 1P and 2P.
- evidence for original formwork finish on the concrete shaft above 2P.
- the floor plan of 3P, with its double set of corridors and their barrel-vaulted ceilings.
- the floor plan of 4P.
- the floor plan of 6P and the surviving section of the 1888 stair.
- the concrete top surface of the pedestal at 7P, including the two concrete arches in the southeast and northeast corners.
- In the Statue, Eiffel's pylon continues to provide the skeletal support for the Statue. A section of original armature framing in the upraised foot was purposefully left in situ as part of the 1984-86 restoration. The double-helix stairs still have their original shaft and risers/treads.
- The original framing and copper sheet metal skin of the crown.
- The original ladder and platform to the right arm/torch.

No evidence was found for original building systems.

POST-HISTORIC MATERIAL

The physical description and character defining features sections list the material that was inserted after the construction of the Statue.

MAJOR RESEARCH FINDINGS

Most histories of the Statue of Liberty National Monument focus on the design, construction, and erection of the Statue and its pedestal. While this report covers that period of the site's history in the first four chapters, it also provides a summary of work done after that period, found in the following chapters:

- United States Light-House Board, 1886-1902
- Jurisdictions and Conditions on the Island, 1901
- National Park Service Years, 1933-1979
- Restoration of the Statue of Liberty, 1982-1986
- Changes to the Statue of Liberty and the Pedestal, 1986-2009

To produce the narrative history and architectural descriptions, the team utilized the extensive holdings of the the Bob Hope Memorial Library (the Statue of Liberty's reference library) at the Ellis Island Immigration Museum. The work began with reviewing the 120 boxes of materials assembled by former NPS staff Carole Perrault, Blaine Cliver, and John Robbins. Diana S. Waite of Mt. Ida Press, the team's architectural historian, compared and aligned this material with the listings in the finding aid prepared by the National Park Service, and with the collection's electronic files.

The reference library also provided historic drawings and photographs. JGWA reviewed the collection of historic documents from the library and also utilized scanned drawings provided by the NPS Technical Information Center at the Denver Service Center. The Historic American Buildings Survey/Historic American Engineering Record provided aerial images and drafts of the measured drawings (still in progress).

The HABS/HAER images at the Library of Congress, taken during the 1980s restoration, were invaluable in documenting the conditions of the site before and after the restoration.

The research for the report also encompassed the following sources:

- The monthly reports of the National Park Service Superintendents of the Statue of Liberty National Monument
- Early guidebooks at the Statue of Liberty reference library for information on the evolution of visitor's routes through the pedestal and Statue
- New York Public Library's collection of photographs, journals, and guidebooks
- Journal and newspaper articles at the New York State Library
- Images from the Pinchot family papers at Grey Towers National Historic Landmark
- Images from the Seneca Ray Stoddard collection at the Adirondack Museum
- Google books for early guidebooks and journals

PHYSICAL DESCRIPTION AND EXISTING CONDITIONS

While preparing the Architectural Descriptions and Existing Conditions of the report, JGWA used the National Park Service designations for each level in the pedestal and Statue, and assigned each space in the pedestal a room number. Spaces in the pedestal at levels 0P-2P were included in the Fort Wood Historic Structure Report completed by JGWA in 2008; the descriptions of those spaces have been expanded and updated for this report.

Because the Statue and pedestal do not face true north, it can be confusing to identify spaces using compass points. After discussion with National Park Service staff at the site it was determined, for this conditions assessment, to establish a plan north, with the main entrance as the west compass point and the Statue facing east. These compass points are the most common designations used by the rangers in the Statue, and are consistent with the compass points used in the Fort Wood Historic Structure Report.

The architectural team surveyed the exterior of the pedestal from each of the accessible exterior levels. Where the structure could not be examined directly, the team used binoculars to view conditions.

The Statue of Liberty is generally in good condition. It receives regular and dedicated maintenance; however, it suffers from the constant demands of visitation and from high operational costs that limit extensive curatorial care.

Water has a constant presence in the Statue and pedestal. Water from the Statue has percolated through the pedestal, causing varying degrees of vivid blue-green staining on the exterior granite facing. The water has dissolved salts in the interior masonry construction and redeposited them through evaporation at the surface of the masonry, forming efflorescence. The constant presence of water has made it necessary to provide a temporary tarp over the emergency elevator.

Vertical and diagonal cracks through the granite spandrel panels at all four of the loggias on Level 4P are of particular concern. Currently, the stones appear to be held in place by gravity. Until corrective conservation measures are implemented, temporary shoring or bracing should be installed.

In general, the building systems at the Statue of Liberty appear to be in fair working condition. The main electric service components and fire protection systems appear to be in good condition. However, the heating and cooling equipment is old and mechanical components, such as chillers and pumps, are near the end of their service life. Mechanical systems for heating, ventilation, and cooling, as well as the mechanical systems for the lift and elevators are subjected to the constant demands of institutional use. Generally, these systems have a limited life span, and must be replaced approximately ever twenty years.

While maintenance at the Statue and pedestal is critical for the monument's survival, it is not sufficient. Design, conservation, and maintenance efforts are required to insure the long term preservation of the monument.

ADMINISTRATIVE DATA

LOCATION DATA

Building Name: The Statue of Liberty Enlightening the World National Monument

Location: Liberty Island

PROPOSED TREATMENT

Preservation/restoration.

RELATED STUDIES

Berg, Shary Page. "Cultural Landscape Report for Liberty Island, State of Liberty National Monument, History, Analysis and Treatment Recommendations," Sept. 1999, Olmsted Center for Landscape Preservation, National Park Service, Boston.

Blumberg, Barbara. *Celebrating the Immigrant, An Administrative History of the Statue of Liberty National Monument, 1952-1982.* N. p.: U. S. Dept. of the Interior, National Park Service, North Atlantic Regional Office, Div. of Cultural Resources, 1985.

Cotter, John. "Report on Archeological Observations at the American Museum of Immigration Foundation Area, 1962-1963." Statue of Liberty National Monument, Museum Collections.

Greenstein, Robert E., ed. "Summary Structural History of Fort Wood (Supplement)," April 1963. National Park Service Library, Statue of Liberty National Monument.

Holliman, Jennie. "The Statue of Liberty, Part II, The American People Receive the Statue of Liberty from the French." Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Holmes, Richard D. "Archeological Investigations for the Temporary Stairs and Security Fencing at the Statue of Liberty, Statue of Liberty National Monument, New York, New York," July 2004. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Hugins, Walter. "Statue of Liberty, National Memorial, Its Origin, Development and Administration," U.S. Department of the Interior, National Park Service, 1958. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

John G. Waite Associates, Architects. "Statue of Liberty National Monument: Liberty Island Threat, Risk, and Mitigation Options Study, Phase II: Island and Monument Egress Assessment," Aug. 26, 2002. Statue of Liberty National Monument.

John G. Waite Associates, Architects. "Fort Wood, Statue of Liberty National Monument, Historic Structure Report." 2009. Statue of Liberty National Monument.

Kroll, Naomi. "Condition Survey, Construction History and Preservation Plan, Fort Wood, Statue of Liberty National Monument," March 2006. U.S. Dept. of the Interior, National Park Service, Northeast Region, Design, Construction and Facility Management Directorate, Architectural Preservation Division.

Levine, Benjamin, and Isabelle F. Story. *Statue of Liberty National Monument, Bedloe's Island, New York.* Washington, D.C.: National Park Service, 1954.

"Liberty Island, Statue of Liberty National Monument, Cultural Landscapes Inventory," National Park Service, 1998, rev. 2000.

Mikel, W. "Completion Report, Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Palmer, George A. "Recollections of the First NPS Superintendent of the Statue of Liberty—George A. Palmer," 1984. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Perrault, Carole L., electronic files. Statue of Liberty National Monument.

Perrault, Carole L. *The Statue of Liberty and Liberty Island: A Chronicle of the Physical Conditions and Appearance of the Island, 1871-1956.* Boston: U.S. Dept. of the Interior, National Park Service, North Atlantic Region, North Atlantic Preservation Center, Oct. 10, 1984.

Perrault, Carole Louise. *Statue of Liberty National Monument, Historic Resources Study, Construction History: Primary Source Material,* review draft. Lowell, Mass: U.S. Dept. of the Interior, National Park Service, Northeast Field Area, Northeast Cultural Resources Center, Building Conservation Branch, 1997.

Perrault, Carole Louise. *Statue of Liberty National Monument, Historic Resources Study, Construction History: The Site,* first review draft. Lowell, Mass: U.S. Dept. of the Interior, National Park Service, Northeast Field Area, Northeast Cultural Resources Center, Building Conservation Branch, 1997.

Perrault, Carole Louise. *Statue of Liberty National Monument, Historic Resources Study, Construction History: The Statue, Its Pedestal and Foundation,* review draft. Lowell, Mass: U.S. Dept. of the Interior, National Park Service, Northeast Field Area, Northeast Cultural Resources Center, Building Conservation Branch, 1997.

Perrault, Carole Louise. *Statue of Liberty National Monument, Historic Resources Study, Lighting History,* review draft. Lowell, Mass: U.S. Dept. of the Interior, National Park Service, Northeast Field Area, Northeast Cultural Resources Center, Building Conservation Branch, 1997.

Pitkin, Thomas M. "Prospectus for the American Museum of Immigration," U.S. Dept. of the Interior, National Park Service, preliminary draft, 1955. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Pitkin, Thomas M. "Summary Structural History of Fort Wood," Statue of Liberty National Monument, Aug. 1956. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Romigh, Philip S. "Historic Structure Report, Fort Wood, Architectural Data Section, Statue of Liberty National Monument, New York," U.S. Dept. of the Interior, National Park Service, Historic Preservation Team, Denver Service Center, Oct. 1973. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

CULTURAL RESOURCE DATA

The Statue of Liberty, whose official name is "Liberty Enlightening the World," was listed on the National Register May 19, 1981 at the National level of significance along with Liberty Island. The Statue meets National Register Criteria A, for its association with events important to the history of the United States, Criteria C for embodying the distinctive characteristics of a type, period, and method of construction, and Criteria D for the information the Statue has or has the potential to yield to history.

The period of significance of the Statue of Liberty, as listed in the current National Register nomination form, is 1875-1884. At the time of this historic structure report, the nomination was being updated, and the period of significance was under review, as some of the ancillary buildings on Liberty Island were built after 1884. Therefore, the National Park Service designated the period of significance, for this report, as 1883-1957.

The Statue retains a high degree of integrity of location, design, setting, materials, workmanship, association, and feeling to the period of significance.

A Presidential Proclamation declared Fort Wood (and the Statue of Liberty within it) a National Monument on October 15, 1924 and the monument's boundary was set at the outer edge of Fort Wood. In 1933, the Statue of Liberty National Monument was transferred to the National Park Service. On September 7, 1937, jurisdiction was enlarged to encompass all of Bedloe's (Liberty) Island and in 1956, the island's name was changed to Liberty Island. In 1984, the Statue of Liberty was designated a World Heritage Site.

Figure 1. The Statue of Liberty, sited at the south end of Liberty Island. [Aerial photograph from ongoing HABS/HAER measured drawing project]

CHARACTER-DEFINING FEATURES

There are few National Park sites or landmarks so significant as the Statue of Liberty. As noted in the World Monuments Fund Statement of Significance:

> The Statue of Liberty Enlightening the World, a hollow colossus composed of thinly pounded copper sheets over a steel framework, was designed in Paris by the French sculptor Frederic Bartholdi, in collaboration with the French engineer Gustave Eiffel, who was responsible for its frame, intended as a gift from France for the centenary of American independence in 1876. Its design and construction were recognized at the time as one of the greatest technical achievements of the 19th century, and, when finally dedicated a decade later, it was hailed as a bridge between art and engineering. Atop its pedestal, designed by noted American architect Richard Morris Hunt, on an island at the entrance to New York Harbour, the Statue has since welcomed millions of immigrants who arrived in the United States by sea.
>
> Criteria
>
> (i) This colossal statue is a masterpiece of the human spirit. The collaboration between the sculptor Bartholdi and the engineer Eiffel resulted in the production of a technological wonder that brings together art and engineering in a new and powerful way.
>
> (vi) The symbolic value of the Statue of Liberty lies in two basic factors. It was presented by France with the intention of affirming the historical alliance between the two nations. It was financed by international subscription in recognition of the establishment of the principles of freedom and democracy by the U.S. Declaration of Independence, which the Statue holds in her left hand. The Statue also soon became and has endured as a symbol of the migration of people from many countries into the United States in the late 19th and the early 20th centuries. She endures as a highly potent symbol – inspiring contemplation, debate and protest – of ideals such as liberty, peace, human rights, abolition of slavery, democracy and opportunity.[11]

The exterior of the Statue itself is obviously significant in its entirety. The following list includes other elements of the site that contribute, or do not contribute, to its significance.

SITE

The siting of the Statue of Liberty in Fort Wood, at the south end of Liberty Island, is an important character-defining feature. The star-shaped Fort Wood was chosen as the base of the Statue because it was "emblematic of our constellation of states, and nationality."[22] The Statue overlooks New York harbor and the southern tip of Manhattan. The direction of the Statue became even more important for the immigrants passing through the harbor, particularly for those headed to Ellis Island.

PROPORTION

The proportion of the Statue to the pedestal, the immense mass and footprint of the concrete foundation, and the relationship between the height of the pedestal and the outer walls of Fort Wood all contribute to a visitor's perspective and perception of the Statue.

During the 1984-86 restoration, the torch was restored to its original appearance and relationship with the Statue. The gilded flame and the detailing/proportions of the torch are significant features.

CONSTRUCTION MATERIALS

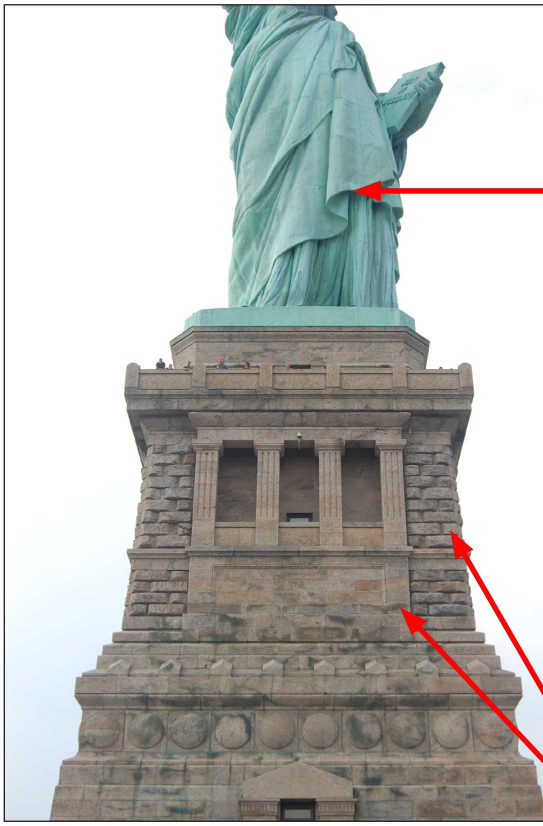
Remarkably, the Statue of Liberty, the pedestal, and the foundation have retained many of the original construction materials. The important exterior building fabric includes:

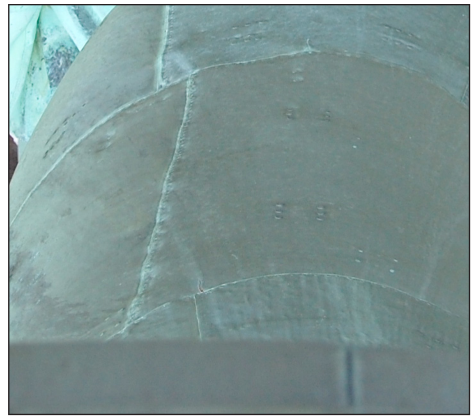
- The height and depth of the foundation steps.
- The composition of the original concrete in the foundation *[see Figure 2, CDF 6]*. At an undetermined date, a skim coat of cement was applied to the exposed foundation steps to make them more visually appealing *[see Figure 2, CDF 5]*. While historic, the skim coat does not contribute to the monument's significance.
- The Leetes Island, Connecticut, granite, with its medium pinkish grey color and fine texture, used to face the pedestal *[see Figure 2, CDF 2]*.
- The size, depth, and detailing of the granite stones.
- The contrast of the smooth finish and rock-face finish of the granite *[see Figure 2, CDF 3 and CDF 4]*.
- The copper sheet metal skin of the Statue and the patina that has developed on the copper *[see Figure 2, CDF 1]*.
- The size of the copper sheets on the Statue and the fastening method *[see Figure 2, CDF 1]*.

OPENINGS

There are few openings in the foundation or pedestal. All are original and contributing features:

- The four openings in the base of the foundation (at 1P) *[see Figure 3, CDF 9]*.
- The four doorways at the historic entry level (3P), with their massive pilasters and lintels *[see Figure 3, CDF 8]*.
- The loggias (at 4P) and the plain, rectangular doorways in the interior walls *[see Figure 3, CDF 7]*.





CDF 1. COPPER SHEET METAL SKIN AND PATINA; SIZE OF THE COPPER SHEETS; AND RIVETS

CDF 2. DETAIL OF GRANITE

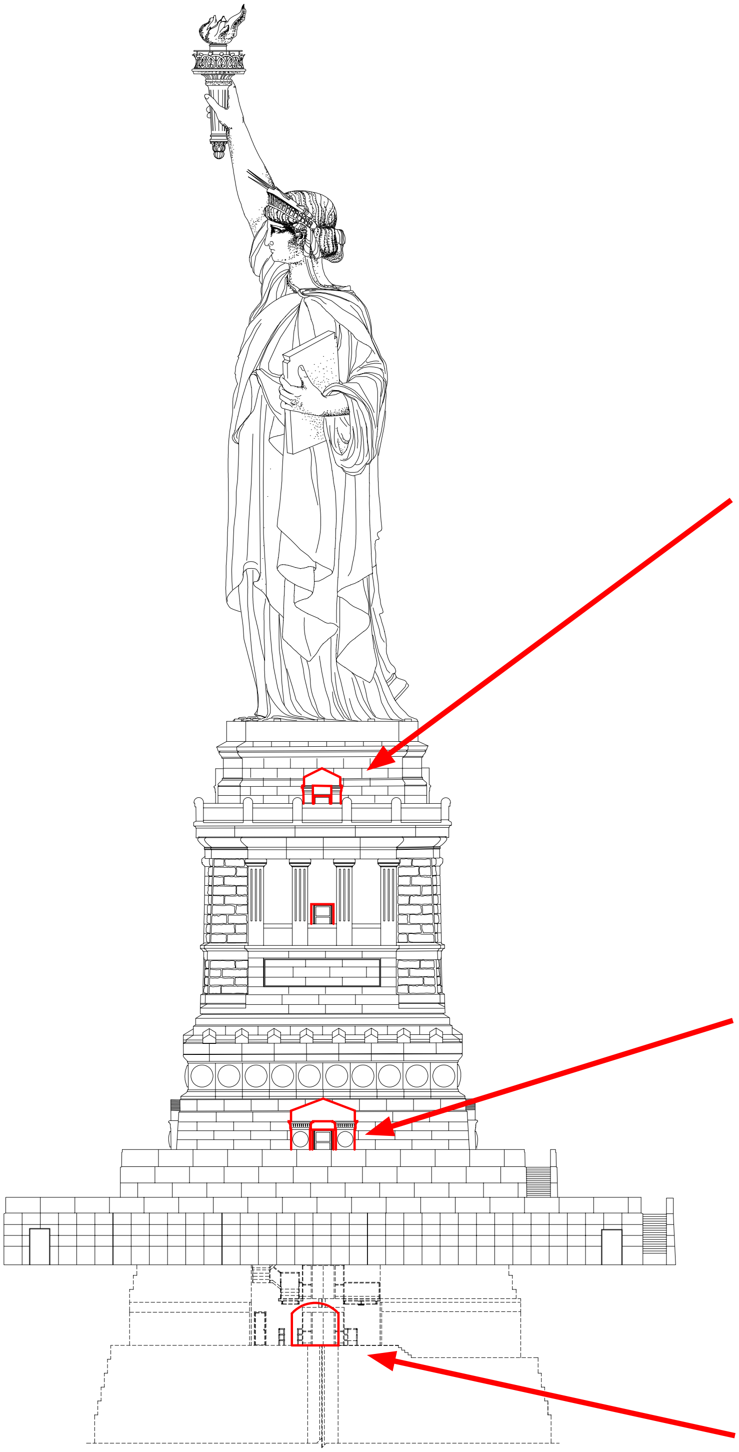
CDF 3. ROCK-FACED GRANITE

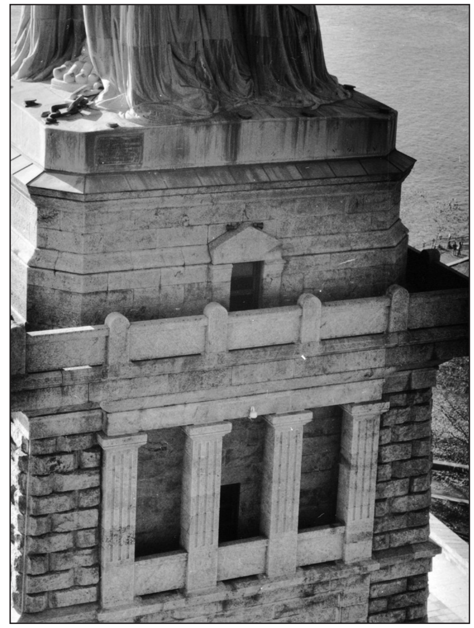
CDF 4. SMOOTH-FACED GRANITE

CDF 5. EXPOSED FOUNDATION COVERED IN SKIM COAT OF CEMENT

CDF 6. DETAIL FOUNDATION IN 2P, SHOWING EXPOSED ORIGINAL CONCRETE

Figure 2. Selected character-defining materials. [JGWA, 2010]





CDF 7. LOGGIA DOORWAYS (4P) AND BALCONY DOORWAYS AND BLIND OPENINGS (6P)

CDF 8. DOORWAYS AT 3P

CDF 9. OPENINGS AT BASE OF PEDESTAL (1P)

Figure 3. Character-defining openings. [Elevation/section adapted from ongoing HABS/HAER measured drawing project; aerial photograph of pedestal provided by HABS/HAER]

- The two functioning doorways and the blind openings at the balcony level (6P) *[see Figure 3, CDF 7]*. The rock-face stone and concrete that were used to further fill the two blind openings are historic materials.

None of the 1984-86 bronze doorways and glazed doors are contributing features.

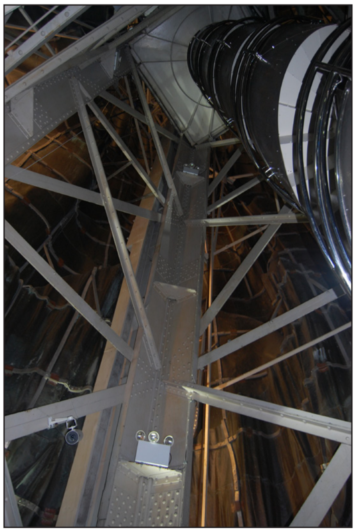
INTERIOR

The following elements are important character-defining features inside the pedestal and Statue:

- The original platform levels at 1P, 3P, 4P, and 6P all relate to exterior features and the way in which the pedestal functioned historically *[see Figure 4]*.
- The original structural framing for the Statue, including the two levels of massive cross-beams in the pedestal and the vertical tension bars connecting the cross beams to the structure of the Statue.
- The open view through the interior of the shaft.

Specific character-defining features at each level include:

- 1P: All four corridors, with their barrel-vaulted ceilings; and the remaining volume of the original shaft *[see Figure 5, CDF 14]*.
- 2P/2.5P: The remaining volume of the original shaft and the original concrete texture on the shaft walls; and evidence for the 1907 entrance that remains on the east face of the foundation.
- the evidence for the original formwork finish on the concrete shaft above 2P *[see Figure 5, CDF 12]*.
- 3P: The double corridors (four leading to the exterior, and the outer corridors connecting those passages); the barrel-vaulted ceilings in the corridors; the granite facing stone that extends into the four exterior corridors; and the outline of the original well. The 1907-08 inner iron gates in the north, west and south corridors, and the two 1907 iron gates in the north and south openings in corridor 3P03, are historic features.
- 4P: The four loggias, including the granite spandrel panels and columns; the four corridors leading to those balconies; the volumes and ceilings in the corridors; and the original concrete and volume of the central pedestal shaft.
- 6P: The north and south corridors and the concrete and granite surfaces in those corridors; the section of 1888 stair in the southwest corner that has survived both the 1930s and 1980s renovation/restoration campaigns *[see Figure 5, CDF 13]*.
- 7P: The pedestal structural framing; the concrete top surface of the pedestal, including the two concrete arches in the southeast and northeast corners; the original supports and structural members surrounding the lower portion of the



CDF 10. ORIGINAL STRUCTURAL FRAMING

CDF 11. ORIGINAL ARMATURE BARS AND SADDLES IN UPRAISED FOOT

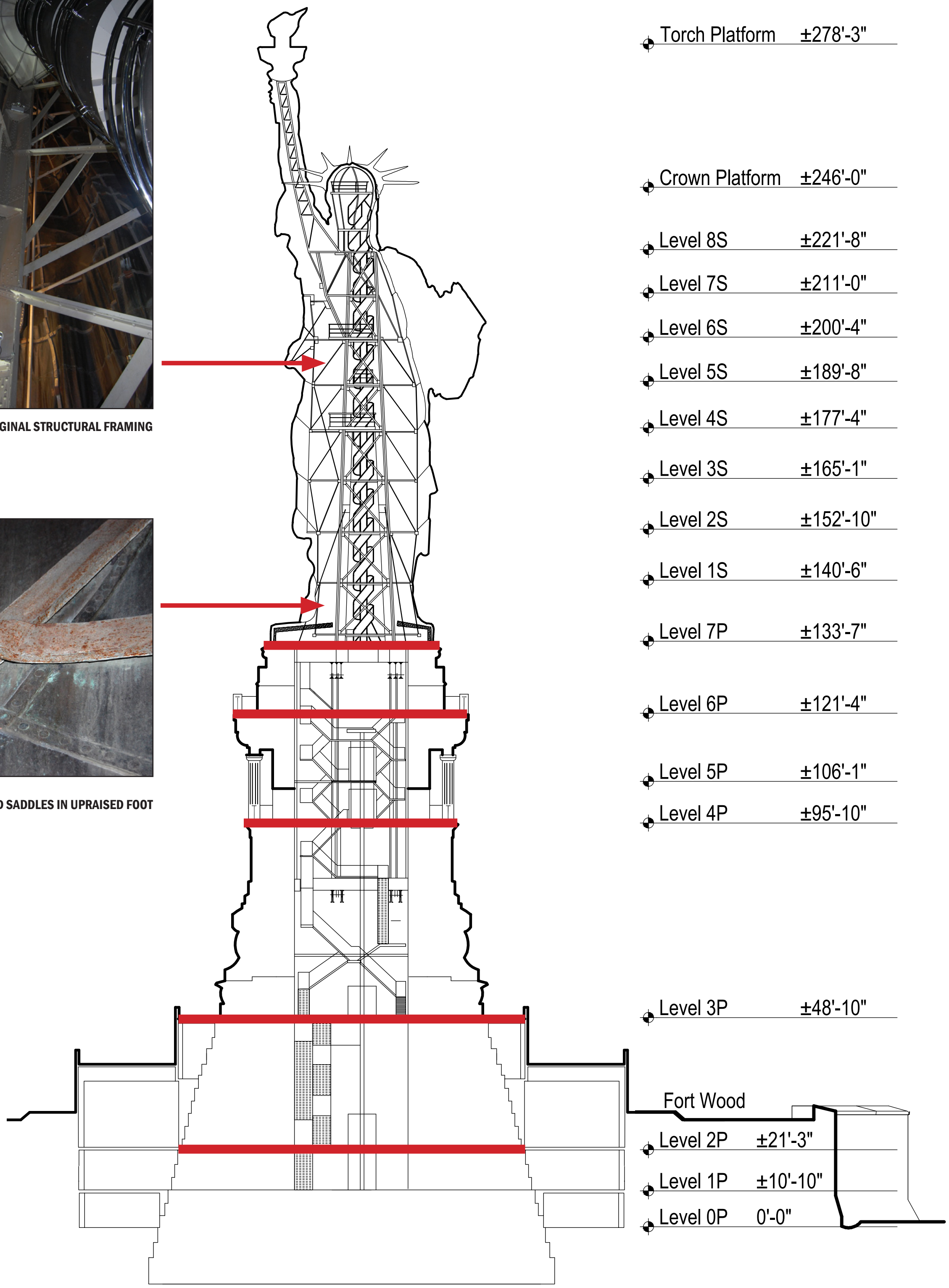
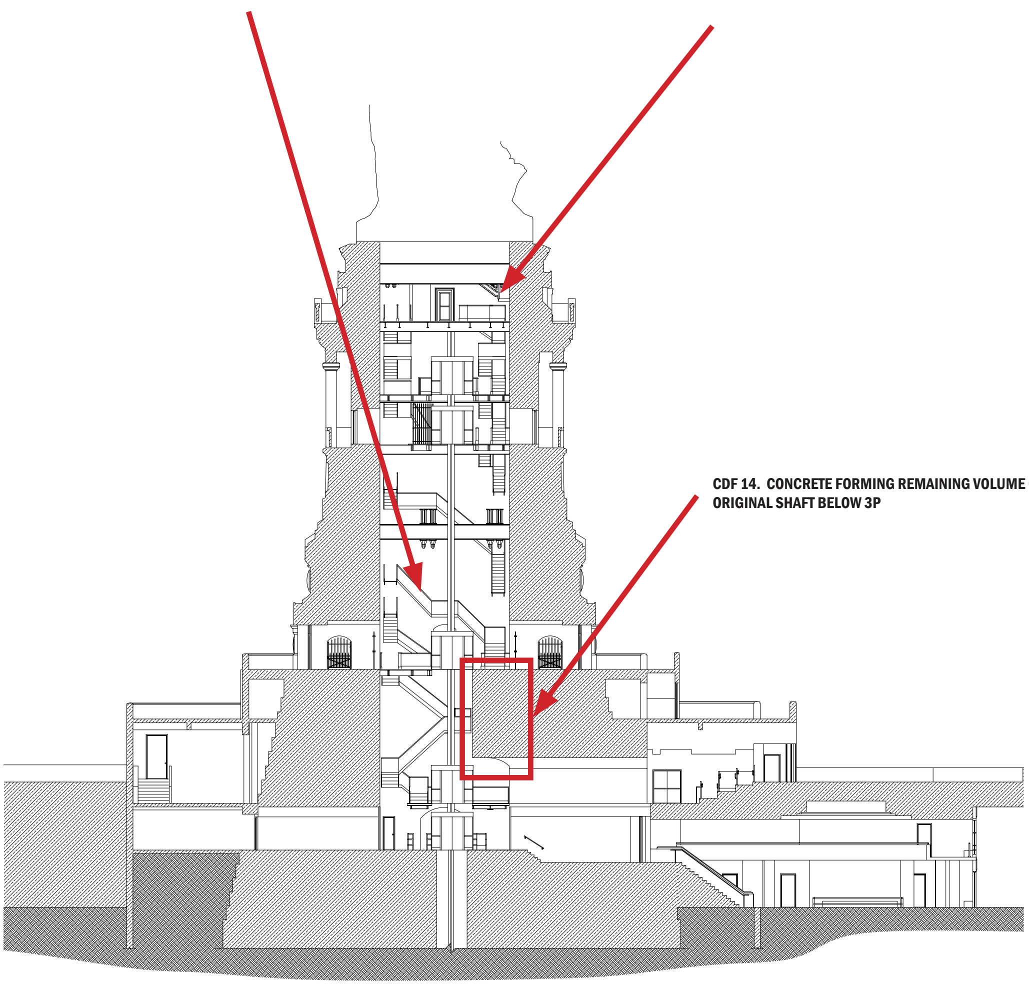


Figure 4. Selected interior character-defining features. The levels marked in red are the levels that correspond to the original platform levels in the pedestal. [JGWA, 2010]

CDF 12. EVIDENCE OF ORIGINAL FORMWORK ON CONCRETE SHAFT (ABOVE LEVEL 2P)

CDF 13. SECTION OF 1888 STAIR AT 6P



CDF 14. CONCRETE FORMING REMAINING VOLUME OF ORIGINAL SHAFT BELOW 3P

Figure 5. Selected interior character-defining features in the pedestal. [Section adapted from ongoing HABS/HAER measured drawing project]

pylon structure; the vertical lattice girders that form the support of the copper base of the Statue.

- Statue: The Eiffel skeletal frame or pylon; the 1984-86 stainless steel armature bars and the copper saddles (as evidence of original construction methodology and subsequent preservation treatments); the original armature bars and saddles retained in the upraised foot; the 1886 double helix stairs; the uncoated interior face of the copper sheet metal skin.
- Crown: The original framing and the copper sheet metal skin; the original "jewel" openings, and access to the view through the openings.
- Right arm/torch: The original framing for the arm and the subsequent campaigns of supplementary framing; the original ladder.

The following are non-contributing elements inside the pedestal and Statue:

- the non-original interior finishes.
- the stainless steel stair and elevator platforms and glass partitions.
- the elevator, wheelchair lift; and emergency elevator.
- the fire-rated doors and frames, and the bronze doors and frames at the exterior openings.
- the lighting, electrical, mechanical, security, communication, and fire suppression systems; none of the original building systems survive in the pedestal or Statue.
- the central vacuum system.
- the glazed panels that have been inserted for visitor safety and to protect the historic fabric.

Specific non-contributing elements at each level include:

- 0P: The elevator pit.
- 1P: The existing granite paving and the painted concrete skim coat on the walls and ceiling; the elevator machine room to the north of the shaft; and the first aid room to the southeast of the shaft.
- 2P: The corridor leading to the west lobby of AMI.
- 3P: The partitions creating the corner storage areas.
- 5P: All construction at this level (this elevator platform was added as part of the 1984-86 work).
- 6P: The metal partitions at the east end of the space; the glazed ceiling panels.
- Statue: the mesh screens covering some of the openings into the recesses of the Statue.
- Crown: The 1984-86 windows.
- Right arm and torch: The wire mesh fence and door/gate.

NOTES: CHARACTER DEFINING FEATURES

1. UNESCO World Heritage Centre, "Statue of Liberty," http://whc.unesco.org/en/list/307 (accessed August 2010).
2. Carole L. Perrault, "The Statue of Liberty and Liberty Island: a Chronicle of the Physical Conditions and Appearance of the Island, 1871 to 1956" (Boston: North Atlantic Historic Preservation Center, U.S. Dept. of the Interior, 1984), 19.

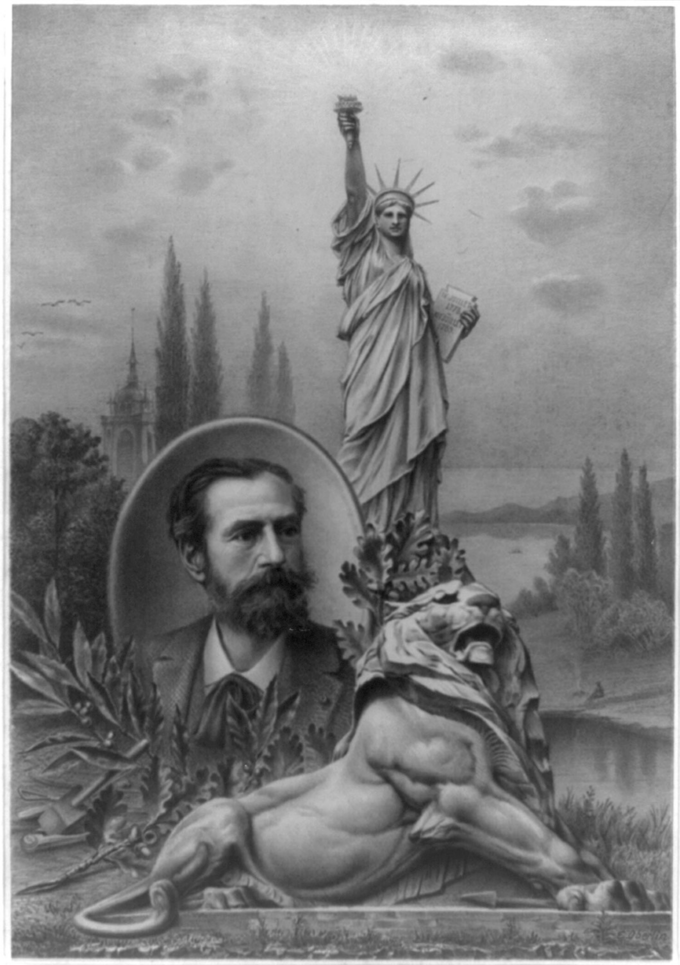


Figure 6. Frédéric Auguste Bartholdi with his Statue of Liberty *and* Lion of Belfort*, by E. Oberlin. [Library of Congress]*

HISTORICAL BACKGROUND AND CONTEXT

THE CONCEPT OF THE STATUE OF LIBERTY

THE REPUBLIC'S DIFFICULT BIRTH IN FRANCE

It was during discussions with French liberals in 1865 that the sculptor Frédéric Auguste Bartholdi first heard of the plan to build a monument commemorating French-American relations and their common aspirations for a republic as a form of government. France had long been ruled by monarchs, while the United States originally struggled under the British. One member of this group, Édouard René Lefèbvre de Laboulaye, was a legal scholar who had studied and admired the United States Constitution with its guaranteed rights and liberties.

While liberal concepts had been formed by French thinkers during the Age of Enlightenment, it was the leaders of the American Revolution of 1776 that first applied these concepts to the Constitution. The French Revolution ensued more than a decade later, in 1789. Liberté, Egalité, Fraternité was popularized as a motto, and the Declaration of the Rights of Man was presented for the first time. The First Republic was launched in 1792 but was short-lived. Napoleon Bonaparte took power and reigned as emperor beginning in 1804 until he was defeated at Waterloo in 1815. A constitutional monarchy followed. In 1848 a Second Republic was organized, and presidential elections were held that same year, but the elected president, Louis Napoleon, a nephew of Napoleon I, staged a coup d'etat to install himself on the throne as Emperor Napoleon III (1852-1870). He had begun with an authoritarian form of government, but in the 1860s, as he became concerned about political stability, he accommodated a certain level of liberalism by allowing debates in Parliament and political parties. At that time Laboulaye served on a government commission for constitutional matters. He was uncomfortable in this position as he could not morally support the Constitution of the Second Republic, which allowed only a single-chamber, rather than a two-chamber, parliament.[1]

Laboulaye was inspired by developments in the United States during the 1860s—particularly the abolition of slavery and the Union's victory during the American Civil War.[2] The United States republic was viewed as a utopian dream in the New World.[3] Passionate about liberty, Laboulaye was concerned about the future of the republic in his own country.

While Bartholdi sat with Laboulaye's liberal-minded friends and colleagues in 1865, he listened to a discussion on international relations. All seemed to agree that Americans admired Lafayette and the French military volunteers. In the same vein, the French had supported the American Revolution and had come to respect the American heroes. However, it was noted that the French government had not recognized this special relationship officially.[4]

Laboulaye was a spokesman for the Union Libérale, a political party that promoted the ideals of the 1789 Revolution with the slogan "liberty, individual, social and political."[5]

Living under the precarious state of the French republicanism, Laboulaye tried to think of a project that would call attention to the party's ideals and hopes for the French nation, and the idea of building a monument in the United States to symbolize liberty and the friendship between this nation and France came to mind.[6] However, in the midst of strong political forces, particularly those of the Emperor, this project could not be expected to start immediately.[7]

Bartholdi was not a dispassionate listener in this gathering. He had defended his native town of Alsace from German forces and was sorely disappointed when Alsace became part of Germany. Bartholdi was quite interested in the progress of the United States. In a later meeting with Laboulaye and his circle, Bartholdi was asked to visit the United States and talk to key people about such a monument. He was to bring back his impressions of the country and study the idea for the project, while Laboulaye would initiate a fund-raising campaign in France.[8]

Bartholdi later described his emotional experience upon arriving in New York harbor. Even at this early stage, he had already decided that this would be the site of the Statue of Liberty:

> The picture that is presented to the view when one arrives at New York is marvelous; when, after some days of voyaging, in the pearly radiance of a beautiful morning is revealed the magnificent spectacle of those immense cities, of those rivers extending as far as the eye can reach, festooned with masts and flags…It is, indeed, the New World, which appears in its majestic expanse, with the ardor of its glowing life…Yes, in this very place shall be raised the Statue of Liberty, grand as the idea which it embodies, radiant upon the two worlds… I was conscious when I landed at New York that I had found the idea which my friends had hoped for.[9]

BARTHOLDI AND HIS TASTE FOR THE COLOSSAL

In a publication designed to raise funds for the Statue's pedestal, Bartholdi devoted an entire section to colossal sculpture. He introduced the reader to its basic principles — that a statue should be suitable for expressing "grand thoughts" and, as far as possible, "abstract" ones, that movement and line should be simple, and that lines should be bold. Equally important was the choice of a compatible site and surroundings.[10]

It was Bartholdi's ambition to create "a statue of colossal proportions which would surpass all that had ever existed since the most ancient times."[11] He cited examples from ancient Egypt and Greece and was particularly fascinated by the Colossus of Rhodes, a bronze figure built in the fourth century B.C. on the shores of the Greek island. One of the Seven Wonders of the World, the sculpture was dedicated to Helios, the Greek god of the sun. Bartholdi explained that "We may consider it as having been a very remarkable piece of work, independently of the fantastic legend of the ships which passed between its outspread legs."[12] The figure had one arm raised, carrying a flame. This feature, thought to have served as a beacon, was probably a design source for the Statue of Liberty.[13] According to legend, the Colossus of Rhodes was 110 feet high. The Statue of Liberty was to measure 151 feet 1 inch from base to torch.[14]

The statue of St. Charles Borromeo, also visible from a body of water, Lake Maggiore in Italy, was another example of colossal statuary that Bartholdi cited. Its volume and medium especially interested him:

> The statue of St. Charles Borromeo is the first known example of a statue of répoussé copper, worked with the hammer inside and outside, and freely supported on iron beams. The work was executed in a somewhat coarse style, but it is interesting, and has the merit of being the result of a bold initiative. The copper is a little thin, measuring only a millimeter in thickness, and yet the whole work has stood until to-day, that is to say, for two centuries.[15]

In particular, the use of thin copper in the St. Charles Borromeo statue provided a technical idea for the Statue of Liberty. Bartholdi wrote about how the choice of materials and process for manufacturing the statue for America would have to consider ease of transportation overseas. To be transportable, the material would have to be sturdy. He was drawn to hammered copper as it could be fabricated in sections and then assembled upon landing in the United States[16]

Both of these sculptures may also have provided ideas for the marine location of the American statue, enhancing the visual, as well as emotional, experience for passengers about to disembark in the United States

BARTHOLDI'S ARTISTIC ENVIRONMENT

The artistic and cultural environment in which Bartholdi was immersed would also have provided references or ideas for the American project. A native of Alsace, France, Bartholdi had received formal instruction in drawing and painting and later studied sculpture with Jean-Francois Soitoux, as well as architecture with Eugene Viollet-le-Duc.[17]

Bartholdi was exposed to the production of monumental art while he was briefly apprenticed to the sculptor Antoine Etex, who worked on the ornamental reliefs for the Arc de Triomphe in Paris, a colossal monument of the First Empire. Equally important to his artistic career, Bartholdi had travelled to Egypt and other ancient sites with a group of painters in 1856. He was interested in the archaeological finds from Napoleon's expedition (1798-1801) and as a sculptor was particularly attracted to the Great Sphinx, the pyramids at Gizeh, and other colossal monuments.[18] During a second trip in 1869, Bartholdi planned to propose to the Egyptian head of state a colossal lighthouse for the Suez Canal. While this project did not materialize, Bartholdi's surviving drawings and maquettes show a female figure wearing a crown with rays of light issuing from it and raising a torch with one arm. Bartholdi named it "L'Egypte apportant la lumiere à l'Asie" (Egypt Bringing Light to Asia).[19]

Bartholdi's desire to work on colossal monuments may have been partially satisfied by an initial project, the Lion of Belfort (1875-80). Dedicated to those who had defended this French town from the Prussian assault in 1870-71, Bartholdi had created a sculpted figure on a cliff, measuring 22 by 11 meters, and this statue made him famous.[20]

THE "LIBERTY" THEME

Bartholdi would not have been lacking in familiarity with symbolic precedents to create the Statue of Liberty. The artists who joined the art competition held in 1848 to choose appropriate representations of the Second Republic of France had attempted to represent similar concepts such as "liberty" or "the republican state." Their works would have been accessible to Bartholdi through former mentors and publications of the time. An entry by Soitoux, his art teacher, for example, was described as:

> a classically draped standing figure, the head surmounted by a star, wreathed with laurel, and bearing a band inscribed "Republique, democratique du 24 Fevrier." With a sword, the figure protects an altar topped by a hive and a mason's level, from which hangs a scroll bearing the words "Constitution francaise." [21]

For the same competition Bartholdi's drawing teacher, Ary Scheffer, entered two rough sketches of a standing figure with one arm raised and the other holding what was probably a sword or scepter.[22] A third work, a painting by artist Ange-Louis Janet-Lange, had a seated female with an arm raising a flaming torch and the other holding a small balance scale. She stood on a plinth inscribed with the phrases "Liberté des cultes" (freedom of worship) and "Liberté de la presse" (freedom of the press).[23] Interestingly, the painting was later entitled "La France eclairant le monde" (France Enlightening the World).[24]

Another design source would have been the Great Seal of France, which had been designed by Jacques-Jean Barre for the Second Republic in 1848. Representing Liberty is the robed figure of Juno, "counselor of the state" in Greek and Roman mythology. She had a crown with seven rays of light issuing from it, much like the Statue of Liberty. However, the French figure is seated and surrounded with several attributes -- a fasces (a symbol of authority), an oak branch (a symbol of long life), and an urn (the equivalent of a ballot box). The American statue is instead a standing figure holding a tablet in her arm inscribed with the date of July 4, 1776.

Finally, Bartholdi's own work, "L'Egypte apportant la lumiere à l'Asie," can logically be thought of as a starting point for the Statue of Liberty. This was a standing female figure dressed in Egyptian attire, with a lighted diadem and one arm raised to hold a torch. The American statue was similarly posed to hold a torch. However, it was dressed in Greco-Roman style with rays around the head and, therefore, also closely related to the representation of Liberty in the Great Seal of France.

Bartholdi's maquettes show that at one point in the design process, the American figure was to hold a piece of a broken jar. As used in third-century Roman art, a broken jar placed at the foot of the goddess of liberty signified the shattering of confinement. Bartholdi further reinforced this idea in the maquette by including broken chains at the foot of the figure, a feature that was kept in the final work. Together with a broken shackle, the broken chains represented the end of all types of oppression.[25] Instead of the jar fragment, her left hand held a tablet inscribed with the date of American independence. The decision to use the tablet, symbolizing law, is attributed to Laboulaye. As aptly put by Pierre Provoyeur, a leading French historian, Laboulaye's liberty was "not the liberty of the barricades, but liberty under (and assured by) law."[26]

While Laboulaye was the intellectual creator of the Statue of Liberty, Bartholdi's artistic education and environment, as well as his passion for colossal monuments, greatly contributed to its design and concept.

NOTES: THE CONCEPT OF THE STATUE OF LIBERTY

1. Barry Moreno, *The Statue of Liberty Encyclopedia* (New York: Simon and Schuster, 2000), 135.
2. Ibid., 134.
3. Marvin Trachtenberg, *The Statue of Liberty* (New York: Viking Penguin, 1976), 25.
4. Frédéric Auguste Bartholdi, *The Statue of Liberty Enlightening the World Described by the Sculptor Frederic Auguste Bartholdi* (New York: North American Review, 1885), 13-14.
5. Jean-Claude Lamberti, "Laboulaye and the Common Law of Free Peoples," in *Liberty: The French-American Statue in Art and History* (New York: Perennial Library, 1986), 24.
6. Bartholdi, 16-17.
7. Moreno, 134.
8. Bartholdi, 16-17.
9. Ibid., 18-20.
10. Ibid., 40-42.
11. Bartholdi, 24.
12. Ibid., 38.
13. Trachtenberg, 52.
14. Moreno, 60, 74.
15. Bartholdi, 39.
16. Ibid., 43.
17. Moreno, 33.
18. Ibid.
19. Pierre Provoyeur, "Artistic Problems," in *Liberty: The French-American Statue in Art and History* (New York: Perennial Library, 1986), 88-89.
20. Trachtenberg, 49.
21. Provoyeur, 43-44.
22. Albert Boime, "The Second Republic's Contest for the Figure of the Republic," *The Art Bulletin* 53 (March 1971), 68-83. Trachtenberg, 51.
23. Ibid., 73. Trachtenberg, 51.
24. Trachtenberg, 76.
25. Trachtenberg, 63. Moreno, 211-212.
26. Provoyeur, "Technological and Industrial Challenges," in *Liberty: The French-American Statue in Art and History* (New York : Perennial Library, 1986), 95. Christian Blanchet and Bertrand Dard, *Statue of Liberty: The First Hundred Years* (New York: American Heritage, 1985), 44-45.

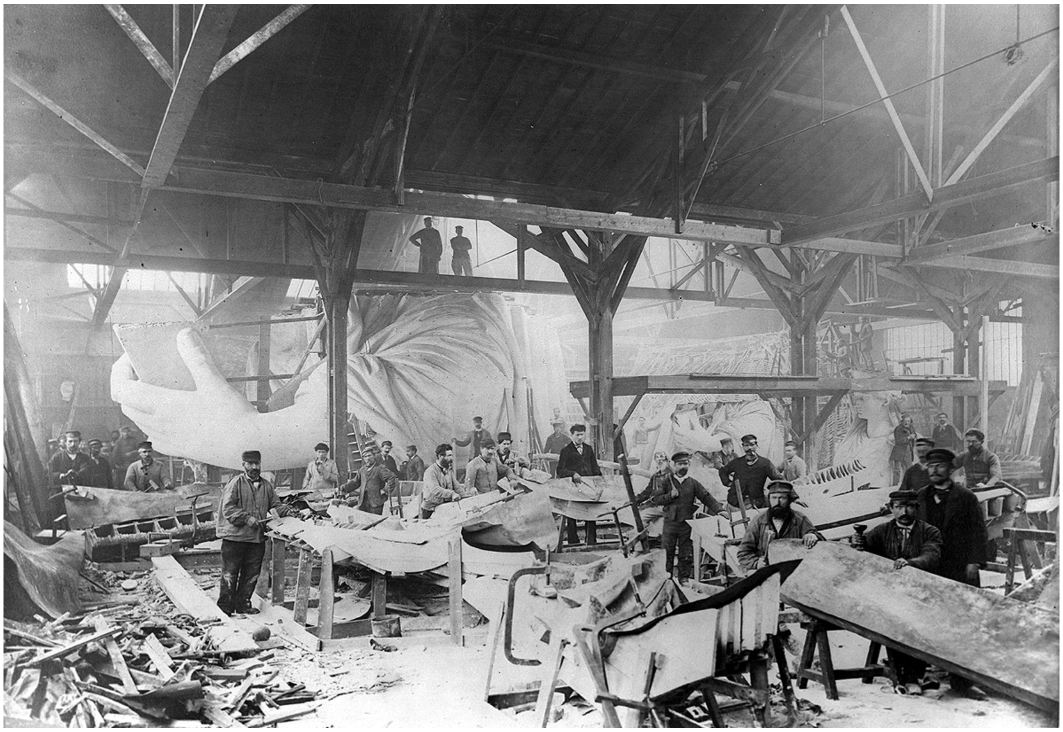


Figure 7. Photograph by Albert Fernique of Bartholdi's warehouse/workshop in Paris, circa 1882. [Library of Congress]

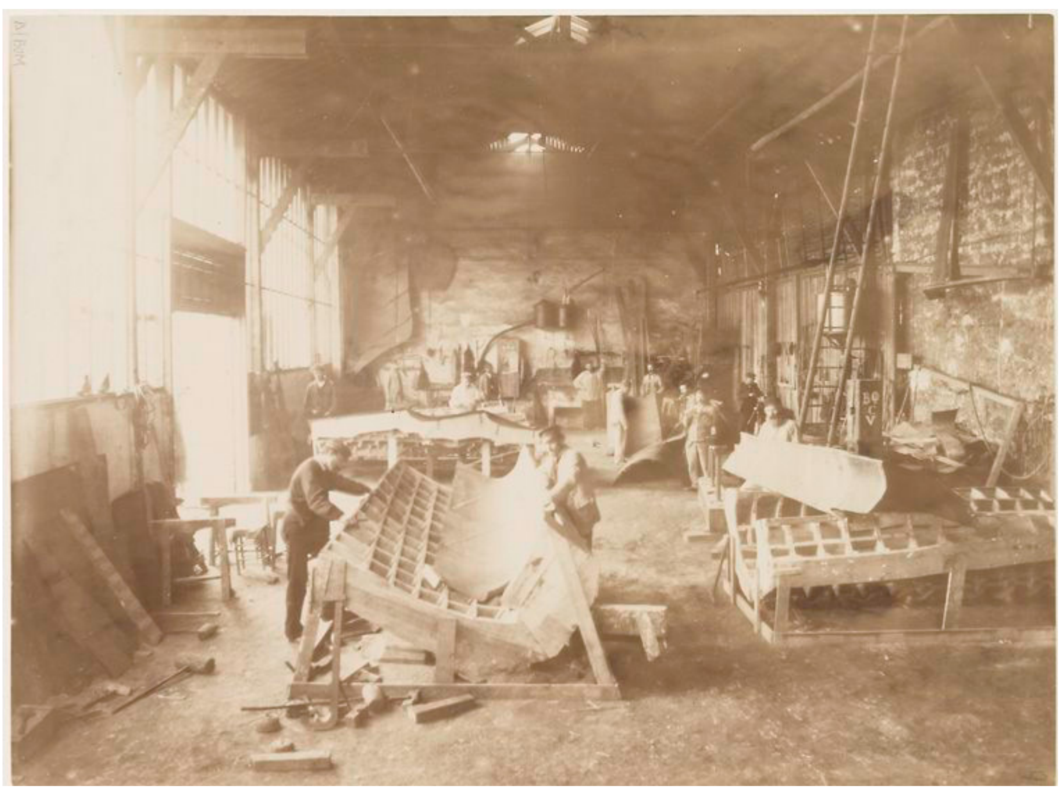


Figure 8. This August 1, 1883 photograph by Albert Fernique of the workshop of MM. Gaget, Gauthier et Cie shows the wood frames and the copper being hammered into shape. [New York Public Library]

THE FABRICATION OF THE STATUE OF LIBERTY

THE COPPER SKIN

The outermost layer of the Statue, the "skin," was to be made of copper, measuring just 3/32 of an inch thick and worked in the repoussé technique, which involved beating or hammering the copper sheet from the inner, reverse face to produce the desired texture and shape on the obverse face, that is, on the exterior of the Statue. The choice of copper as a medium and the appropriate thickness were critical. The metal had to be thin enough for craftsmen to apply the finer details but thick enough to withstand hammering, riveting, and brazing. Strength and lightness were also important for the overseas trip to America.[1] Approximately 128,000 pounds of copper were donated by the French industrialist Pierre-Eugène Secrétan, who had interests in the Franco-Belgian-controlled mine of Vigsnes in Norway. His donation may have come from this source as it was known to be exceptionally pure.[2]

The tedious process of preparing the Statue's skin, which involved woodcarvers, carpenters, plasterers, coppersmiths, and sculptors, is documented in photographs and dioramas, mainly at the Bartholdi Museum in Colmar, France, and the National Conservatory of Arts and Crafts in Paris.[3] This work took place at the foundry of Gaget, Gauthier et Companie, located on the outskirts of Paris, from 1876 through 1884.[4] A shed measuring about 100 feet square was built to allow four sections of the Statue to be worked on simultaneously.[5] *[See Figure 7 and Figure 8.]*

The sculptor, Frédéric Auguste Bartholdi, had made a few models of the Statue between 1870 and 1875, when one made in clay was chosen as the basis for the Statue's form. It was 1.25 meters high and reproduced several times to raise money for the sculpture. From this model, two more were made. Bartholdi wrote:

> After this first study I made the statue which measures from the head to the feet 2.8 metres, and in its entirety 2.85 metres. This statue, executed with rigid precision, was reproduced four times as large by the ordinary processes. The model which was the result of this work measured about 11 metres in total height. Placed in a large space it could be taken in by the eye in its entirety, and the corrections to be made could still be noted. This statue was divided into a large number of sections destined to be reproduced separately at four times their size. After this last enlargement changes were no longer possible. Now the sculptor could only aim at very great precision, and at great care in the modeling of the surfaces, which were becoming enormous.[6]

To create a full-size mold, the 11-meter reproduction was laid at the center of a squared area marked with a wooden frame. Four vertical posts supported horizontal ones, which were marked in intervals corresponding to a grid marked on the base. The model was marked with numbered horizontal lines, from the base to the top. These lines were further marked at regular intervals and were used as reference points to record height, width, and depth, in relation to the frame. Measurements were made by using plumb lines and rulers, then recorded on several sheets of graph paper. Each reference point, which was measured three times (depth, width, height) on the third model, had to be measured thrice again to provide scaled measurements for the full-size model. Since each horizontal section had about 1,500 reference points, about 96,000 measurements were made for the Statue.[7]

To proceed to the next step, the full-size mold, a wooden framework four times bigger than the one made for the 11-meter reproduction, was built. Due to its size, the latter had to be made in sections cut horizontally. Numerous frames were set up so that various sections of the mold could be worked on simultaneously. To create the full-size sections, wooden beams were used to make an armature roughly outlining the shape of each section. The armature was then covered in wooden lath to provide a surface for a new layer, this one made of plaster.[8] Eventually, there were 300 plaster sections completed, each of which Bartholdi inspected and to which he applied finer sculpting.

The next step was to create negative forms from the plaster sections. The copper sheets would be hammered against the negative forms in order to create the positive forms. Hammering the reverse side would avoid markings on the exterior surface. A negative form in wood would be used for strong hammering, and another in lead for finish hammering.[9]

To make the wooden molds, boards were cut to follow the contours of the plaster layer and to cross each other, thus forming pigeon holes.[10] Photographs show how these wooden molds were removed in sections and set upon wooden cradles so that several craftsmen could hammer the copper sheets onto the molds all at the same time. They used levers or hammers to press the sheets against the molds and smaller hammers to refine the shapes.

The size of each of the copper sheets was restricted to about 1 to 3 meters square; otherwise, handling would be difficult. There were instances when joining or soldering sheets together was necessary. This work was done in a forge.[11] After Bartholdi had inspected the hammered sheets, the molds were destroyed in order to provide more workspace.[12]

Rigidity of the thin copper sheets was important for maintaining the shape of the Statue. The copper sheets were supported by flat iron bands, 50 millimeters by 8 millimeters in thickness.[13] They were not soldered to the copper sheets; instead, they were held in place with copper saddles. This form of attachment allowed the copper and the iron to expand or contract without becoming misshapen.[14] The iron bands were, in turn, attached to iron bars projecting from the secondary iron frame that was attached to a central pylon and outlined the general shape of the Statue. Historian Marvin Trachtenberg offered this evaluation of the technology:

> It is these simple connections which are, in fact, the most ingenious and subtle aspect of the entire armature. Bending upwards and outwards towards the skin, the thin bars are nothing but simple springs. The skin, in other words, is not rigidly attached to the armature, but floats at the ends of hundreds of flexible members that form a suspension to which the entire skin adheres. Floating thus on springs, the thin copper envelope is

> given an extraordinarily supple elasticity, allowing it to adjust subtly to thermal expansion and contraction and yet resist the pressures of the winds acting unevenly on the sculpted surfaces (probably the major reason why most of *Liberty's* carefully countersunk rivets are still intact).[15]

Later, when the Statue was assembled temporarily in Paris in 1884, only a small number of screws were used to fasten the copper sheets together. However, for the final installation in New York, the joints were fashioned so as to be nearly invisible. This was to be accomplished with a feather-edge and rows of tiny copper rivets measuring 5 millimeters in width and spaced about 25 millimeters apart.[16]

Meanwhile, parts of the Statue were put on display, even before the completion of the entire work, for fund-raising or publicity purposes. In 1876 the arm with the torch was sent to the Philadelphia Centennial Exhibition. Visitors were allowed to climb up to a viewing platform around the torch.[17] The following year, the arm and torch were displayed in New York's Madison Square and remained there until 1882 to raise money for the pedestal.[18] The head was displayed in Paris for the World's Fair of 1878 and later stored in the workshop of Gaget, Gauthier et Companie, while work on the other sections progressed. The displayed sections were reunited in the workshop only in 1882. While the delay in completing the Statue was caused by a shortage of funding, it has been suggested that Bartholdi spent some more time trying to improve the sculpture or that he tried to sell the arm with the torch so that he could make another one.[19]

Finally, in August 1883, it was reported that the Statue was to be completed in a few weeks. Its size was compared to other existing monuments such as the Vendome Column, which was about 7 feet shorter, and its weight was compared to that of the statue of the Virgin of Puy which was only 16 meters high yet required 100,000 kilograms of bronze.[20] A contemporary document gave the dimensions and weight of the Statue of Liberty as follows:

> From the base of the figure to the summit of the torch 150 ft. 10 in., the index finger is 8 ft. long and 4 ft. 9 in. in circumference at the second joint, the finger nail is 10 x 13 in.; the head is 14 ft. 5 ¼ in. high. Recently a dinner of 26 covers was served in a mid section of the body, and there was plenty of room to spare. The total weight of the statue is 440,000 pounds, of which 176,000 are copper, the remainder wrought iron.[21]

ENGINEERS DESIGN THE INTERIOR IRON SKELETON

The copper-clad colossal statue of St. Charles Borromeo, created in the seventeenth century, had an interior of massive masonry, except for a tube that housed a stairway leading to the top of the statue. This system for providing stability to a statue or monument was not outdated at the time Bartholdi was conceptualizing the Statue of Liberty.[22] However, it was the architect engineer Eugène-Emmanuel Viollet-le-Duc who first provided the expertise Bartholdi needed for an alternate structural system.

At a banquet in 1875 Viollet-le-Duc talked about his idea for the interior of the Statue of Liberty. Instead of masonry, a system of compartments filled with sand would provide more than just stability. If there was a problem in any part of the Statue, it would not be necessary to break the masonry open. Instead, one would open a flap-valve of any compartment to allow the sand to escape and the workers to enter and make repairs. This system would be applied from the base to the hip section of the Statue; above the hips Viollet-le-Duc probably intended to use an iron armature.[23] Such an armature was actually applied to two sections of the Statue which were made in advance -- the right hand with the torch, displayed in the 1876 Philadelphia Centennial Exhibition, and the head displayed at the Paris World's Fair of 1878.[24] In his 1986 essay on the Statue of Liberty, Pierre Provoyeur, then museum director for the Union des Arts Décoratifs in Paris, pointed out how Viollet-le-Duc's plan would have affected the Statue's form:

> The lowering of the monument's center of gravity through the masonry coffers meant that the rest of the structure had to be self-supporting against all the torsional stresses to which it was exposed to by its height and weight. When Viollet-le-Duc saw the model that evolved from Bartholdi's studies of 1869-71, and his new version of 1872, he must have been concerned at the wide, flat surfaces and their pronounced lopsided posture. It was probably he who inspired the major changes so evident in the models and drawings of 1875, as well as the multiple folding of the drapery that alone could give enough rigidity to the thin copper skin.[25]

Indeed, it was later reported that "Bartholdi has given the greatest possible stability to the statue by utilizing the woman's drapery to give a broad base to the structure, so that it may stand the brunt of the strongest hurricane." [26]

Viollet-le-Duc, however, died in 1879. In 1880 the engineering problem was passed on to the company of Gustave Eiffel. Before designing the famous Eiffel Tower for the World's Fair of 1889, he was already known for designing elegant and efficient railway bridges.[27] He had also designed the Garabit viaduct in southern France, constructed between 1880 and 1884. With a single arch and a span of 455 feet, it was a masterpiece of iron construction.[28] Eiffel became known for his mastery of aerodynamics and the building of light, elegant structures with strong latticework .[29]

For the Garabit viaduct, Eiffel had the assistance of Maurice Koechlin, a young engineer and former student of Karl Culmann, a professor known for his method of combining calculation and graphics to design metal structures.[30] For the viaduct Koechlin used trussed pier and box beam systems that had "greater strength and resistance to wind, a critical concern highlighted by frequent bridge collapses."[31] The analytical method and design concept already familiar to Koechlin was applied to the support structure for the Statue of Liberty. The structural system was described in *Frank Leslie's Popular Monthly* in 1885:

> The core of the trusswork is formed by four great stanchions, bound together by St. Andrew's crosses. From these go out braces to support the surface of the statue. Three bolted braces run from the foot of these stanchions 26 feet into the masonry of the pedestal, and are there connected with an iron framework.[32]

Bartholdi's account indicates that the bolted braces measured 15 centimeters in diameter.[33]

In 1881 construction of the truss tower or central pylon began. Provoyeur provided its dimensions based on drawings in the French periodical, *Le Genie Civil*:

> The iron pylon is 92 feet high; its cross section is 16 feet 6 inches x 13 feet at the base and 6 feet 10 inches x 5 feet 10 inches at the top. The posts are of iron, L- shaped 28 x 24 inches. The arm, set out of plumb, measures ca. 61 feet 6 inches, of which 38 feet 5 inches rise above the level of the pylon.[34]

Drawings of the structure also showed Eiffel's calculations indicating that it would bear the weight of the Statue's skin as well as the horizontal stress from the wind. For the Statue to be mounted successfully in New York Harbor, the strength of the wind that would hit the face and the side of the Statue, as well as a diagonal wind, were considered. Stresses on the posts, the "trellis" of St. Andrew's crosses, and the bolted braces were calculated separately, taking into account bending moment, shearing stress, and upsetting moment.[35] For viaducts, the maximum force of the wind was calculated at 270 kilograms for a square meter of surface facing the wind. This same figure was used for the Statue.[36]

Also to be calculated separately was the iron framework for the arm holding the torch *[see Figure 11]*. It was cantilevered to the upper part of the torso. Its complexity was described as follows in 1883:

> Its metal framework is made of four uprights tied together by horizontal ties and by diagonals at the corners. The horizontals divide the framework into sections whose bases are rectangles having their sides parallel to each other and also parallel to the principle [sic] structure (body of statue). The exterior section of each section is in the form of a trapezoid, one of whose diagonals is formed by the bar of the trellis. The framework of the arm is attached at six points to the principal structure. The arm's height is 18 meters 77 [sic] measured from the lowest attachment to the highest plane (level). It has to resist, like the rest of the structure, two different sorts of stress:
>
> 1. Its own weight
> 2. Weight of the wind
>
> For each of these calculations the arm was divided into twelve sections; the center of gravity for each was assumed to be situated along the axis of the metal framework.[37]

COMPLETING THE STATUE

Before the year 1881 ended, *The American Architect and Building News* reported that in addition to the arm with the torch and the head, "the remaining portions are now finished, and on the twenty-fourth of October, the first rivet of the series which will join them into complete figure was fastened in Paris, in the presence of a large number of distinguished French and American citizens." [38]

These sections were put together in 1883 *[see Figure 12]* and, while waiting for the completion of the pedestal in New York, the Statue stayed on display in Paris.[39] On July 4, 1884, the Statue was presented to the United States ambassador to France. The Statue was finally dismantled in Paris in January 1885. Parts of the skeleton and the skin, totaling about 300 pieces, weighed about 200,000 kilograms -- 80,000 kilograms of copper and 120,000 kilograms of iron.[40] All the pieces were numbered and then packed in 214 crates, all of which were numbered and labeled as well. The crates weighed more than 150 tons.

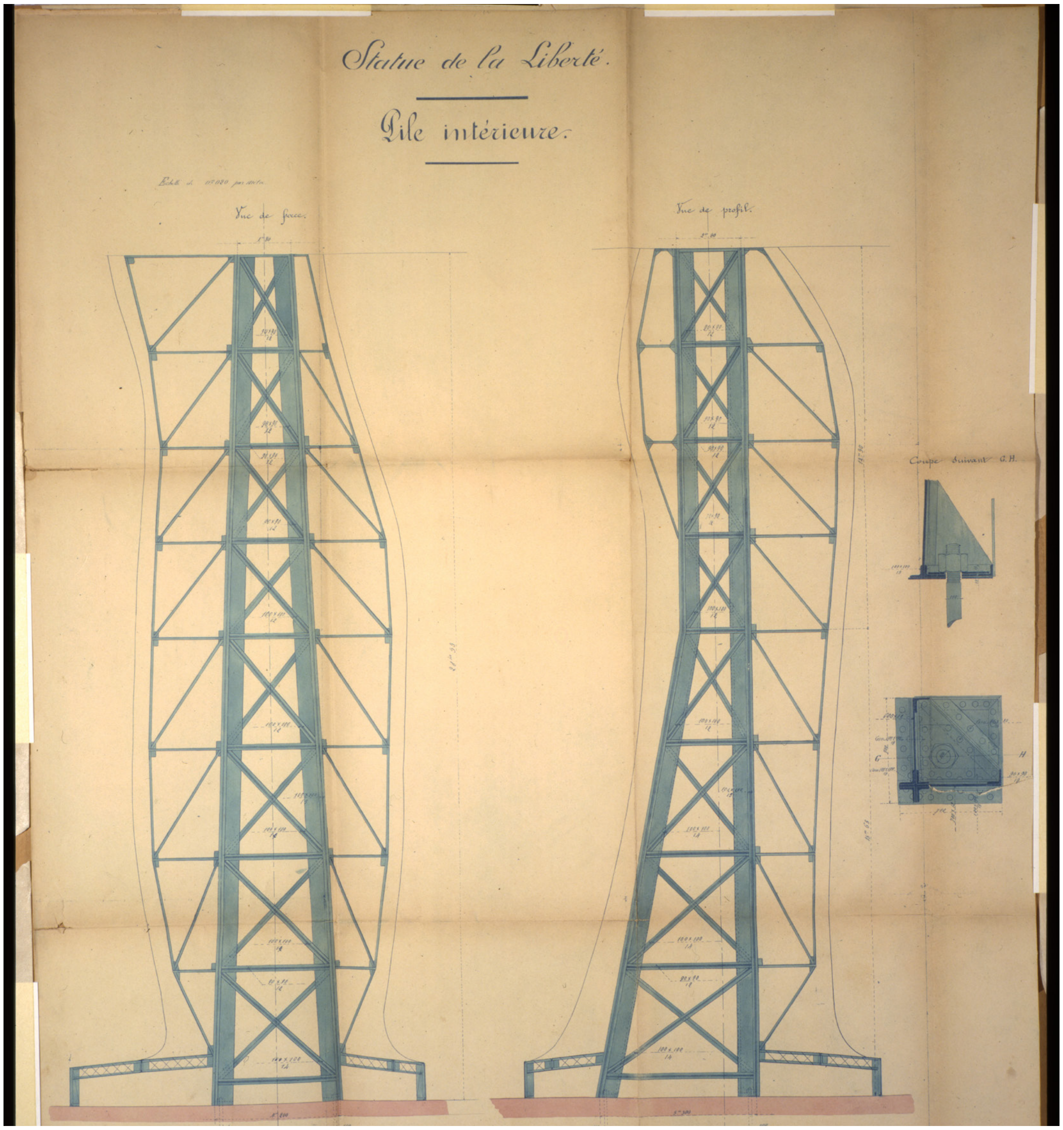


Figure 9. Gustave Eiffel's drawing for the Statue framework, sent to Richard Morris Hunt, circa 1881. [Library of Congress]

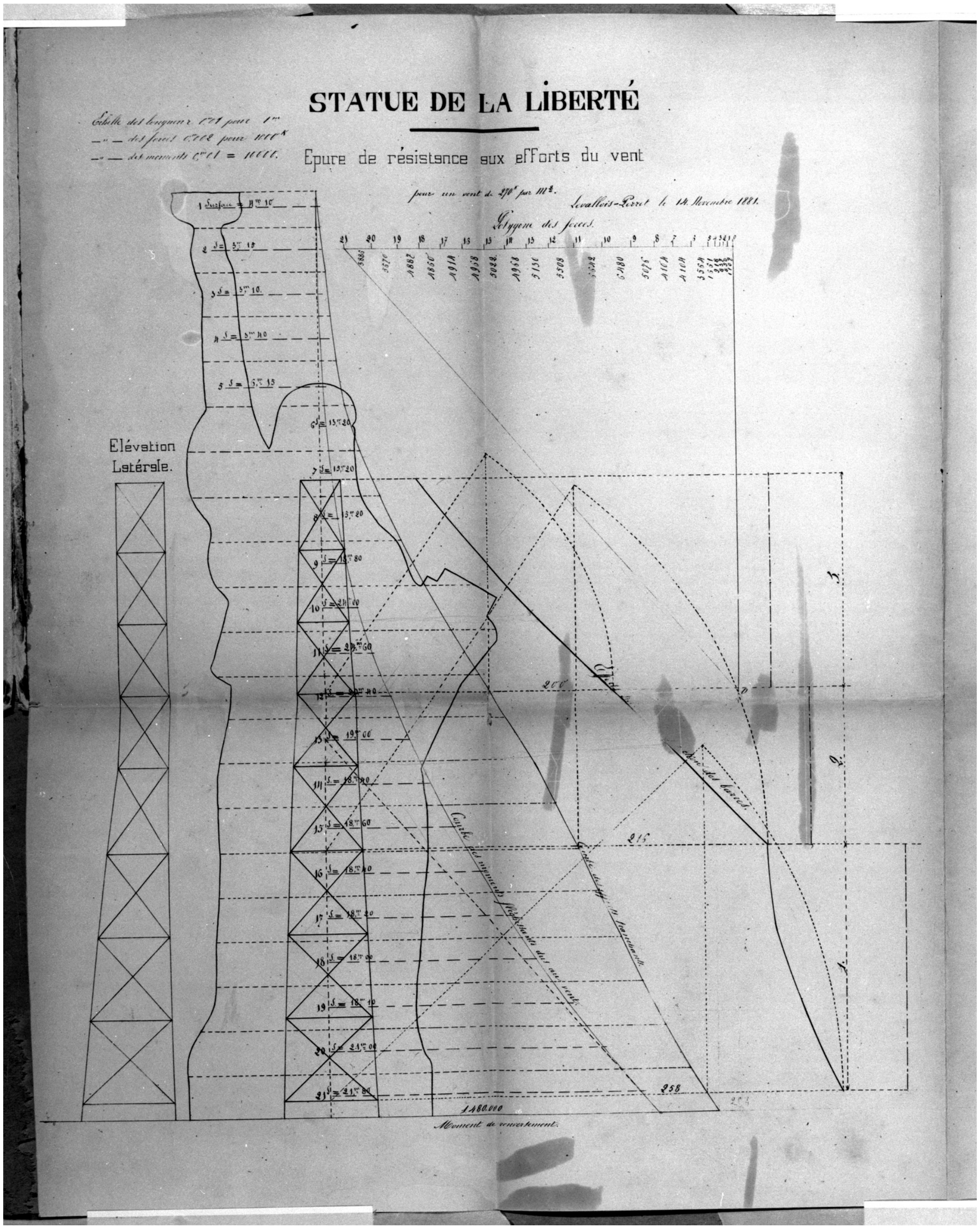


Figure 10. Gustave Eiffel's wind resistance diagram, November 14, 1881. [NPS, STLI, Ref.Lib.]

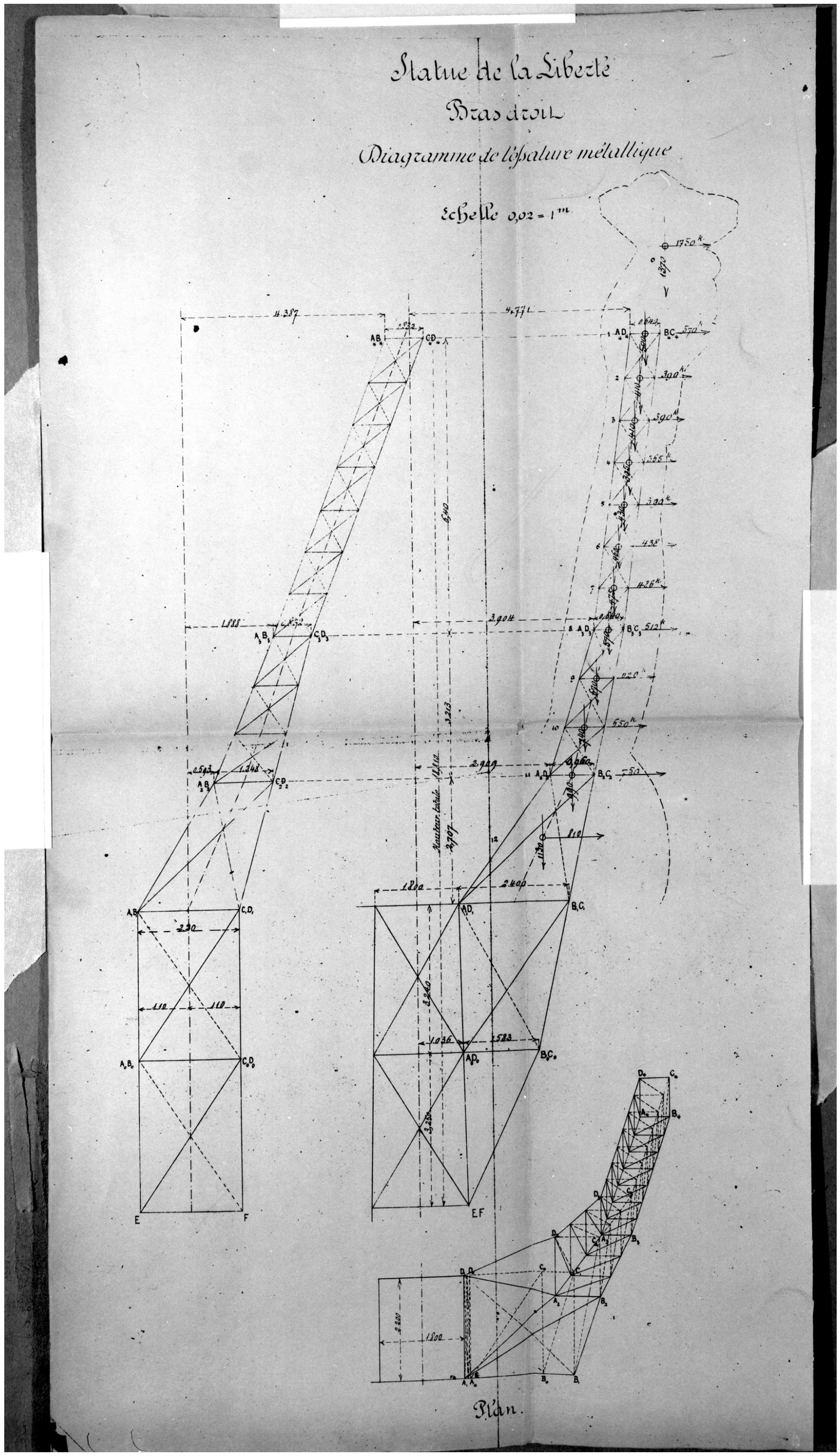


Figure 11. Eiffel's diagram of the framing for the right arm. [NPS, STLI, Ref.Lib.]

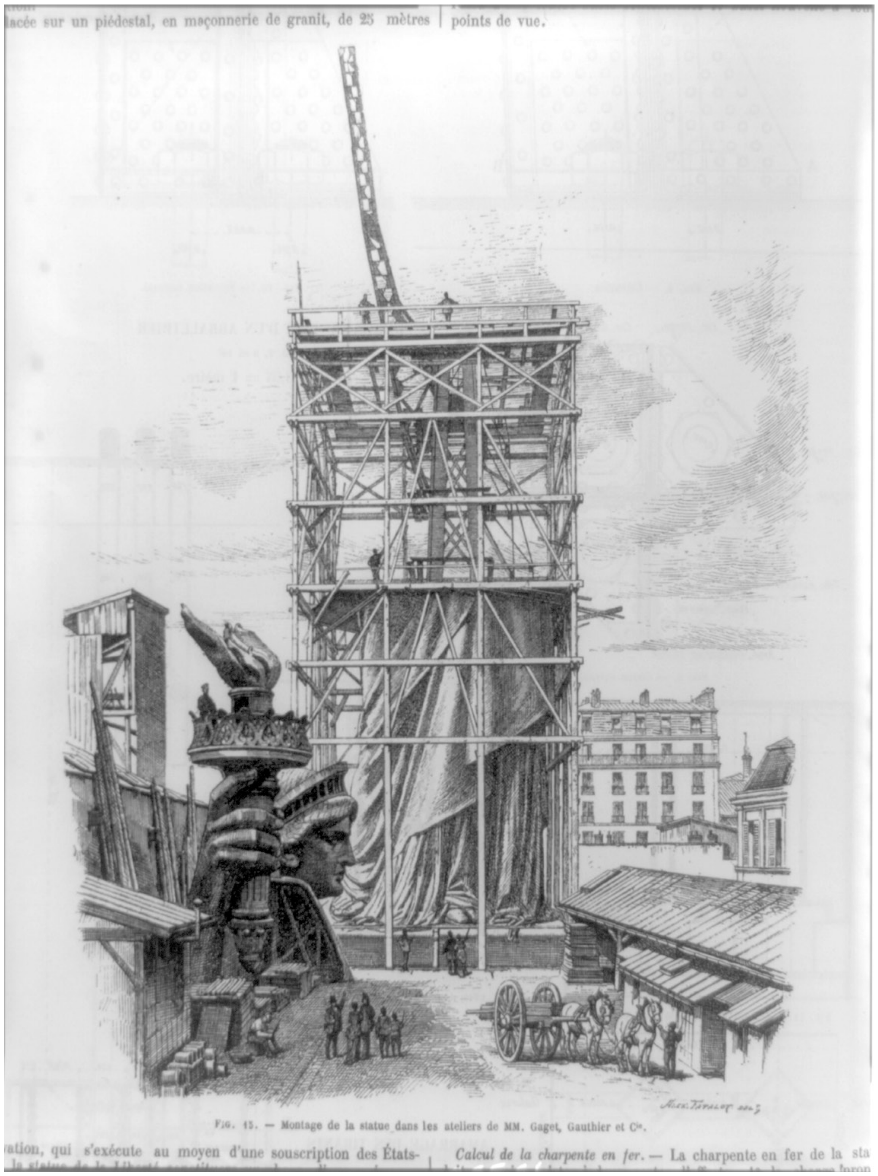


Figure 12. Assembly of the Statue in Paris, from La Genie Civil*, Aug. 1, 1883. [Library of Congress]*

On May 1, 1885, these crates were shipped by rail to Rouen, then loaded onto a French naval vessel, the *Isere*. Under Commander Lespinasse de Saune, the *Isere* set sail on the morning of May 21, heading for New York.[41]

NOTES: THE FABRICATION OF THE STATUE OF LIBERTY

1. Carole Perrault, "Liberty: To Build and Maintain Her for a Century," in *The Statue of Liberty Restoration* (Houston: National Association of Corrosion Engineers, 1989), 16.
2. Barry Moreno, *The Statue of Liberty Encyclopedia* (New York: Simon and Schuster, 2000), 66.
3. Pierre Provoyeur, "Technological and Industrial Challenges," in *Liberty: The French-American Statue in Art and History* (New York : Perennial Library, 1986), 93-98.
4. Moreno, 101.
5. Perrault, 17.
6. Frederic Auguste Bartholdi, *The Statue of Liberty Enlightening the World Described by the Sculptor Frederic Auguste Bartholdi* (New York: North American Review, 1885), 44-46.
7. *The American Architect and Building News* (Sept. 22, 1883), 137, Ellis, Box 9, File 155.
8. Bartholdi, 46.
9. Yasmin Sabina Kahn, *Enlightening the World: The Creation of the Statue of Liberty (*Ithaca: Cornell University Press, 2010), 127-128.
10. Bartholdi, 48.
11. *Le Génie Civil* (Aug. 1,1883), 470, Lee Woodbury, trans. Ellis, Box 9, File 156.
12. Provoyeur, 115.
13. *Le Génie Civil* (Aug. 1,1883), 464. Provoyeur, 116.
14. Bartholdi, 49.
15. Marvin Trachtenberg, *The Statue of Liberty* (New York: Viking Penguin, 1976), 139.
16. *American Architect and Building News* (Sept. 22,1883), 138. Talansier, 464.
17. Trachtenberg, 125.
18. Moreno, 161.
19. Provoyeur, 115.
20. *American Architect and Building News* (Sept. 22,1883), 138.
21. "The Statue of Liberty" in *Engineering News and American Contract Journal* (Aug. 25, 1883), 404.
22. Trachtenberg, 122.
23. Provoyeur, 109.
24. Trachtenberg, 123-125.
25. Provoyeur, 109.
26. *The Strand* (July-Dec. 1899), 770, Box 33, File 382, in Carole Perrault, comp., "Statue of Liberty National Monument Historic Resources Study. Construction History: The Statue, Its Pedestal and Foundation: Appendices."
27. Moreno, 80.
28. Christian Blanchet and Bertrand Dard, *Statue of Liberty: The First Hundred Years* (New York: American Heritage, 1985), 24.
29. David I. Harvie, *Eiffel: The Genius Who Reinvented Himself* (Gloucestershire: Sutton Publishing, 2006), 57.
30. Khan, 140.
31. Ibid., 141.

32. *Frank Leslie's Popular Monthly* (Aug. 1885), 134, Ellis, Box 10, File 170.
33. Bartholdi, 49.
34. Provoyeur, endnote 11, 280. *Le Génie Civil* (Aug. 1,1883), Plate 35, Box 32, File 381, in Carole Perrault, comp., "Statue of Liberty National Monument Historic Resources Study. Construction History: The Statue, Its Pedestal and Foundation: Appendices.
35. *Le Génie Civil* (Aug. 1,1883), 467. Eiffel, note concerning the calculation of the interior frame, Nov. 12, 1881, Philippe Grandjean, trans., in Carole Perrault, comp., "Statue of Liberty National Monument Historic Resources Study. Construction History: The Statue, Its Pedestal and Foundation: Appendices.
36. *Le Génie Civil* (Aug. 1,1883), 466-467. Lee Woodbury, trans. Ellis, Box 9, File 156.
37. *Le Génie Civil* (Aug. 1,1883), 470. Lee Woodbury, trans. Ellis, Box 9, File 156.
38. *The American Architect and Building News* (December 3, 1881), 261, Ellis, Box 8, File 150.
39. Bartholdi, 29.
40. *The American Architect and Building News* (Sept. 22,1883), 138, Ellis, Box 9, File 155.
41. June Hargrove, "Reassembly on Bedloe's Island," in *Liberty: The French-American Statue in Art and History* (New York : Perennial Library, 1986), 188. See endnote 18, 286.

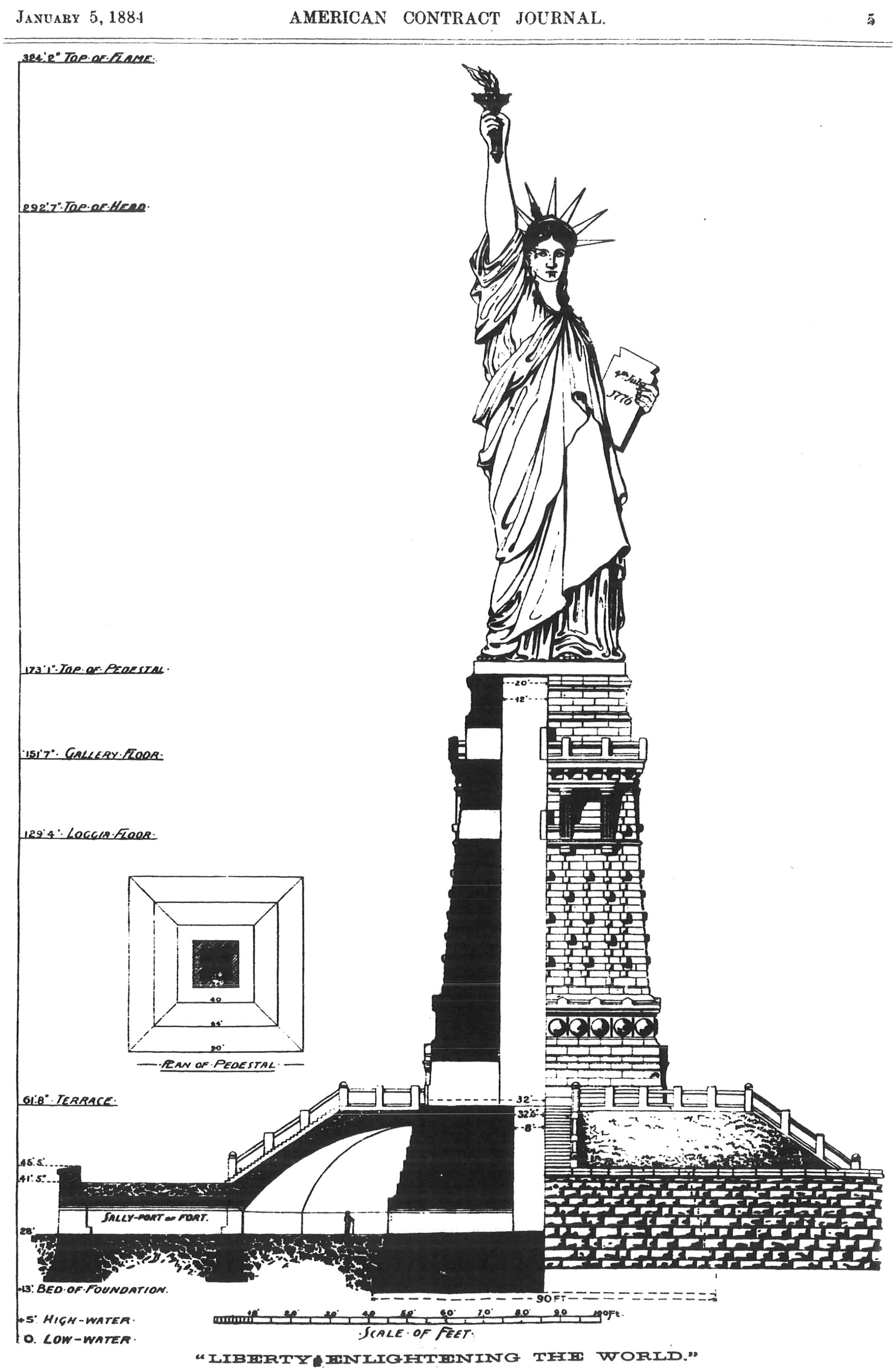


Figure 13. Section and elevation of the early design for the pedestal. The taller, narrower pedestal was based on Bartholdi's designs. From American Contract Journal, *January 5, 1884, p. 5. [New York State Library]*

THE FOUNDATIONS AND THE PEDESTAL FOR THE STATUE

LOCATING THE STATUE WITHIN FORT WOOD ON BEDLOE'S ISLAND, 1877-1883

Bedloe's Island had been officially selected as the site for the Statue in 1877.[1] Two years earlier, in 1875, the Franco-American Union had been established to orchestrate the funding, creation, and transport of the Statue; the French side of the union was responsible for the creation of the Statue itself, and the American side was responsible for the erection of a suitable pedestal on which the Statue would stand. The Pedestal Committee provided the following description of Fort Wood and other features then on the island in 1877. The island, the committee wrote,

> is covered (excepting a small tongue of land on the northerly side) with a solid and admirably built star shaped fortification of dressed granite, having a diameter of almost 300 feet, the parapets rising 25 feet above the surface of the water.
>
> The fortification encloses a rectangular space 160 feet square, which is now occupied by brick barracks facing toward an inner court of about 80 feet square.
>
> The exterior boundary of the fortification is a moat 20 feet wide, and beyond this an encircling sea wall, with a small intervening space of turf included.[2]

The Pedestal Committee's report echoes Bartholdi's preference of Bedloe's Island as the site for the Statue because of its aesthetically advantageous position in New York Harbor. The report, however, further explained that Bedloe's Island was selected because of Fort Wood itself, whose star shape the committee interpreted as "emblematic of our constellation of states, and nationality." The committee agreed that Fort Wood's shape satisfied certain "artistic requirements." Furthermore, the inclusion of such an appropriate existing base allowed for the budget to be "wholly devoted to the pedestal."

The pedestal for the Statue would consist of three parts: the below-grade foundation made of poured concrete; the above-grade foundation made of cast-in-place concrete poured into a stepped-back wood formwork; and, above those two components, the pedestal proper, which had been designed by New York architect Richard Morris Hunt and would be constructed of concrete and faced with granite.[3] General Charles P. Stone designed the foundations, with the stepped pyramid form resembling earlier sketches made by the sculptor Auguste Bartholdi.[4]

A preliminary plan for the foundation was outlined by an Army officer in February 1877:

> It is the desire of the [Pedestal Committee] to place the statue within the main work so that the Fort shall represent the base of the pedestal:—the pedestal proper being entirely above the interior crests. The dimensions of the base at the surface of the ground being somewhere about 80 feet square it will not only occupy all the present available parade but in order to secure room for circulation about it when completed and also for the purposes of construction it will be necessary to remove the buildings now standing on the parade

Figure 14. Root & Tinker's ca. 1884 chromolithograph shows the early taller, narrower design for the pedestal. [Library of Congress]

Figure 15. This view of the Statue is similar to Figure 9, but shows the final pedestal. "New York. Bartholdi "Statue of Liberty," erected on Bedloe's Island, in New York Harbor" by Charles Magnus, circa 1885. [Library of Congress]

> of the work. This would give a clear space, as shown on the plan we have, of about 160' x 140', which would be abundantly large for the purposes of the statue.[5]

Work on the Statue's foundation would not begin for another six years, after the military evacuated the island. An Army lieutenant provided this report in the spring of 1883:

> The committee having the work in charge, propose to use the entire fort; the pedestal, 60 feet square at the base, will be placed in the center of the parade, and will rise to a height of 146 feet above the ground. The quarters on the North, west and south sides of the parade will be torn away, and the whole of the interior parade will be filled up to the height of the terre-plein, which later, so enlarged and extended, will be converted into a wide surrounding esplanade. The entrance steps to the pedestal will spring from the terre-plein. It is not yet decided how the terre-plein will be reached from the exterior.[6]

EXCAVATIONS, SPECIFICATIONS, AND THE CONTRACT FOR THE FOUNDATIONS, 1883-1884

On April 18, 1883, ground was broken at the fort's parade level for the below-grade portion of the foundation.[7] Additional excavation was postponed, however, in order to give officers of the Marine Hospital on the island and their families sufficient time to relocate.[8]

The American Committee of the Statue of Liberty had also hired General Stone at a salary of $500 a month to manage the excavation. Stone had projected that the foundations and the pedestal would be completed by the summer of 1884 and that the Statue could then be put in place during the autumn of that year.[9] In early July 1883 the excavation work was reported to be "proceeding steadily," and it was expected that it would be completed by the middle of the month.[10] Next would come the concrete work.

The American Committee of the Statue of Liberty issued an advertisement for the "construction in concrete of the foundations of the Pedestal" in August 1883. The specifications presented in the advertisement set forth the following requirements for the concrete to be "used in the construction of the foundation mass," both above and below grade. The concrete was to be

> made of one part in volume of the best cement; two parts in volume of good, clean, sharp sand; three parts of small broken stone (passing through a one-inch ring); and four parts of larger broken stone (passing through a two-inch ring). The stone used must be trap or other suitable stone, to be approved by the Engineer-in-Chief. The materials for the concrete must be thoroughly and carefully mixed, according to the rules of art, with the proper quantity of water and no more, must be placed in layers six inches thick, and well rammed, to the satisfaction of the Engineer-in-Chief.[11]

The contractor was to have the "privilege of procuring the sand" for the concrete mix from sand deposits located at Sandy Hook that were owned by the United States government. The trap rock was to be quarried near Weehawken, New Jersey, and the 18,000 barrels of cement were to come from American sources, reportedly from Rosendale, New York.

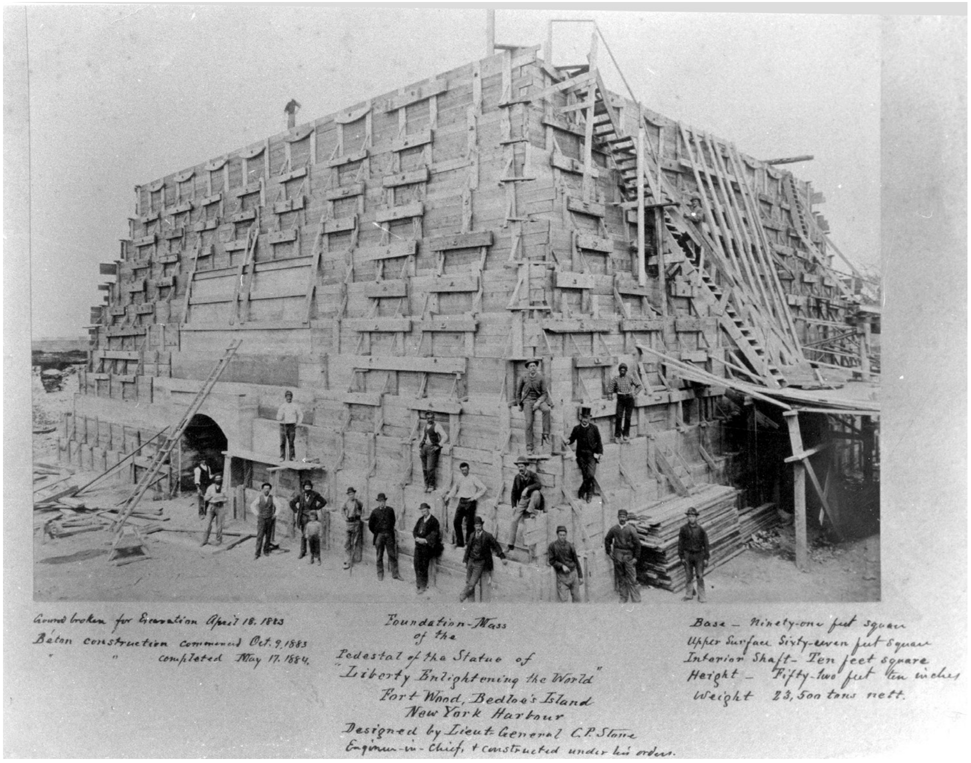


Figure 16. The foundation with the wood formwork. [United States Forest Service, Grey Towers National Historic Landmark]

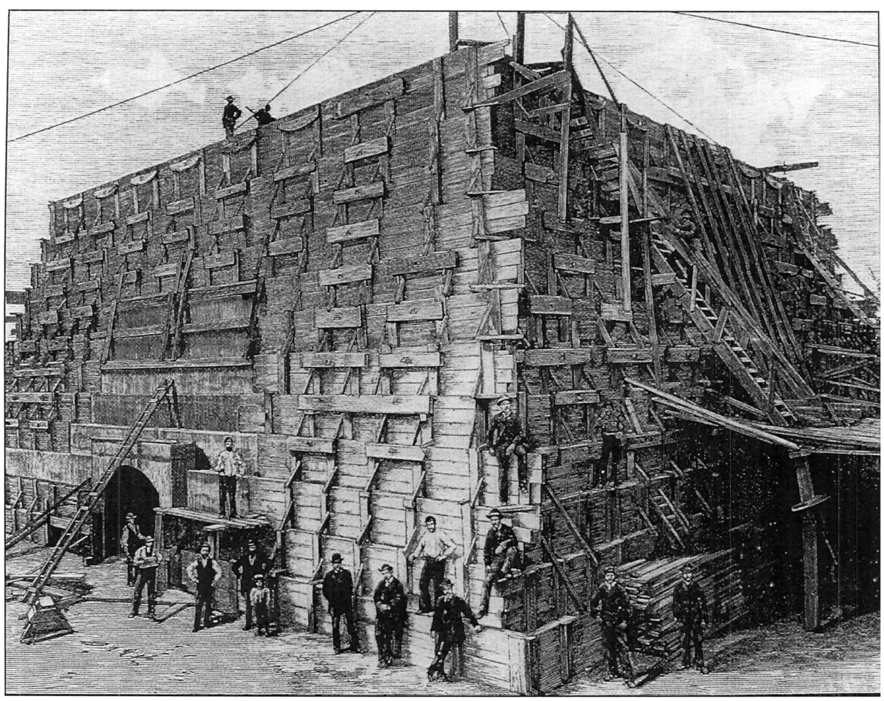


Figure 17. Etching based on the photograph above of the formwork for the pedestal, from Harper's Weekly, *July 1884. [Harpweek digital database, accessed at New York Public Library]*

Water needed for the concrete would be pumped up from the harbor and over the parapet. The "surfaces of the arches and passages in the foundation mass" were to be "trowel-finished." Charles P. Stone, the chief engineer, had the final word in deciding whether the contractor's work would be accepted.[12]

On August 14, 1883, the contract for constructing the concrete foundations was awarded to Francis Hopkinson Smith, of Smith, Magan and Drake of New York City, at a price of $8.94 per cubic yard, for a total cost of approximately $51,000. The base of the foundation was to be at the bottom of the 15-foot-deep excavation, where tests had shown that there was a "satisfactory basis of gravel and boulders. . .upon which to lay the concrete."[13] The concrete was to be transported over walls 11 and 12, the location of the sally port at the northwest side of the fort, by means of cars on rails (later, a breach was made in wall 9 to make way for the rail cars to transport the granite for the pedestal from the dock to the site). The blocks from the dismantled sections of the wall were stockpiled and later replaced.[14]

The foundation work was scheduled to be finished by November 15, 1883.[15] A week after Smith was awarded the contract for the work, however, another contractor came forth, contending that he had been the lowest bidder and therefore should have been the one selected to carry out the work. Though the suit ultimately was thrown out and Smith's contract was upheld, the proceedings stalled the work, and the project fell behind schedule.[16] Workers began pouring the concrete for the below-grade portion of the foundations, the first 15 feet 8 inches, on October 9, 1883, using a mix of two barrels of cement, two barrels of sand, and seven barrels of broken trap rock plus seawater pumped up from the harbor. The next 12 feet of the concrete work consisted of one part Portland cement, one part Rosendale cement, two parts sand, and seven parts of trap rock. All but the uppermost part of final 25 foot section of the pedestal was made up of two parts of Portland cement, two parts of sand, and seven parts of trap rock; the very top portion was a mixture of one part Portland cement and four parts of "trap rock screenings."[17]

By early May 1884, it was reported, not only was the below-grade work complete; the above-grade, stepped-back foundation was then about 40 feet tall and could be "plainly seen from the Battery and from the Staten Island ferryboats—a huge shapeless bulk crowned with an immense crane." The reporter continued,

> On approach to the island, an army of Italians are discovered at work, landing materials, mixing the concrete which is to form the base of the pedestal, and shaping the structure itself. At present its sides are boarded up to allow the concrete to harden in the proper shape.[18]

The foundation work was completed on May 17, 1884.[19] Weighing 23,500 tons, it was reported to be the "largest solid mass of concrete above ground in the world":

> It consists of a step pyramid—the steps 3 feet high, with a recess of 9 inches—truncated, with a base 91 feet square, a top surface 67 feet square, and a height of 52 feet 10 inches. It is composed of one solid stone, or mass of béton [concrete]…
>
> The foundation mass rises from the centre of the old fort 22 feet above its walls. Below the parade level the concrete extends about 15 feet. Two arched passageways extend through the foundation mass at the ground level, each 10 feet in height, and with a 10-

> foot span. They meet at the centre, making a 10-foot shaft, which is continued to the top. The same shaft will be extended through the pedestal to the statue, and in it will be placed an elevator. . .To guard against defective concrete entering into the construction, cubical blocks of every foot of béton laid were put by, numbered, and dated…There are, in round numbers, about 12,000 yards of solid stone in the pyramid. The béton may well be called stone, for it weighs 155 pounds to the cubic foot, within five pounds as heavy as granite. From the top of the pyramid a series of arches—also of béton—will be sprung to the walls of the fort, making an enclosed chamber 500 feet around, 35 feet high, and 35 feet wide. The arches will be covered with a foot or two of earth, and when sodded will make an artistic touch of green between the dark red retaining walls of the old fort and the granite of the pedestal.[20]

Several members of the Statue's Pedestal Committee visited Bedloe's Island on May 19 to check the progress. A reporter accompanying them wrote that

From the top of the mammoth stone a beautiful view is had. The party climbed laboriously up the steps, and, holding with both hands to their hats, leaned windward and looked around. There is an unobstructed view of the entire surroundings of New-York Harbor. Through the Narrows and beyond Sandy Hook, up the East and North Rivers. And over Brooklyn, New-York, Jersey City—away to the Pennsylvania mountains.[21]

RICHARD MORRIS HUNT AND THE DESIGN OF THE PEDESTAL, 1882-1884

Meanwhile, architect Richard Morris Hunt's final design for the pedestal had been accepted by the American Committee on July 31, 1884, just a week after it had been submitted. He had, however, been developing the design for several years, since winning the commission in December 1881.

Trained at the Ecole des Beaux-Arts and based in New York, Hunt was well known as one of America's leading architects. His portfolio included designs of significant commercial structures, such as the towering Tribune Building; handsome libraries and university classrooms; and most famously domestic buildings that ranged from the first American apartment house to luxuriously appointed mansions on Fifth Avenue in Manhattan and "cottages" in Newport, Rhode Island. He was well connected to several members of the American Committee both socially and professionally, and he brought to the pedestal project a "thorough knowledge of monumental architecture in France.[22]

Hunt had begun his work on the pedestal for the Statue of Liberty by requesting a survey of the island, including elevations of the fort and its pediment, along with plans and sections. Bartholdi had earlier sketched preliminary designs for a tall, narrow pedestal, whose basic form Hunt took into account as he generated his own design.[23] As with his many other collaborative designs with sculptors, Hunt was faced with the problem of how "to provide a base that was proportionate in size and that harmonized with the statue, though not so massive or bulky nor so elaborate as to call attention to itself and turn the viewer's eye from the figure placed upon it."[24] He began designs for the pedestal for the Statue of Liberty in 1882, incorporating a "strong vertical emphasis in the pedestal to counter the outward thrust" of the walls of Fort Wood and rusticated

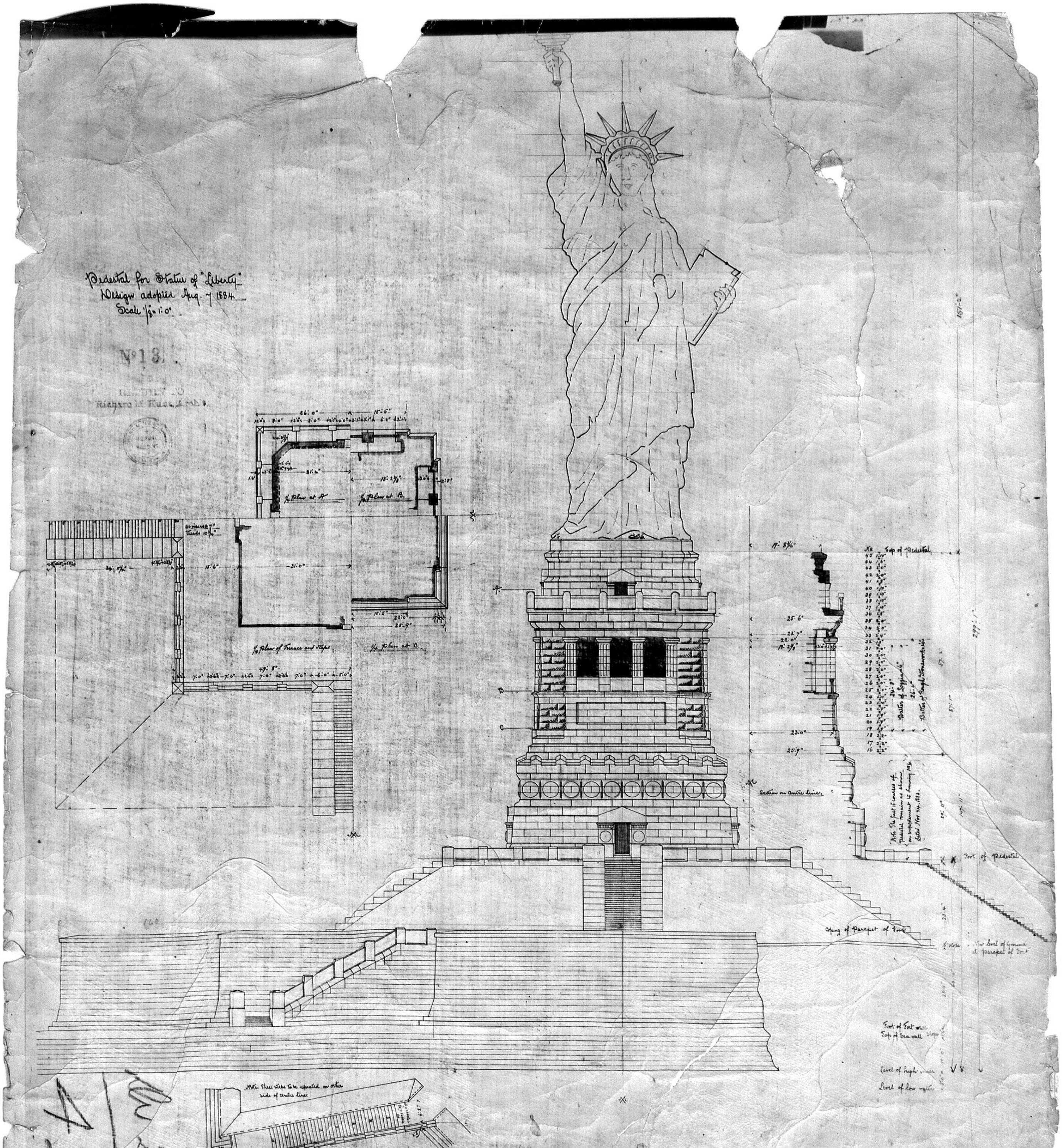
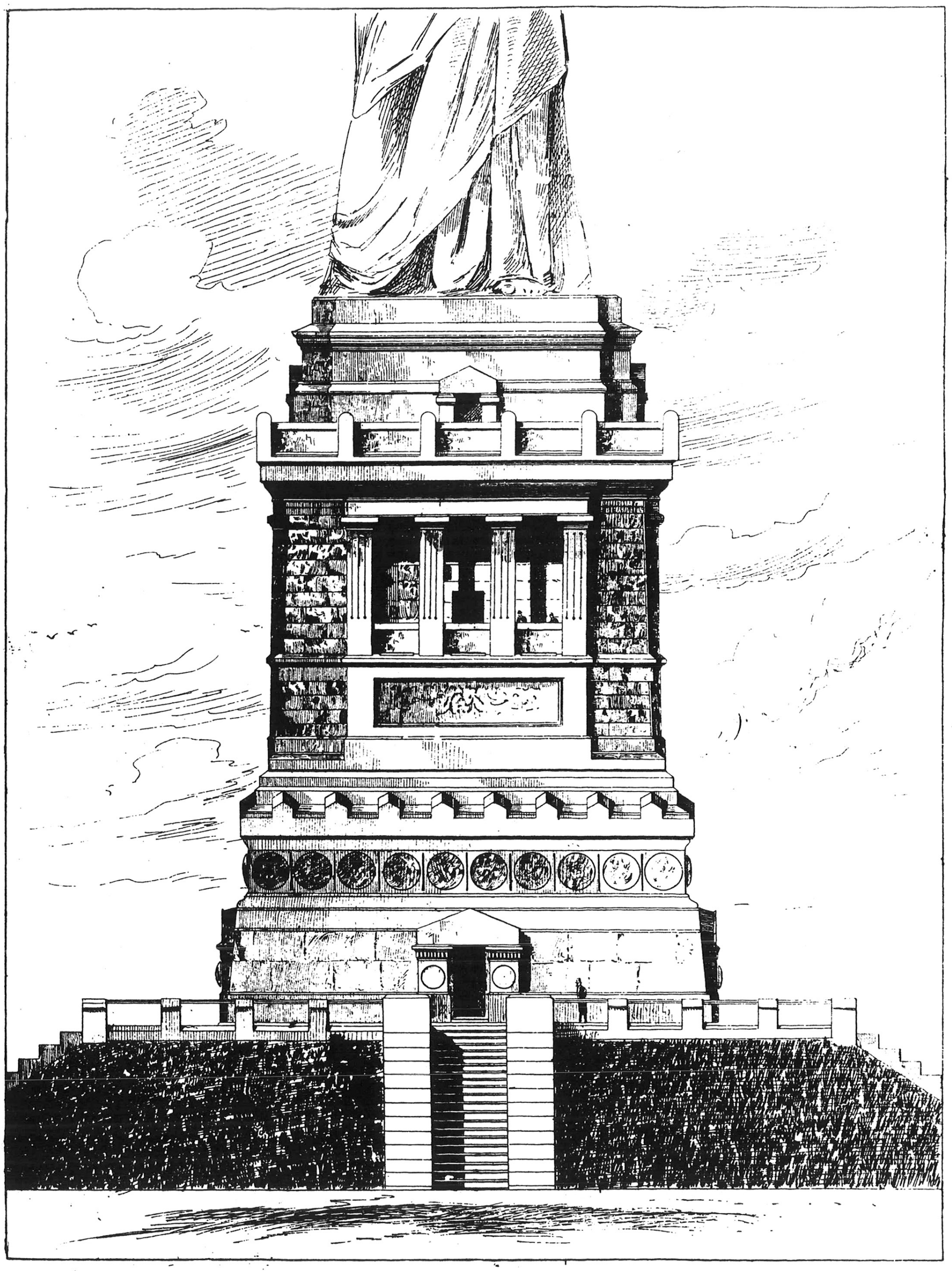
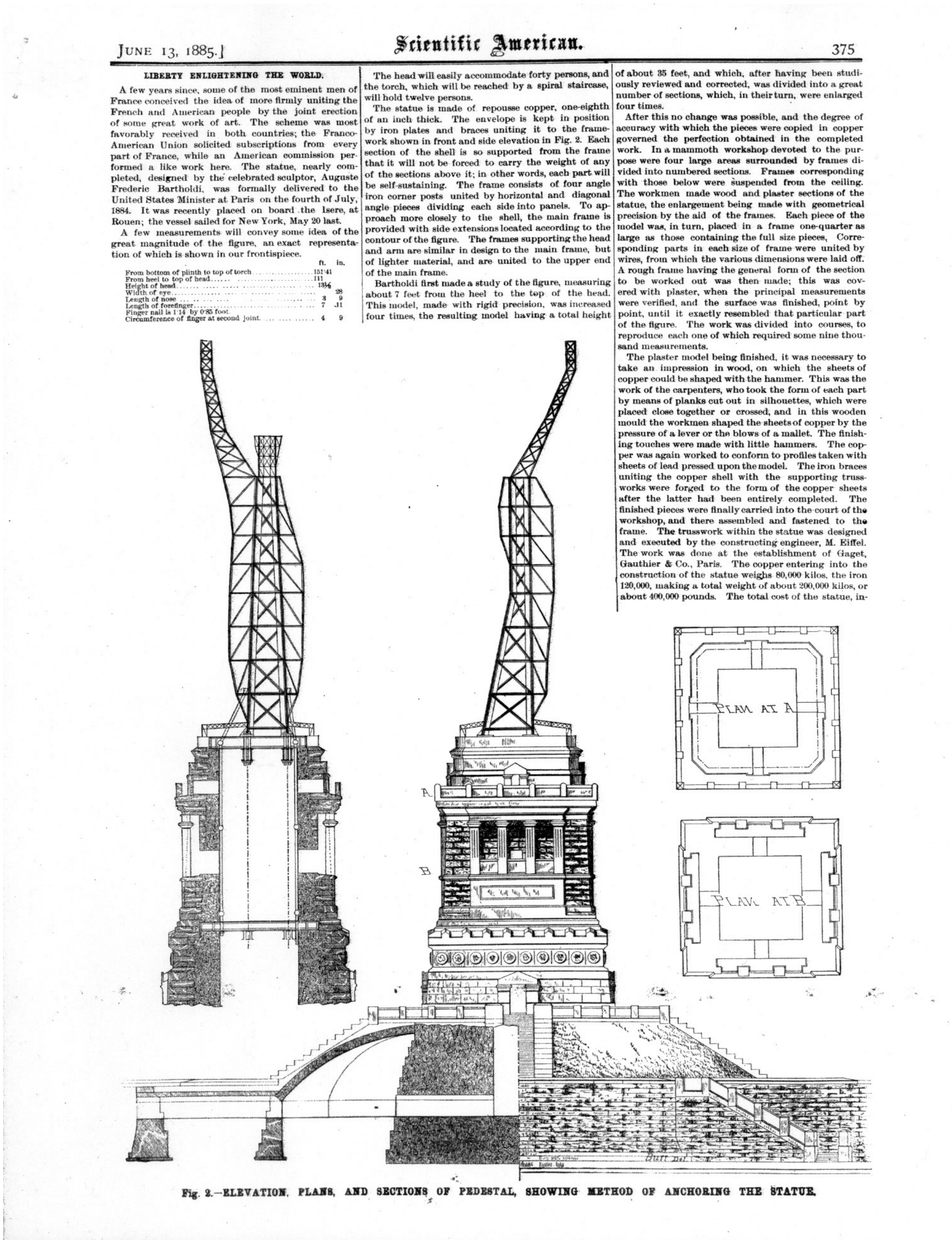


Figure 18. Richard Morris Hunt drawing for the pedestal. [NPS, STLI, Ref.Lib., 36819]



THE CORRECT ELEVATION OF THE BASE FOR BARTHOLDI'S STATUE OF LIBERTY.

Figure 19. "The Correct Elevation of the Base for Bartholdi's Statue of Liberty," from the May 14, 1885 edition of The Daily Graphic, *p. 590. [photocopy from Carole Perrault files at NPS, STLI, Ref.Lib.]*



JUNE 13, 1885.] **Scientific American.** 375

LIBERTY ENLIGHTENING THE WORLD.

A few years since, some of the most eminent men of France conceived the idea of more firmly uniting the French and American people by the joint erection of some great work of art. The scheme was most favorably received in both countries; the Franco-American Union solicited subscriptions from every part of France, while an American commission performed a like work here. The statue, nearly completed, designed by the celebrated sculptor, Auguste Frederic Bartholdi, was formally delivered to the United States Minister at Paris on the fourth of July, 1884. It was recently placed on board the Isere, at Rouen; the vessel sailed for New York, May 20 last.

A few measurements will convey some idea of the great magnitude of the figure, an exact representation of which is shown in our frontispiece.

	ft.	in.
From bottom of plinth to top of torch	151·41	
From heel to top of head	111	
Height of head	13½	
Width of eye		28
Length of nose	3	9
Length of forefinger	7	11
Finger nail is 1·14 by 0·85 foot.		
Circumference of finger at second joint	4	9

The head will easily accommodate forty persons, and the torch, which will be reached by a spiral staircase, will hold twelve persons.

The statue is made of repousse copper, one-eighth of an inch thick. The envelope is kept in position by iron plates and braces uniting it to the framework shown in front and side elevation in Fig. 2. Each section of the shell is so supported from the frame that it will not be forced to carry the weight of any of the sections above it; in other words, each part will be self-sustaining. The frame consists of four angle iron corner posts united by horizontal and diagonal angle pieces dividing each side into panels. To approach more closely to the shell, the main frame is provided with side extensions located according to the contour of the figure. The frames supporting the head and arm are similar in design to the main frame, but of lighter material, and are united to the upper end of the main frame.

Bartholdi first made a study of the figure, measuring about 7 feet from the heel to the top of the head. This model, made with rigid precision, was increased four times, the resulting model having a total height of about 35 feet, and which, after having been studiously reviewed and corrected, was divided into a great number of sections, which, in their turn, were enlarged four times.

After this no change was possible, and the degree of accuracy with which the pieces were copied in copper governed the perfection obtained in the completed work. In a mammoth workshop devoted to the purpose were four large areas surrounded by frames divided into numbered sections. Frames corresponding with those below were suspended from the ceiling. The workmen made wood and plaster sections of the statue, the enlargement being made with geometrical precision by the aid of the frames. Each piece of the model was, in turn, placed in a frame one-quarter as large as those containing the full size pieces, Corresponding parts in each size of frame were united by wires, from which the various dimensions were laid off. A rough frame having the general form of the section to be worked out was then made; this was covered with plaster, when the principal measurements were verified, and the surface was finished, point by point, until it exactly resembled that particular part of the figure. The work was divided into courses, to reproduce each one of which required some nine thousand measurements.

The plaster model being finished, it was necessary to take an impression in wood, on which the sheets of copper could be shaped with the hammer. This was the work of the carpenters, who took the form of each part by means of planks cut out in silhouettes, which were placed close together or crossed, and in this wooden mould the workmen shaped the sheets of copper by the pressure of a lever or the blows of a mallet. The finishing touches were made with little hammers. The copper was again worked to conform to profiles taken with sheets of lead pressed upon the model. The iron braces uniting the copper shell with the supporting trussworks were forged to the form of the copper sheets after the latter had been entirely completed. The finished pieces were finally carried into the court of the workshop, and there assembled and fastened to the frame. The trusswork within the statue was designed and executed by the constructing engineer, M. Eiffel. The work was done at the establishment of Gaget, Gauthier & Co., Paris. The copper entering into the construction of the statue weighs 80,000 kilos, the iron 120,000, making a total weight of about 200,000 kilos, or about 400,000 pounds. The total cost of the statue, in-

Fig. 2.—ELEVATION, PLANS, AND SECTIONS OF PEDESTAL, SHOWING METHOD OF ANCHORING THE STATUE.

Figure 20. Section from the June 13, 1885 issue of Scientific American, showing the proposed section and elevation of Fort Wood and the approach to the pedestal. [New York State Library]

stonework "to complement the strong stonework of the fort." His first schemes were reworked over the next two years into a design that was lower in height and would be less expensive to execute.[25] *[see Figure 14, Figure 15, and Figure 19]*

CONSTRUCTING THE PEDESTAL, 1884-1886

The pedestal proper was constructed of concrete and faced with granite. Gray in color, the granite came from the Beattie quarry at Leete's Island, located near New Haven, Connecticut. In mid-July 1884 it was reported that the "quarrying and dressing of the stone" was "in rapid progress, the stones of the first two courses, and some more, being already quarried and dressed ready for transportation to the island."[26] The contractor was David H. King of New York.[27] The cornerstone, part of the first course of the granite, was placed at the northeast corner of the foundation; it was a six-ton block that measured 6 feet 10 inches by 3 feet 8 inches and 2 feet 6 inches high. It was laid with ceremonies during a heavy rainstorm on August 5, 1884.

The pace of work on the granite pedestal was dependent upon the availability of funding for the project.[28] At the time that the cornerstone was laid, there was only enough funding to lay nine courses, or just 20 percent, of the granite.[29] However, work continued at the quarry, and by April 1885 there was enough stone on site in New York to lay 3 more of the 36 courses still to be completed.[30] Frustrated that the United States Senate had not approved a $100,000 funding bill for the pedestal and disappointed with the lack of private donations, the committee issued a warning in March 1885 stating that "If the people of New York want to have an unfinished pedestal and a statue knocking around on Bedloe's Island, all right. The committee has done all it can."[31]

Meanwhile, the Statue itself had been completed in the Paris workshop during the spring of 1884 and presented to the American ambassador in France on July 4 of that year.[32] The pedestal, however, remained incomplete due to insufficient funds raised on the American side of the project. Finally, the American Committee accepted the help of Joseph Pulitzer, publisher of the *New York World*, who launched a popular campaign to raise $100,000, promising to list the name of every contributor in his newspaper. That goal was not reached until August 1885.[33]

Thus, when the Statue arrived in America, at Sandy Hook, on June 17, 1885, aboard the French frigate *Isere*, the pedestal was not ready to receive it.[34] The concrete work had been completed at that time, but the granite facing was still not in place. By early August the granite had been installed on the lower section of the pedestal, and in mid-October the masons still had another 16 courses to go.[35] Finally, on April 22, 1886, the last block of stone needed to complete the pedestal, known as the capstone, was laid.[36]

Figure 21. The completed foundation and pedestal. [United States Forest Service, Grey Towers National Historic Landmark]

Figure 22. The pedestal under construction. [United States Forest Service, Grey Towers National Historic Landmark]

NOTES FOR THE FOUNDATION AND THE PEDESTAL

1. Some portions of the text in this section are based on John G. Waite Associates, Architects, *Fort Wood, Statue of Liberty National Monument, Historic Structure Report* (2009), 37-42.
2. Carole L. Perrault, “Liberty: To Build and Maintain Her for a Century,” in Robert Baboian, E. Blaine Cliver, and E. Lawrence Bellante, eds., *The Statue of Liberty Restoration* (Houston: National Association of Corrosion Engineers, 1990),18.
3. Perrault, 19. Kenneth T. Jackson, ed., *The Encyclopedia of New York City* (New Haven and London: Yale University Press, 1995), 575. John Singer Sargent Virtual Gallery, “John Singer Sargent’s Richard Morris Hunt,” www.jssgallery.org/Paintings/Richard_Morris_Hunt.htm (accessed June 22, 2005). Richard Morris Hunt was one of the founders of the American Institute of Architects and studied at the École des Beaux-Arts in Paris. In addition to the Statue pedestal, Hunt designed New York’s Tribune Building, built in 1873, and the façade of the Metropolitan Museum of Art, built between 1890 to 1902, as well as many notable private residences for the era’s elite, including the Vanderbilt mansions, Marble House (1888) and The Breakers (1893) in Newport, Rhode Island, and Biltmore (1889-1895) in Ashville, North Carolina.
4. Moreno, 186.
5. [illegible] to Brig. Gen. A. A. Humphreys, report, Chief of Engineers, U.S. Army, Feb. 16, 1877, RG 77, E171, NA-DC.
6. Lieut. Col. G. L. Gillespie to Brig. Gen. H. G. Wright, Chief of Engineers, U. S. Army, May 10, 1883, RG 77, E171, Fort Wood, NA-DC.
7. Pitkin, 13.
8. “City and Suburban News,” *New York Times*, May 10, 1883.
9. The Statue of Liberty, Beginning the Work of Laying the Pedestal Foundations,” *New York Times*, May 6, 1883.
10. “Preparing for the Bartholdi Statue,” *New York Times*, July 1, 1883.
11. American Committee of the Statue of Liberty, Advertisement, Aug. 3, 1883, Ellis, Box 9, File 154.
12. American Committee of the Statue of Liberty, Advertisement, Aug. 3, 1883, Ellis, Box 9, File 154. “The Bartholdi Statue,” *American Architect and Building News* 14 (Sept. 22, 1883), 142. “The Pedestal for the Statue of Liberty,” *American Architect and Building News* 14 (Dec. 15, 1883), 284.
13. “The Statue of Liberty, Beginning the Work of Laying the Pedestal Foundations,” *New York Times*, May 6, 1883. “The Base for Liberty’s Statue,” *New York Times*, Aug. 15, 1883. Moreno, 93.
14. Kroll, 18.
15. “The Base for Liberty’s Statue,” *New York Times*, Aug. 15, 1883.
16. “Seeking to Set Aside a Contract,” *New York Times*, Aug. 22, 1883. “Foundation of Bartholdi’s Statue,” *New York Times*, Nov. 16, 1883.
17. Moreno, 92-93. “The Bartholdi Statue,” *The Sanitary Engineer* (Oct. 23, 1886), 491.
18. “The Rise of the Bartholdi Pedestal,” *Frank Leslie’s Illustrated Newspaper* 58 (May 10, 1884), 187.
19. Moreno, 184.
20. “Massive Base for the Statue,” *New York Times*, May 20, 1884.
21. Ibid. The members of the Pedestal Committee present that day were “Gen. Charles P. Stone, engineer in charge; Parke Goodwin, Henry F. Spaulding, Richard Butler, Mahlon Chance, of Ohio, who has been visiting the West in the interest of the fund, and Capt. J. Chance, Seventeenth Infantry.”
22. Susan R. Stein, “Richard Morris Hunt and the Pedestal,” in *Liberty*, 176. Hunt also worked tirelessly to promote architecture as a profession in America.
23. Paul R. Baker, *Richard Morris Hunt* (Cambridge: MIT Press, 1980), 317.
24. Baker, 319.
25. Baker, 319. Lewis I. Sharp, “Richard Morris Hunt and His Influence on American Beaux-Arts Sculpture,” in Susan R. Stein, ed., *The Architecture of Richard Morris Hunt* (Chicago and London: University of Chicago Press, 1986), 128-129. Hunt’s drawings for the pedestal were in the Prints and Drawings

Collection of the Octagon, the museum of the American Architectural Foundation in Washington, D.C.; they have been transferred to the Library of Congress.

26. "The Statue of Liberty," *Harper's Weekly*, July 12, 1884, p. 451.
27. Moreno, 186.
28. "Massive Base for the Statue," *New York Times*, May 20, 1884. *American Contract Journal* 2 (March 8, 1884), 119.
29. *New York Times*, Aug. 6, 1884.
30. *The World*, April 22, 1885.
31. *New York Times*, March 8, 1885.
32. Walter Hugins, *Statue of Liberty National Monument: Its Origin, Development, and Administration* (Washington, D.C.: Dept. of the Interior, National Park Service, 1958), 5.
33. Moreno, 190.
34. Benjamin Levine and Isabelle F. Story, *Statue of Liberty National Monument, Bedloe's Island, New York* (Washington D.C., National Park Service, 1954), 21.
35. *New York World*, Aug. 2, 1885, New York State Library (hereafter, NYSL). *New York World*, Oct. 20, 1885, Box 10, File 171, SOL Part II.
36. *New York World*, April 23, 1886, Box 11, File 174, SOL Part II.

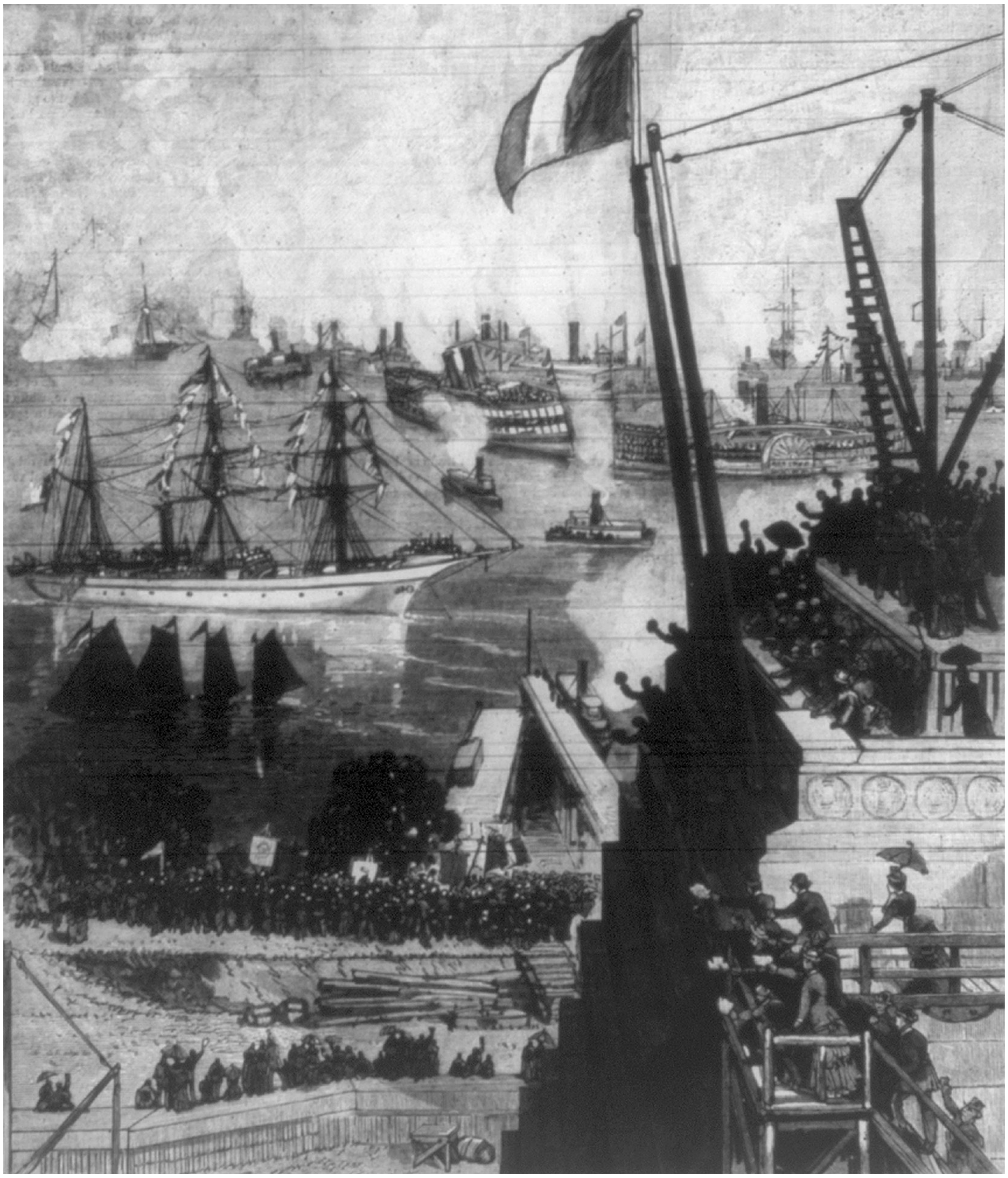


Figure 23. Engraving of the arrival of the Isere, *from Frank Leslie's Illustrated Newspaper (June 27, 1885). [Library of Congress]*

ERECTING THE STATUE ON BEDLOE'S ISLAND, 1885-1886

THE STATUE ARRIVES IN AMERICA, JUNE 1885

At daybreak on June 17, 1885, a lookout at Sandy Hook spotted the French frigate *Isere* as it sailed into the Lower New York Bay and dropped anchor. After 27 sometimes stormy days at sea, the *Isere* had safely delivered its long-awaited cargo, the prefabricated Statue of Liberty Enlightening the World, to the United States.[1]

Within hours General Charles P. Stone, along with members of the American Committee and the president of the Board of Aldermen, boarded a tug at the Battery in Manhattan to welcome the French officers. The men gathered in the cabin of the French commander, Lespinasse de Saune, to conduct an important ceremony –the transfer of the "handsomely" inscribed parchment deed to the Statue to the American Committee.[2] General Stone remarked that "as a representative of the American people, I can say that no gift ever made by one great nation to another has ever been so highly appreciated and of so much significance as this."[3]

Two days later the *Isere* was the centerpiece of a flotilla in New York harbor, with vessels of all sizes—from warships to excursion boats, yachts, and small pleasure craft—all flying the French tricolor and the Stars and Stripes in a "brilliant aquatic display." The shores of the harbor and a hilltop on Staten Island were thronged with spectators. As the *Isere* made its way up the bay, cannons at nearby forts fired salutes, and steam vessels blew their whistles. Shortly after noon the *Isere* was anchored beside Bedloe's Island and welcomed by cannon fire from Fort Wood and by the voices of French choruses. After inspecting the pedestal for the Statue, the French officers and the American officials proceeded to the Battery and to a parade up Broadway and then a luncheon for 600 at city hall.[4]

On June 22, three days after the *Isere* had arrived at Bedloe's Island, two lighters—heavy, flat-bottomed boats outfitted with derricks—were moored beside the French frigate, and workers began unloading the cargo. There were three categories of cargo on board—"bundles of iron rods, pieces of the stanchions or internal supporting columns, and huge crates" containing the copper sheathing. Moving it all ashore took six days, but the work was completed with "no breakage nor accident of any kind."[5]

Once on the wharf, the crates and the iron components were lifted by crane into an iron car on the overhead tramway. Four men then pushed each car along the rails toward the fort. At the other end of the tramway, another crane offloaded the goods to an area between the seawall and the walls of the fort.[6] One reporter commented that "this part of the island is becoming highly picturesque, for the crates are of every conceivable size" and their slats were "many inches apart, affording a fair view of the inner nature of the goddess herself."[7] The "structural fragments of iron" were painted "a bright vermillion." The crates

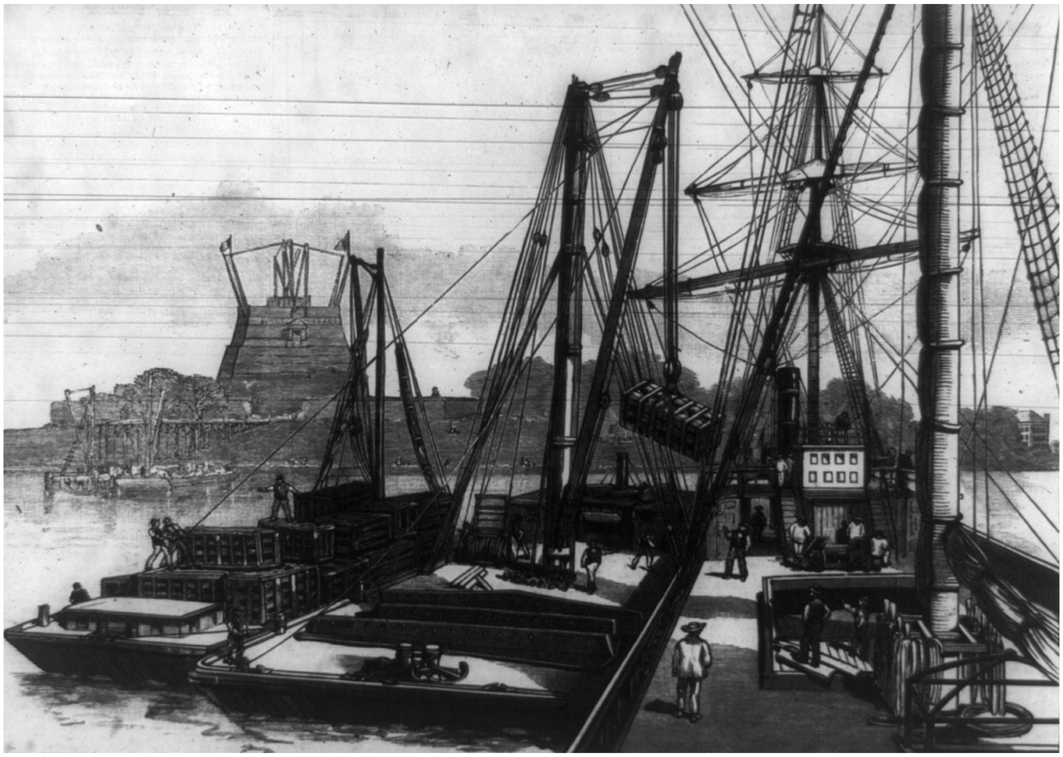


Figure 24. Unloading the Isere's cargo, including the cases holding the copper sheathing, to a pair of flat-bottomed boats (lighters) for transfer to the island. Engraving from Frank Leslie's Illustrated Newspaper, *July 4, 1885. [Library of Congress]*

were to be stored in a shed to protect them from the weather until it was time to erect the Statue.[8]

INSTALLING THE GRANITE FACING AND THE STEEL GIRDERS IN THE PEDESTAL, JULY-AUGUST 1885

Bartholdi had predicted that "four months would be required to put the statue together on its pedestal," but the engineers in charge in America felt "confident that the work can be accomplished in a shorter time."[9] First, however, the granite facing had to be completed and a system of steel girders inserted into the pedestal, in order to reinforce the pedestal and attach the structural iron framework of the Statue securely to the pedestal.

The work of laying the granite facing against the exterior surfaces of the concrete pedestal had been interrupted during the week in June when the crates containing the Statue and its iron framework were being unloaded.[10] The *New York World* reported that work on the pedestal would be resumed immediately after the cargo was unloaded and then "pushed forward to completion." The current status, the paper continued, was that the "Beton or concrete has been laid and preparations made for the masons. Everything

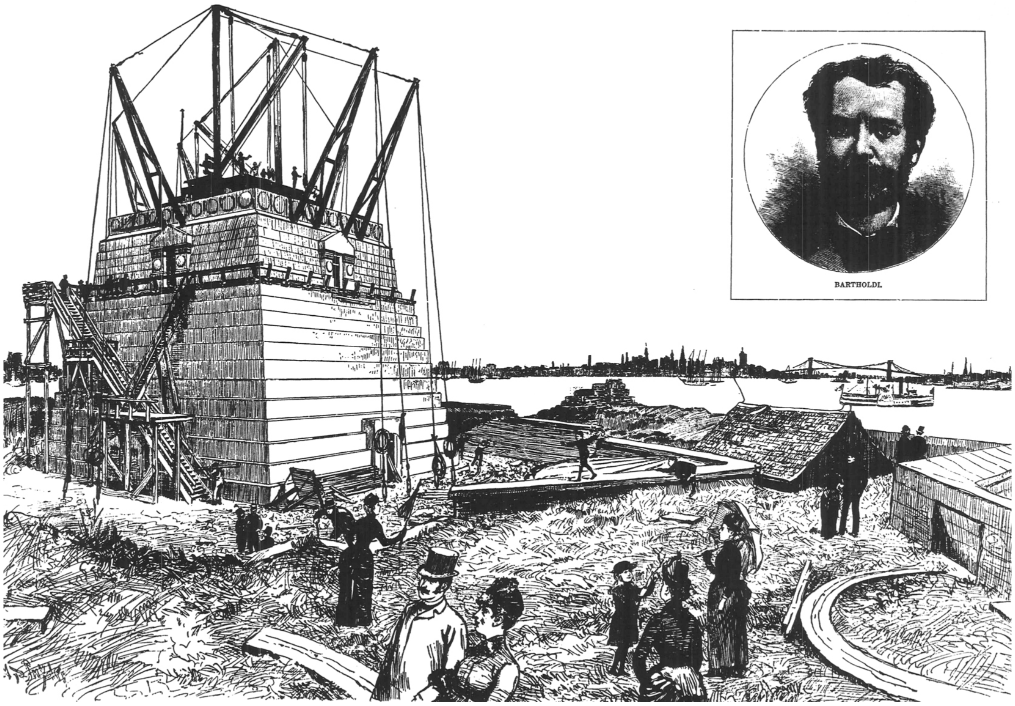


Figure 25. The pedestal under construction, from Harper's Weekly, *Volume XXIX, No. 1485, 6 June 1885, p. 356. [Harpweek digital database, accessed at New York Public Library]*

is in good shape and there is little likelihood of delays." General Stone predicted that the pedestal would be completed within two months, by August 15, 1885.[11]

Much was indeed done during the ensuing summer. By the beginning of August the masons had completed laying the top course of granite of the lower section of the pedestal.[12] The steel girders for the pedestal were being rolled by the Keystone Bridge Company in Pittsburgh as the Statue itself arrived in America, and by early August much of the steel had been delivered to the island.[13]

In a newspaper interview, General Stone had described how the iron framework inside the Statue and the copper sheathing would be supported. "Inside the sheet copper," Stone stated, "there will be a very strong framework of wrought iron, consisting of four large angular pillars braced with iron from the bottom to top." The iron frame had been designed by Gustave Eiffel and fabricated in France; it had arrived with the Statue and weighed 120 tons, "much more, in fact, than the Statue itself."[14] The frame, Stone explained, consisted of "four angle iron corner posts united by horizontal and diagonal angle pieces dividing each side into panels." In addition, there were "side extensions located according to the contour of the figure," so that the structural elements of the frame would be closer to the copper shell. The frames that supported the extended arm and the head were "similar in design to the main frame, but of lighter material."[15] The copper plates, which were not structural elements, were, in turn, attached to the interior structural iron frame by narrow bands of wrought iron, making each element self sustaining.[16]

In the same interview Stone also described how the weight of the frame of the Statue and the copper sheathing would be attached to the steel girders inside the pedestal. The iron frame inside the Statue, he said,

> will rest upon and be attached to two strong steel girders which we shall place on the top of the Pedestal, and these two girders will have two others directly under them at right angles. About sixty feet below the top of the Pedestal there will be two other pairs of steel girders, which will be connected with those on top by steel eye-bars, so that the girders which support the weight of the Statue and its framework will be anchored to the masonry and held securely by the weight of the Pedestal itself.[17]

This exceptionally strong anchoring was necessary, Stone continued, because the

> Statue, while colossal in size, is by no means correspondingly heavy. While 151 feet high, it, with its interior framework, weighs only about 200 tons; but it has great surface—nearly 4,000 square feet—exposed to the wind. With a strong wind blowing on this great surface the tendency would be to overturn the Statue, and in such an effort the wind, since the centre of gravity is more than sixty feet above the top of the Pedestal, would have the advantage of great leverage. In case a violent gale should strike it, a cyclone such as been known at Mount Washington and in many parts of our country, the wind effort to overturn the Statue would be nearly 7,000 foot tons.[18]

In a report presented to the American Committee on August 26, General Stone stated that "the matter of the proper method of fastening the statue firmly to the pedestal was one of great importance and required much and careful study." It was important, he wrote, "that a system be developed which could always be visited in all its parts to give opportunity for painting or repairs and capable of slightly changing strains to meet great changes of temperature." The scheme that was finally developed, he believed, fulfilled those needs; in addition, the framework had been "constructed to resist, with a proper factor of safety, a wind-strain of 100 pounds to the square foot of surface on the statue."[19] The system was not without its detractors: one account, for instance, noted that "this method of anchoring the statue is open to severe criticism." "It practically hinges the statue at its base," the article continued, "the first section of the main frame serving as a fulcrum resisting the lateral pressure coming upon any side of the figure. This is the weakest part of the main frame, since it receives no support from the side extensions, which do not reach to the bottom of the lowest panel." [20]

An article in *Scientific American* stated that the anchoring system had been designed by General Stone.[21] Stone had engaged Charles C. Schneider, the well-known civil engineer and bridge builder, as a consulting engineer, to supervise and inspect the steel.[22] However, another account stated that Schneider was responsible for the plan for connecting the Statue framework to the pedestal.[23]

Scientific American provided its readers with many additional details about the steel girders inside the pedestal:

> Extending across the top of the pedestal are six channel bars arranged in two sets of three each; these bars are directly beneath the corner posts of the main frame in the interior of the statue. Beneath and at right angles to these are six other channel bars, also arranged

> in two sets, placed under the corner posts. These bars are 34 feet long, so that each end rests in the masonry to the depth of 3¾ feet, the well hole or shaft being 26½ feet square. The channel bars are 4 feet deep, the web plates are 5/8 inch thick, and the angles are 4 by 5 by 5/8 inches. The base of each post and the two sets of bars immediately beneath it are united by three bolts 5½ inches in diameter.
>
> A little over 60 feet below is a second and similarly arranged system of girders 41 feet long, 36 inches deep, with web plate 5/8 inch thick; the angles are 4 by 5 by 5/8 inch. In the lower system there are only two channel bars in a set. These two systems are joined by four sets of eye bars placed as near as possible to the side walls of the shaft. Each set consists of four bars 4 inches wide by 1 3/8 inches thick. Upon the sides of the statue the upper ends of these bars will be prolonged to join the main frame at the tops of the first and second panels. All bracing within the pedestal will be made of steel.[24]

On August 1, 1885, the *World* carried a detailed description of the installation of the steel then underway. "Liberty Island presented a lively appearance yesterday morning," the reporter explained, as workers prepared "to lay the great steel girders which are to strengthen the interior of the upper base" of the pedestal:

> Two gigantic derricks swung their long beams from the outer edge of the mass of masonry. The platform on which they stand is 60 feet above the top of the stone and concrete formation on which the pedestal rests. Foreman John W. Jeiley and a gang of skilled workmen from the Keystone Bridge Company's mills prepared to put the girders in place. The beams were too heavy to be taken up complete, so they had to be hoisted up in quarter sections. Slowly and with a great creaking of windlasses the first steel section was pulled to the top. It was carefully lowered to the iron rails which had been prepared and there laid on edge.
>
> It was slow work and difficult. The mass of steel weighed nearly four tons and the task of setting it in position was no easy one. When it was finally placed, three more sections were hoisted alongside, and then the workmen began to fasten the pieces together. Big steel plates, with so many holes punched in them that they looked almost like sieves were laid so that they covered all the top of the girder sections. Then the men heated big bolt heads in their little portable furnaces, and the work of riveting began. Foreman Jeiley drove the first bolt and hammered the glowing rivet home amid a shower of sparks. The work of fastening the huge beams together was quite tedious—there were so many bolts; but finally the masses of steel took shape, and there the finished girder lay.[25]

"Meanwhile," the reporter continued, "the derrick-men had not been idle":

> While the first girder was being put together, the sections of the second one were being hoisted up. The first piece was marked "Girder B, outside vertical rib." Afterwards Foreman Jeiley told a WORLD reporter something about the girders. He said: "There will be four of these girders on this course of stone. The platform on which they rest is sixty feet from the surface of the lower base. They will be set corner to corner, forming a square corresponding to the sides of the pedestal. From these girders large ribs of steel will extend upward for sixty feet, where they will be fastened to another set of girders. The masonry will be built solidly around them and the framework will serve as a sort of

> anchor in helping to hold together and strengthen the structure. The girders we are laying now weigh altogether 54 tons; those on the next course will weigh 120 tons.[26]

At the time of the report, the four lower girders were in place," Stone explained, but awaiting their delivery and installing them had delayed construction of other parts of the pedestal for almost four weeks.[27]

Meanwhile, the *World* announced on August 10 that contributions to the pedestal fund had at last reached, and even slightly exceeded, the goal of $100,000. "Never before," the paper stated, "was so large an amount of money raised from so large a number of people in so short a time." However, even this sum was not adequate to finish the pedestal. Expenses had been mounting—it had cost $4,000 to unload the Statue from the *Isere*, $350 more to move it to the base of the pedestal, and $600 to construct the shed to shelter the copper plates. The steel anchors and girders inside the pedestal were expected to cost $14,000.[28] Even more money would be needed to assemble the Statue itself.

COMPLETING THE PEDESTAL, SEPTEMBER 1885-APRIL 1886

General Stone had predicted that the pedestal could be completed by December 1, 1885, and the work continued into the fall. The *World* reported in mid-October that masons were laying the 29th horizontal course of stone, with 16 more courses still to be done. The workers had laid five courses every two weeks, and it was expected that "this rate can be maintained no matter how bad the weather." In addition, there were 70 stonecutters at work at the quarry in Connecticut, and some of the stone was ready to be shipped to Bedloe's Island.[29]

In an article published on October 20, 1885, the *World* stated that once the pedestal was completed, General Stone would no longer be involved; instead, a French engineer would superintend the erection of the Statue itself. [30] A few days later, however, the paper published a notice from the American Committee, stating that Stone would donate his professional services during the break in work between the completion of the pedestal and the erection of the Statue and that as engineer-in-chief he would now in fact direct the work of erecting the Statue. The notice also saluted Stone, expressing the committee's "high appreciation of the engineering skill, ability and devotion to the best interests of the enterprise " that Stone had exhibited "throughout the operations."[31]

Auguste Bartoldi, the French designer of the Statue, arrived in New York on November 4, 1885, partly to confer with the commission in charge of a proposed monument to Lafayette in Washington, D.C., and partly, as he told a reporter, to give "advice and assistance to those engaged in putting the pieces of the statue together."[32] He planned to go to Bedloe's Island the next day to "inspect the pedestal" and expected to "shortly superintend the unpacking of the statue." "Then," he continued, "I wish to show General Stone especially the methods of putting together the joints." Successfully forming the joints between the copper plates was "more important at the base of the Statue than anywhere else, " he explained, and he hoped to see that work completed before returning to France.[33]

The day after his arrival in New York, Bartholdi, along with Stone, and other officials, climbed to the top of the pedestal. Bartholdi told the press that he was "pleased with the work done" and that he "had nothing to suggest to Gen. Stone." The pedestal then stood 123 feet high. Stone stated that "every effort would be made to complete the thirty-one feet remaining of the pedestal before winter," especially because "frost would do great damage to the cement if not hardened and in a finished state." Thirty-five men, the maximum number who could be engaged to advantage, were then "hard at work setting in place the huge blocks of granite and pounding down the concrete, which will soon be as hard as the rock itself." The party then moved to the shed where the crates containing the copper plates were stored and where French workers were busy joining the iron ribs to the copper plates; the "work of laying out the multitude of parts of iron which will compose the statue has been going forward rapidly," the New York Daily Tribune reported.[34] Shortly before his return to France, however, Bartholdi did tell the press that he "had given all the necessary instructions to General Stone in regard to joining and erecting the statue itself." Remaining behind in New York were "two of the French workmen who were with him at Paris."[35]

The *World* reported in the early spring of 1886 that the pedestal would be finished by April 15, 1886. The "last of the stone" was on hand, and the remaining girders had been put in place.[36] The capstone, the last block of stone to be installed on the pedestal, was laid, with modest ceremony, on April 22. Six feet in length and weighing two tons, the capstone was "swung into place" and imbedded in mortar sprinkled with coins by the masons.[37]

ERECTING THE FRAME FOR THE STATUE, APRIL-JULY 1886

Early in April 1886 a headline in the *World* announced that the "Great Monument" was "Soon to be Placed on Its Pedestal." Congress had finally appropriated $56,500 toward the costs of "landing, housing, protecting and inaugurating upon Bedloe's Island of Bartholdi's Statue of Liberty Enlightening the World, and for construction of platform, repairs of wharf, clearing grounds of unsightly structures and other incidental expenses, and for incidental expenses of the ceremony of inauguration." This sum, however, was only about half what was needed.[38] The American Committee was short about $12,000; they especially needed to be reimbursed for the $4,000 that they had paid for unloading, "housing, insuring, and, asbestoing the iron ribs of the statue to guard against corrosion with the copper."[39]

The next task was to erect the iron frame that Gustave Eiffel had designed to support the Statue and to begin assembling the copper skin of the Statue. The *World* reported in mid-April 1886 that Bartholdi was sending over "skilled workmen" from France, who were expected to arrive in early May and "commence work at once."[40]

Meanwhile, on May 5, 1886, the American Committee signed a contract with D. H. King, Jr., of New York "to fully erect and securely place, upon the pedestal now constructed upon Bedloe's island for that purpose, the 'Statue of Liberty Enlightening the World'"; the work was to be completed by September 3, the anniversary day of the signing of the peace treaty in which Great Britain acknowledged the independence of

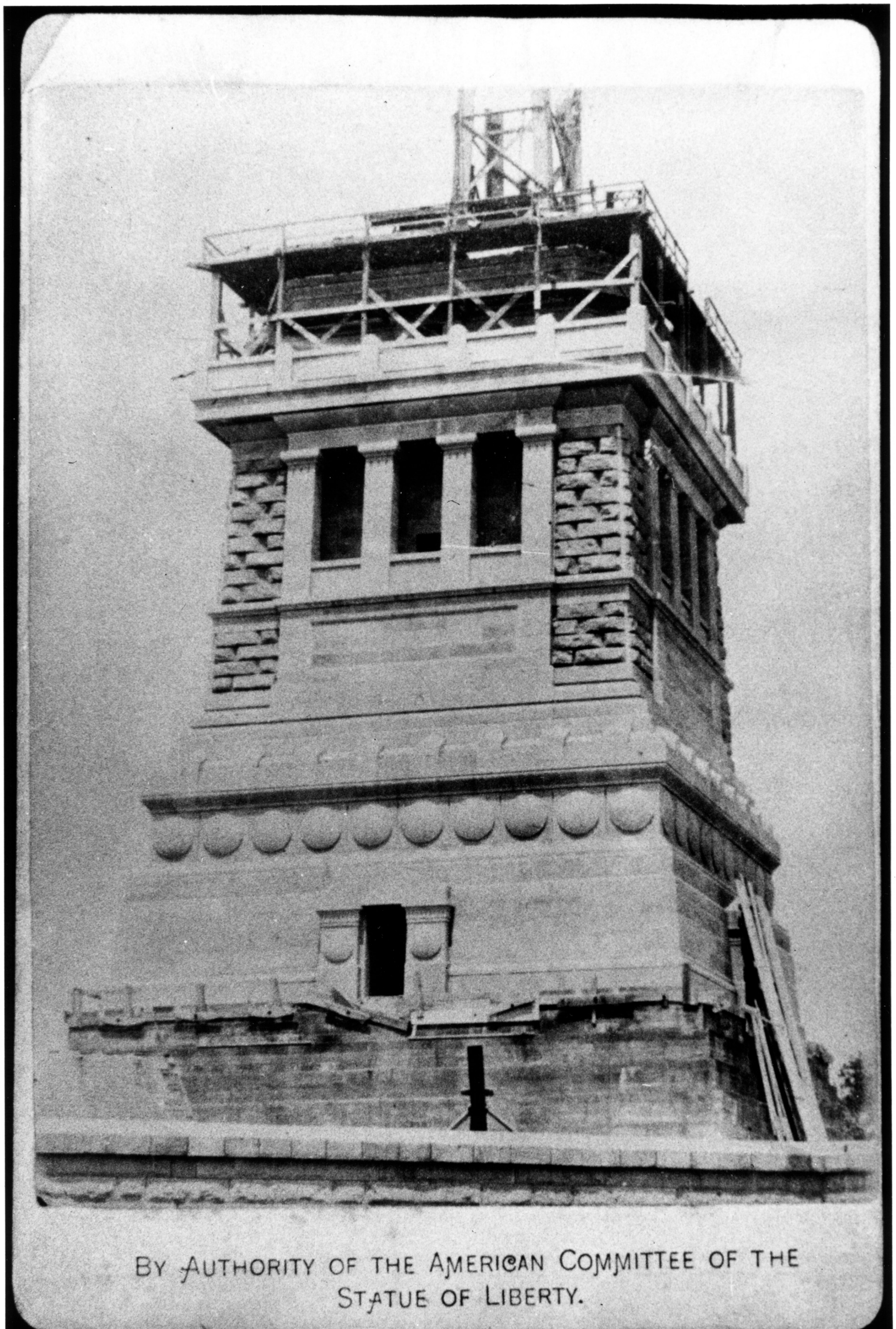


Figure 26. The pylon in place on the pedestal in 1886. [NPS, STLI, Ref.Lib., 4 1 #5]

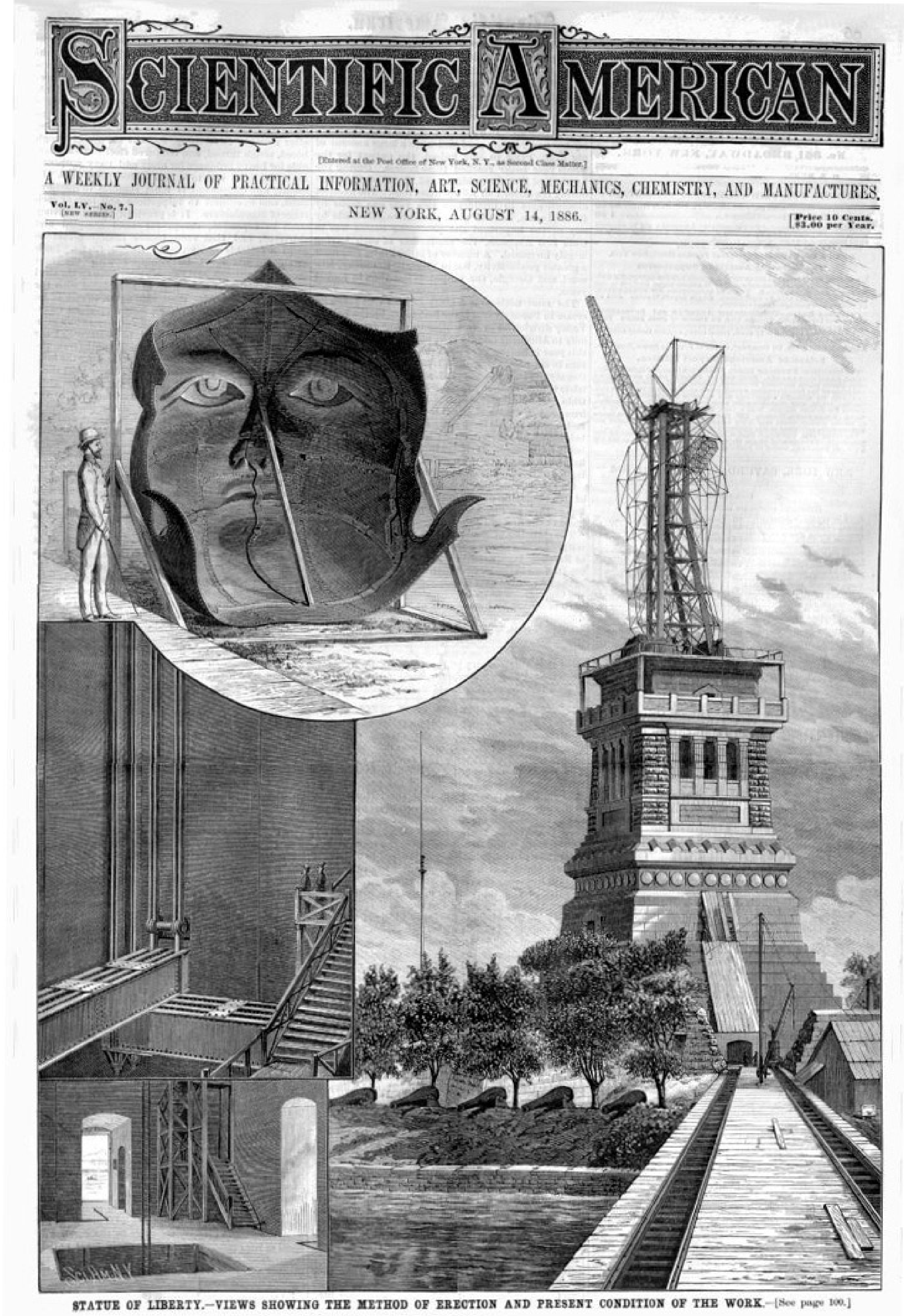


Figure 27. Assembling the Statue's frame in 1886, from Scientific American, *August 14, 1886. [New York State Library]*

the United States."[41] King was "to add to the interior frame, such additional iron work as may be necessary, to give the whole structure such strength, as the engineer in chief," General Stone, might "deem necessary and proper." King was also to "properly" insulate all ironwork that would come in contact with the copper of the Statue, following Stone's instructions. King would also be responsible for paying the "salary of the workman sent over by Mr. Bartholdi at the rate of Six Dollars per day," from May 10 until he returned to Paris. The amount of King's contract was $10,000, but he would be entitled to payment for any additional ironwork needed for the frame and for repairing "any broken injured or defective parts" of the copper elements unless they had been damaged by his own workers.[42]

About two weeks later General Stone wrote to the chief of engineers of the United States Army seeking an additional appropriation for work needed at the Statue. He reported that an elevator inside the pedestal was "evidently necessary for the decent satisfaction of the public"; it could be powered during the day, he explained, by the same source of electricity that would be used to illuminate the Statue at night. There was also some additional structural work to be done at the fort: about 1,200 cubic yards of beton would be needed to strengthen interior walls, to compensate for the "removal of the buildings which formerly occupied the interior," and to support the "thrust of the arches connecting the fort with the foundation-mass of the pedestal." The "connecting arches," he had estimated, would require "3,300 cubic yards of beton and very heavy centering, as the half arches have forty feet span."[43]

By mid-June 1886 the "bulk" of the structural framework was reported to be "nearly completed." The next task would be to erect the frame for the arm, and this work was expected to be "an undertaking of some difficulty, as some additional braces are thought necessary in order to secure the greatest safety." However, delays were encountered, some "caused by the wrong labeling of the different pieces" in France before the Statue was shipped to America; as a result the superintendent was sometimes "obliged to raise, try and lower twenty pieces" to the ground, a distance of some 200 feet, "before he found the right one." Nevertheless, on July 10 the *Sun* reported that the framework had risen nearly 100 feet: the frame had passed the area of the "not remarkably slender waist of the gigantic figure," and workers would "soon be engaged at the bust and shoulders." A few days later they were working on the frame for the torch and the tablet held in the Statue's left hand. The timeframe for finishing the frame was now expected to be "before the end of July."[44]

Meanwhile, the iron frame had been struck by lightening several times, but no damage was incurred because a lightening-protection system had been installed. A copper rod, measuring 5/8-inch in diameter, had been run down the inside of each wall of the pedestal and attached to plates in the earth below the foundation. During construction the upper ends of the rods were attached temporarily to the frame.[45] The completed system was described by *Scientific American* in November 1886:

> Against lightening, provision has been made by soldering four 5/8 in. copper rods to the inside of the statue against the external copper plates to a height of 15 ft. above the pedestal. These rods pass through the pedestal, each inside of a 4 in. iron pipe tamped with coke dust, extending 5 ft. below low tide level in the earth. In the lower four feet of these pipes the copper rods are closely coiled like springs, thus giving a greater mass of

metal in the wet ground connection. . .The statue itself is the best kind of a conductor as far as her pedestal; hence no outside rods are needed, and the copper rods extending into the ground will doubtless carry off any flashes that Liberty may attract.[46]

ASSEMBLING THE COPPER SHEATHING, JULY-OCTOBER 1886

As the frame was rising, other workers at ground level had been assembling the copper elements temporarily, including those of the "massive head."[47] A ceremony held atop the pedestal on July 12, 1886, marked the permanent riveting of the "first two of the copper plates which form the flesh of the statue."[48] The first rivet was driven in honor of designer Auguste Bartholdi, and his name was "inscribed in the copper-plate, opposite the rivet." The second honored Joseph Pulitzer, publisher of the *World*, and other rivets honoring politicians and other officials followed.[49] Within another ten days, the Statue's feet "were firmly placed in position on the pedestal."[50]

Before the copper sheathing of the Statue could be assembled, the individual copper sheets had to be connected to the wrought-iron bars, which in turn would be connected to the structural frame of the Statue. While the structural framework appeared regular in its form, the webs of bracing were not; they appeared as a "seemingly confused collection of bars of all shapes and lengths" that extended "in every conceivable direction," in order to provide sufficient support. Accounts varied on how the iron bars would be insulated from the copper to prevent rusting. One account stated that "to insulate the iron from the copper," the surfaces would be shellacked and a piece of asbestos inserted in between.[51] During his November 1885 visit to New York, however, Bartholdi told the press that he had "explained to Stone the "method of preventing rust by placing papier maché between them."[52] *Scientific American* described the iron bars thus:

> These bars are three-quarters thick by two inches wide, are bent to closely conform to the curves in the copper, to which they are fastened by copper bands whose ends are riveted to the shell, and are so disposed and united to each other as to form a most intricate network of bracing, covering and strengthening the entire statue. . . .
>
> This bracing is connected by bars with the main frame that holds the statue upon its pedestal. . .By this means, the rigidity of the whole work is assured, and any wind pressure—the force most to be provided for—upon the pliable, paper-like shell is transmitted to the four massive iron corner posts of the frame, which are firmly anchored to the masonry.[53]

The *World* published regular reports on the progress of erecting the "flesh" of the Statue. By August 1 the "lower plates of her dress" had been "fastened to the frame work to a distance somewhat above her knees."[54] A reporter's account of a visit on August 2 provided a picture of the work then underway:

> Around the base of the pedestal are now scattered pieces of the upper sheathing which, riveted together, will constitute the statue. Some pieces are as big as a side of leather; others are twice as big. They are of endless variety in shape and outline, and very few parts except bits of the hands, the ears, and the face could be recognized on the ground. The

> French work appears to be well done, each piece being strengthened on the inside with iron braces forged to follow the lines of the copper. Along the edges are holes, one inch apart, for the rivets which are to hold the sheets together. Work is now so hurried and workmen are so few that a rivet is not used for every hole, although eventually this will be done. The work seems to go on slowly, owing probably to the small number of men engaged. Yesterday there were not more than twenty in all, of whom less than a dozen were putting the statue together, the others getting the pieces out of the packing cases and carrying them from the store sheds at the water's edge to the foot of the pedestal. There are hundreds of pieces now ready to be hoisted to the top as soon as the workmen are ready for them, and some six or eight enormous cases remain to be unpacked; the higher the work goes the slower it will be and the fewer men can be employed. The face of the statue has been placed on the ground, where visitors can inspect it at close quarters and scratch their names on the copper surface if the guard's back is turned long enough.[55]

Workers encountered many difficulties in assembling the copper sheathing. One account pointed out that it had been "impossible to prevent a certain amount of distortion from taking place" when the copper sheets had been boxed up in France for transport to America. Then, in New York, "great height above ground" where the men were working, had rendered the "otherwise simple work of erection one of great magnitude."[56]

The work of hoisting the copper sheets in place proved difficult, according to *Scientific American*:

> The piece wanted is carried to the foot of the pedestal, the face of which is protected from injury by a covering of wood, and is, if large, lashed to a wooden frame to which is attached the end of a rope passing over a derrick on the top of the frame, and thence to a hoisting engine on the ground. The piece is then raised to a platform built around the top of the pedestal, and is carried to the place where its marks indicate that it belongs. When necessary, a rope and tackle are brought into play to raise the piece into position, and to hold it until enough rivets or small temporary bolts have been inserted to secure it. All the rivets are then driven, and the braces are bolted to the frame and stiffening bars. The shell is thus carried up, piece by piece, in horizontal courses. The difficulty of the work increases as the top is approached, mainly because of the increased height above the ground, the top of the pedestal, where the statue begins, being 150 feet, and the torch 305 feet above water level.[57]

By August 19 five sections of copper sheets, each ten feet high, had been installed; another 58 feet of sheathing remained to be put in place. The report also mentioned the problems with the assembly process. The foreman had found it very difficult to select and fit the copper pieces, because "in many instances the numbering placed on them was either erroneous or had been rubbed off by the working of the *Isere* on the voyage." It had been "necessary to lift several pieces separately to the desired height in order to find the proper one." Now, however, with many pieces assembled and fewer pieces consequently remaining to choose from on the ground, the assembly work had become "much simplified."[58]

Furthermore, the thousands of rivets added "most materially to the labor, as they must be so driven as not to disfigure the statue by presenting conspicuous and unseemly lines."[59]

Figure 28. The installation of the copper sheathing. Engraving from Frank Leslie's Illustrated Newspaper, *vol. 63, no. 1620 (1886 Oct. 9). [Library of Congress]*

There were, according to an article in *Scientific American*, three types of joints used between the copper pieces:

> Where it is particularly desirable that the joint should be concealed, the meeting edges are brought flush together and are held by a double line of rivets through a strip covering the inside of the joint. In other cases one edge overlaps the other, a single line of rivets uniting them, and the outer edge is either hammered down to make a flush joint or is not touched further, the selection of the style of seam being governed by its location. The outer heads of the rivets, which are of copper, are countersunk.[60]

By the last week in September only the right arm with the torch and the head were missing from the Statue.[61] According to a story published in the *World* in September 1886, the American workers had become so accomplished in working with the copper that it had been "found unnecessary to retain the French artisans sent over by M. Bartholdi to erect the figure." The iron frame for the head had been "laid out at the base of the pedestal" and then would be "hoisted into place." The face itself, the largest element, would then be hung; the *World stated* that there was not a "single flaw in the mask," nor had it become misaligned.[62] Meanwhile, other workers were busy aloft, riveting the remaining pieces together:

> Hanging in a swing of ropes a man was rivetting [sic] the copper of the hand. In proportion he was little more than a Jersey mosquito on a human hand. He seemed perfectly unconcerned with his insignificance, however, and banged away at the plate with a merry whistle…[63]

COMPLETING THE STATUE AND THE UNVEILING, OCTOBER 1886

With the end in sight, the date of the unveiling was finally set; it would be held on October 28, 1886. The island continued to attract visitors, with sometimes hundreds a day arriving to inspect the progress. On Sundays service to the island was maintained on an hourly schedule.[64] As the date of unveiling approached and visitation swelled, the captain of one steamer gave up his schedule and simply ran continuously. The *Florence*, a large side-wheel steamer, began hourly service in mid-October.[65] Others traveled on the *Grace Pitt*, a large vessel "with ladies' cabins and other comforts," that made the trip in eight minutes. Before mid-October, according to one news account, the visitors had been "largely strangers in the city," but now "they were mostly New Yorkers who had postponed the trip so long that they began to fear that the statue would be finished before they could see it."[66]

On October 7 the *World* reported that the work would be completed "several days" before the unveiling. Seventy-five workers were now busy on the island, "putting the extra rivets in place where the plates have been held only temporarily." The right arm had been completed except for the hand; once that was in place, the diadem with its seven spikes would be installed. Finally, the torch would be hoisted in place.[67] Other workers were "giving finishing touches to the shoulders and face, and removing ropes and scaffolding now no longer required."[68] Once the scaffolding had been removed, the workers had to finish their work by dangling from long ropes, "moving like industrious ants over the classic draperies and uplifted arm of the mighty figure" and reminding one reporter of the "Lilliputians swarming over Gulliver in the picturebooks."[69] Another newspaper provided its readers with a colorful account of the activities on the island:

> Now that the unveiling is so near at hand everything is bustle and confusion down on Bedlow's [sic] Island. The walls of old Fort Wood, torn down in parts for the convenience of the workmen are being refurbished and rebuilt. The ramparts, overgrown with coarse grass, are being trimmed and set in turf, and the sloping banks outside that run down to the stout sea-wall must be leveled into a smooth terrace, which will be carried afterward back over ramparts, walls and everything to the pedestal's base. The long-abandoned powder magazine and the unsightly inner barracks are being blown away with dynamite and the rubbish will soon go to fill the hollows of the island at the back of the statue. There is the same incessant hammering of the copper bolts and rivets high overhead and one can hear the sharp metallic noises far across the water. The old fort at the statue's base is alive, too, with workmen digging, shovelling [sic] and trucking, sending the dust and dirt flying and making life a burden generally for the luckless sight-seers who have ventured down to catch a glimpse of the great bronze [sic] goddess in her unveiled state.[70]

On October 11 the "greater part of the torch" was put in place. The next day the workers were busy securing the flames of the torch, and on October 13 it was lifted into position. This work had proved "slow and difficult," with extra derricks required.[71] Then, just after the derricks were removed, Lt. John Millis, an engineer with the United States Light-House Board and an authority on electric lighting, arrived on the island and ordered the torch lowered to the ground so adjustments could be made. His men would "cut an aperture for the electric lights," so that instead of being outside on the balcony encircling the torch, the lights could be placed inside the torch, even though that space was only eight feet in diameter. At first Millis wanted his men to cut long, narrow strips from the torch and insert glass, but this approach was soon determined to be too time consuming.[72] Instead, he ordered two rows of holes, one above the other, to be cut into the torch and filled with plate glass. This was the first alteration to be made to the Statue, and it attracted criticism: according to one account, the effect was that the flame looked "like a huge sieve instead of a solid sheet of flame." Placing the lights within the torch also greatly reduced the amount of light visible from the torch. [73] At ground level, arc lamps, fitted with parabolic reflectors, were to be placed behind the parapet to help illuminate the Statue itself. Inside, "small incandescent lamps" would light the pedestal and the stairways up through the pedestal and the Statue. The lighting plant and system were the gift of the American Electric Manufacturing Company.[74]

Just as Millis arrived, workers from the Hecla Iron Works in Brooklyn began unloading and assembling the components of the iron staircase that would take visitors up through the interior of the Statue.[75] On Friday, October 15, the remaining fingers clasping the handle of the torch were installed.[76] Early the following week workers were busy installing the stars in the diadem.[77] Other last-minute tasks included placing the last piece of copper, the sandal pad, in place and removing the scaffolding at the feet of the Statue.[78]

The inauguration of the Statue had been set for October 28, and the date was declared a holiday in city offices and schools. Headed by General Stone as grand marshal, 20,000 marchers from military and civic units paraded down Fifth Avenue to the Battery in

Figure 29. Charles Graham's engraving of the unveiling of the Statue of Liberty. Harper's Weekly, November 6, 1886. [Harpweek digital database, accessed at New York Public Library]

the morning; in the afternoon there was a naval parade of 300 vessels sailing down the Hudson and into the harbor. President Grover Cleveland and other American and French officials stood on Bedloe's Island amid a "pandemonium of artillery salutes from the warships and shrieks from hundreds of steam whistles." U.S Senator William M. Evarts, who was also chairman of the American Committee and United States senator, "presented the Statue to the United States." A French flag, which had served as the "veil" and covered the Statue's face, was removed to a 15-minute-long cacophony of cheers, steam whistles, cannon bursts, and strains of the "Marseillaise."[79]

NOTES: ERECTING THE STATUE ON BEDLOE'S ISLAND

1. *New York Evening Post*, June 17, 1885, Box 10, File 169, Statue of Liberty Collection, Part II, Bob Hope Memorial Library at Ellis Island (hereafter, SOL Part II).
2. Ibid.
3. Quoted in Jennie Holliman, "The Statue of Liberty, Part II, The American People Receive the Statue of Liberty from the French," 35, MS Box 2, Folder 5, Bob Hope Memorial Library at Ellis Island.
4. Joseph W. Drexel to Thomas F. Bayard, April 26, 1886, quoted in Message from the President of the United States, Executive Document No. 232, U.S. House of Representatives, 49th Congress, 1st Session, p. 4, Box 11, File 174, SOL Part II. June Hargrove, "Reassembly on Bedloe's Island, in *Liberty, The French-American Statue in American History* (Cambridge: Harper and Row, 1986), 189-190. Holliman, 35-38. [*New York Times*?], June 20, 1885, Box 10, File 169, SOL Part II. Carole Perrault, comp., "Statue of Liberty

National Monument Historic Resources Study, Construction History: Ceremonies, 1997, p. 219, SOL Part II.

5. *Frank Leslie's Illustrated Newspaper*, July 4, 1885, pp. 324, 326, Box 10, File 170, SOL Part II. *New York World*, June 27, 1885, Box 10, File 169, SOL Part II.
6. *New York World*, June 27, 1885, Box 10, File 169, SOL Part II.
7. *Frank Leslie's Illustrated Newspaper*, July 4, 1885, p. 324, 326, Box 10, File 170, SOL Part II.
8. *Frank Leslie's Illustrated Newspaper*, July 4, 1885, p. 324, 326, Box 10, File 170, SOL Part II.
9. *Boston Globe*, June 18, 1885, Box 10, File 169, SOL Part II.
10. *New York World*, June 27, 1885, Box 10, File 169, SOL Part II.
11. *New York World*, June 27, 1885. *Boston Globe*, June 18, 1885, Box 10, File 169, SOL Part II.
12. *New York World*, Aug. 2, 1885, New York State Library (hereafter, NYSL).
13. *New York Tribune*, June 23, 1885, Box 10, File 169, SOL Part II. *New York World*, Aug. 2, 1885, NYSL.
14. *New York World*, April 22, 1885, NYSL.
15. "Liberty Enlightening the World," *Scientific American*, Vol. 62 (June 13, 1885), 375, NYSL.
16. "Liberty Enlightening the World," *Scientific American*, vol. 62 (June 13, 1885), 375, NYSL.
17. *New York World*, April 22, 1885, NYSL.
18. *New York World*, April 22, 1885, NYSL.
19. *New York Tribune*, Aug. 29, 1885, Box 10, File 170, SOL Part II. The press was denied access to the report for several days; *New York World* carried a synopsis of the report on Sept. 1, 1885, Box 10, File 171, SOL Part II.
20. "Liberty Enlightening the World," *Scientific American*, Vol. 62 (June 13, 1885), 375, NYSL.
21. "Liberty Enlightening the World," *Scientific American*, Vol. 62 (June 13, 1885), 375, NYSL.
22. *New York Tribune*, Aug. 29, 1885, Box 10, File 170, SOL Part II.
23. "The Statue of Liberty, New York," *Scientific American*, Vol. 55 (Nov. 20, 1886), 320, NYSL. This account also includes calculations that were used to determine the wind pressure on the Statue.
24. "Liberty Enlightening the World," *Scientific American*, Vol. 62 (June 13, 1885), 376, NYSL.
25. *New York World*, Aug. 2, 1885, Box 10, File 170, SOL Part II.
26. *New York World*, Aug. 2, 1885, Box 10, File 170, SOL Part II.
27. *New York Tribune*, Aug. 29, 1885, Box 10, File 170, SOL Part II.
28. Quoted in the *Boston Globe*, Aug. 11, 1885. "Cost of the Bartholdi Statue," *Engineering News and American Contract Journal*, Aug. 15, 1885, Box 10, File 170, SOL Part II. *New York World*, April 23, 1886, Box 11, File 174, SOL Part II.
29. *New York World*, Oct. 20, 1885, Box 10, File 171, SOL Part II.
30. *New York World*, Oct. 20, 1885, Box 10, File 171, SOL Part II.
31. *New York World*, Oct. 23, 1885, Box 10, File 171, SOL Part II Hargrove, 190-191].
32. *New York World*, Nov. 5, 1885, Box 10, File 171, SOL Part II. Hargrove, 191.
33. *New-York Daily Tribune*, Nov. 5, 1885, Box 10, File 171, SOL Part II.
34. *New-York Daily Tribune*, Nov. 7, 1885, Box 10, File 171, SOL Part II. *New York World*, Nov. 1, 1885, Box 10, File 171, SOL Part II.
35. *New-York Tribune*, Nov. 19, 1885, Box 10, File 171, SOL Part II.
36. *New York World*, April 5, 1886, Box 11, File 174, SOL Part II.
37. *New York World*, April 23, 1886, Box 11, File 174, SOL Part II.
38. *Congressional Record*, 49th Congress, 1st Session, p. 7456., in Holliman, 56.
39. [H. F.] Spaulding to [William M.?] Evarts, March 20, 1886, William M. Evarts Papers, Vol. 37, Manuscript Div., Library of Congress, trans. in Carole L. Perrault, comp., "Statue of Liberty National Monument Historic Resources Study, Construction History: Primary Source Materials, 1997, p. 117. *The World*, June 17, 1886, Box 11, File 174, SOL Part II.

40. *New York World*, April 23, 1886, Box 11, File 174, SOL Part II.

41. *New York World*, April 23, 1886, Box 11, File 174, SOL Part II. Message from the President of the United States, Executive Document No. 232, U.S. House of Representatives, 49th Congress, 1st Session, pp. 1-2, Box 11, File 174, SOL Part II.

42. Richard Butler and D. H. King Jr., Contract, May 5, 1886, trans. in Carole L. Perrault, comp., "Statue of Liberty National Monument Historic Resources Study, Construction History: Primary Source Materials, 1997, pp. 120-121. Carole Perrault wrote in "Liberty: To Build and Maintain Her for a Century" in Robert Baboian, E. Blaine Cliver, and E. Lawrence Bellante, eds., *The Statue of Liberty Restoration* (Houston: National Association of Corrosion Engineers, 1990), p. 22, that Bartholdi's representative was a "Mr. Bouquet."

43. C. P. Stone to John Newton, May 21, 1886, Box 10, File 173, SOL Part II.

44. *New York World*, June 17, 1886, Box 11, File 174; July 13, 1886, Box 11, File 175; SOL Part II. *The New York Sun*, July 10, 1886, Box 11, File 175, SOL Part II.

45. "The Statue of Liberty Nearing Completion," *Scientific American*, Vol. 55 (Aug. 14, 1886), 101, Box 111, File 175, SOL Part II.

46. "The Statue of Liberty, New York," *Scientific American*, Vol. 55 (Nov. 20, 1886), 320, NYSL.

47. *The New York Sun*, July 10, 1886, Box 11, File 175, SOL Part II.

48. *New York World*, July 13, 1886, Box 11, File 175, SOL Part II.

49. *New York World*, July 13, 1886, Box 11, File 175, SOL Part II.

50. *New York World*, July 23, 1886, Box 11, File 175, SOL Part II.

51. "The Statue of Liberty Nearing Completion," *Scientific American*, Vol. 55 (Aug. 14, 1886), 101, Box 11, File 175, SOL Part II.

52. *New-York Daily Tribune*, Nov. 7, 1885, Box 10, File 171, SOL Part II. *New York World*, Nov. 1, 1885, Box. 10, File 171, SOL Part II.

53. "The Statue of Liberty Nearing Completion," *Scientific American* Vol. 55 (Aug. 14, 1886), pp. 100-101, Box 11, File 175, SOL Part II.

54. *New York World*, Aug. 1, 1886, Box 11, File 175, SOL Part II.

55. *New York Evening Post*, Aug. 3, 1886, SOL Part II.

56. The Statue of Liberty Nearing Completion," *Scientific American* Vol. 55 (Aug. 14, 1886), pp. 100-101, Box 11, File 175, SOL Part II.

57. "The Statue of Liberty Nearing Completion," *Scientific American*, Vol. 55 (Aug. 14, 1886), 101, Box 11, File 175, SOL Part II.

58. *New York World*, Aug. 19, 1886, Box 11, File 175, SOL Part II.

59. "The Statue of Liberty Nearing Completion," *Scientific American* Vol. 55 (Aug. 14, 1886), pp. 100-101, Box 11, File 175, SOL Part II.

60. "The Statue of Liberty Nearing Completion," *Scientific American*, Vol. 55 (Aug. 14, 1886), 101, Box 11, File 175, SOL Part II.

61. *The New-York Daily Tribune*, Sept. 26, 1886, Box 11, File 175, SOL Part II.

62. *New York World*, Sept. 12, 1886, Box 11, File 175, SOL Part II.

63. *New York World*, Sept. 22, 1886, Box 11, File 175, SOL Part II.

64. *New York World*, Sept. 12, 1886, Box 11, File 175. SOL Part II. *New-York Daily Tribune*, Sept. 26, 1886, Box 11, File 175, SOL Part II.

65. *New-York Daily Tribune*, Oct. 14, 1886, Box 11, File 176, SOL Part II.

66. *New York World*, July 13 1886, Box 11, File 175; Oct. 11, 1886, Box 11, File 176; SOL Part II

67. *New York World*, Oct. 7, 1886, Box 11, File 176, SOL Part II.

68. *New York Daily Graphic*, Oct. 8, 1886, Box 11, File 176, SOL Part II.

69. *New-York Tribune,* Oct. 10, 1886, Box 11, File 176, SOL Part II *Frank Leslie's Illustrated Newspaper*, Oct. 9, 1886, Box 11, File 186, SOL Part II.

70. *New-York Tribune*, Oct. 10, 1886, Box 11, File 176, SOL Part II.
71. *New-York Daily Tribune*, Oct. 12, 1886, Oct. 13, 1886; Oct. 14, 1886; Box 11, File 176, SOL Part II.
72. Holliman, 64.
73. *New-York Daily Tribune*, Oct. 12, 1886, Oct. 13, 1886; Oct. 14, 1886; Box 11, File 176, SOL Part II. *New York World*, Oct. 14, 1886; Oct. 17, 1886; Box 11, File 176 SOL Part II. On Oct. 14 the *Daily Tribune* reported that the lights had 6,000 candlepower; Box 11, File 176, SOL Part II. Holliman, 64.
74. *New-York Daily Tribune*, Oct. 14, 1886, Box 11, File 176, SOL Part II. *New York World*, Oct. 17, 1886, Box 11, File 176, SOL Part II. Holliman, 64-65.
75. *New York World*, Oct. 14, 1886; Oct. 16, 1886; Box 11, File 176, SOL Part II.
76. *New-York Daily Tribune*, Oct. 16, 1886, Box 11, File 176, SOL Part II.
77. *New York Daily Graphic*, Oct. 18, 1886, Box 11, File 176, SOL Part II.
78. Carole Perrault, “Liberty: To Build and Maintain Her for a Century,” p. 23.
79. Holliman, 67-71.

Figure 30. The Statue in ca. 1886. [Photo-Gravure Co., NY, Annual Report of the Light-House Board to the Secretary of the Treasury, *Washington, Government Printing Office, 1886; photocopy from Carole Perrault files, NPS, STLI, Ref. Lib.]*

UNITED STATES LIGHT-HOUSE BOARD, 1886-1902

The Statue and its torch were illuminated for the dedication, but the effect was not as intended, and a solution proposed by Millis did not produce the intended result either. The point was rendered moot, however, a week after the dedication, when funding for the lighting ran out. The Light-House Board was obliged to extinguish the lights, much to the chagrin of the American Committee, since the French Committee, in New York for the dedication, had not yet left town. The lights at the Statue remained dark until November 22, 1886, when President Grover Cleveland turned the Statue over to the Light-House Board.[1]

Much of the information on the history of the Statue during the years when the Light-House Board was responsible for the Statue comes from monthly reports to the board from the engineers and inspectors and from the board's annual reports. A December 1886 report by engineer Lt. John Millis, for example, delineated the details of how the Statue was originally illuminated:

> Lighted by 1 Wood's dynamo and 15 Wood's arc lamps which cost about $4,000., and 14 incandescent lamps for lighting the interior of the Statue. These last were changed to 3 arc lamps instead of the incandescent ones, as more advisable, to be operated from the main dynamo, for interior illumination.
>
> Of the 15 arc lamps, 9 are in the torch and 5 fitted with reflectors to illumine the statue and pedestal are placed in the salient angles of the fort, and 1 in the engine room; with one duplex and one single arc lamp in reserve; besides a steam pump, injector heater, circuit cut-outs, and other necessary accessories.
>
> The "flame" of the torch was cut at the sides and the openings were covered with glass. The lamps within the torch shine through these openings. They are seen at full power from a distance and diminish to obscurity as the observer approaches the island.
>
> The electric apparatus was designed and built by Mr. James J. Wood, electrician of the American Electric Manufacturing Co."[2]

The engineer's annual report for 1887 to the Light-House Board stated that "little difficulty has been experienced" with the lighting at the Statue, even though it was of "necessarily imperfect character" due to the rush in installation.[3]

In October 1887 Millis wrote to the Treasury Department concerning gates that he thought were needed at the Statue:

> I have the honor to state that the grating or gate at the entrance to Statue of Liberty from Pedestal will cost about $25. The one which it is proposed to put at entrance to arm…will be of peculiar shape and had best be made and fitted by workmen from the depot using material in store.[4]

The construction of the gate to the arm from "materials on hand at the General Depot" was authorized. A separate application would be needed for a gate at the entrance to the Statue.[5] Apparently this application was filed, since records from later that month

Figure 31. A rare view of the Statue of Liberty from the west, ca. 1891. [S.R. Stoddard, Glens Falls, NY; Library of Congress]

authorized the purchase of "wire door and screen at entrance to Statue from pedestal including placing in position."[6]

In May 1888 Major D. P. Heap forwarded to the chairman of the Light-House Board a memorandum from the American Committee dealing with the "necessity of completing the pedestal and Approaches to the Statue." Heap was certain that there was "no question but that this work should be done." The conditions were, at best, unsightly. " The "wooden staircase and platforms are shabby, make-shift, only intended for a temporary purpose," he wrote; the "base of the pedestal is of béton and should be concealed in accordance with the general design proposed by the American Committee." He warned that "this unsatisfactory condition of affairs" would persist until Congress made an "adequate appropriation" of at least $50,000. He recommended that that amount be requested.[7]

The engineer's annual report for the year ending June 1888 noted that the following work, which has been requested less than a year earlier, had been done: "two iron gates have been made and fitted, one at the foot of the steps, leading from the pedestal to the statue, with a jib shaped netting fastened to the rail of the steps; the other in the arm near the head."[8]

The extract from the inspector's report for the same fiscal year listed the following equipment related to the Statue: "Electric light, from 14 Woods arc lamps, nine in the torch of the statue, and five in the salients of the forts." In addition, "double spiral stairs" were "being put in the statue from base to shoulder. A lamp was fitted in the base." The inspector reported that it had been "necessary on several occasions to make slight repairs to the dynamo, and, in consequence, the lights were discontinued for the time being."[9]

By the next spring the impending centennial celebration of George Washington's inauguration as the first president of the United States, scheduled for April 29, 1889, prompted an appraisal of conditions at the Statue in advance of the number of visitors who were expected to be on the island to witness the naval parade. In a letter sent to the chairman of the Light-House Board less than a week before the parade, Commander Frederick Rodgers, the inspector, recommended that the Statue be closed to the public during the parade "as a proper precaution against accidents and as a matter of public safety as well as to prevent injury to the work," explaining that the "interior of the Statue is dark and the stairways and passages are narrow and very crooked," thus making it "entirely unsuited for the accommodation of crowds."[10] His request was granted.[11]

The engineer's monthly report for June 1889 stated that "six new lamp houses for reflectors" were almost finished.[12] The engineer's annual report for the year ending June 1890 recounted that "contracts were concluded in April 1890 with the United Edison Manufacturing Company for an incandescent light plant and with the United States Electric Lighting Company in May 90 for a dynamo generator." In addition, "eleven new lamp houses for the lights about the base of the Statue were built and the new incandescent electric light plant for lighting the interior of the Statue and pedestal[,] the engine house and keeper's dwelling was completed" and a "dynamo electric generator for the new lamp to be placed in the torch was completed."[13]

The 1892 annual report of the inspector reported on "an improved method of lighting the Statue of Liberty," which had been authorized by the Light-House Board and designed by D. P. Heap: "briefly it consists in producing a powerful white light in the focal plane of the torch and a vertical beam of colored light or 'flame.'"[14] The inspector's report from the following year listed the lighting equipment and confirmed the implementation of Heap's plan:

> One electric arc lamp on the torch[,] four in the salients, of 6000 c.p. each; one search light and fifty incandescent lamps in the torch. On October 21st., 1892, the characteristics of the light were changed. In addition to the light shown from the torch, a vertical beam of red and yellow light was shown; the face and bust of the statue were illuminated by a search light from the salient of the fort, and the coronet was decorated with red, white and blue incandescent electric lights.

The report noted again the need for $50,000 to finish the pedestal, reiterating D. P. Heap's 1888 request. This report also noted for the first time that the site was in fair, rather than good, condition.[15] Apparently Frederic Auguste Bartholdi, the Statue's creator, agreed, since when he had visited the United States and seen the condition of his Statue in 1893, he wrote to Heap, stating that:

> As it is impossible to have the Statue illuminated by night on account of its dark color, it has been thought best to have it painted in a clear color. I think at first that the best plan would be to have it gilded, but if it is too expensive, it would be necessary in any way to have it painted in such manner that it would appear metallic. If we should not succeed in that way, I think that best thing would be not to illuminate by reflection the pedestal and to preserve the power for the light of the torch, and to have only some lights disposed around the pedestal in a decorative was (sic), as a garland, so as to show where it is.
>
> If the pedestal remains in the dark, it will be much easier to illuminate the crown. Perhaps it could be done with a central lantern projecting rays alternately tri-colored.
>
> I think, also, that it would be very interesting and useful to have the inside of the Statue illuminated during some hours in the day, so as to show the people the arrangement of the work and allow an accurate examination of all the parts, which could be altered.[16]

However, the issue would not be addressed until the latter half of the decade.

Due to budgetary concerns, the decorative lights at the Statue were eliminated one by one, until in July 1895 only the torch lights were still burning.[17] Documents from 1896 reported broken glass in both the head and lamp house at the base of the Statue; repairs were to be made for less than $99.[18] The 1896 annual report noted that the "lamp house around base of Statue [was] removed and broken glass in head of Statue replaced."[19]

Although a letter from the summer of 1896 stated that there was no "intention at present to light the interior of the Statue of Liberty with electric lights,"[20] by October of that year William Ludlow, the engineer of the Third Light-House District, wrote about the following concerns and instructions:

> The Board has reason to believe that the condition of the Statue of Liberty is unsatisfactory, that the present system of lighting could be improved and the cost reduced, and desires a detailed examination and report of the condition of the Statue, pedestal and surroundings, as to the repairs and improvements needed for preservation and maintenance and for putting the surroundings in proper condition, with estimates of cost

*Figure 32. Photograph by William Eddy, using a camera mounted to a kite, ca. 1900. Note the platform and wood stair. [*St. Nicholas, *June 1900, vol. XXVII, No. 8, p.727.]*

Figure 33. View of the Statue of Liberty from the south, ca. 1896. [Photographic Views of the Statue of Liberty and New York Harbor from Recent Original Photographs, *Rand McNally & Co.; photocopy from Carole Perrault files at NPS, STLI, Ref.Lib.]*

> of what may be needful. You will therefore make the necessary examination and report, with estimates to cover the following points:-
>
> 1st. Condition in detail of exterior and interior of Statue.
>
> 2nd. Condition of pedestal.
>
> 3rd. Condition of surroundings and adjuncts of the LH Bldgs
>
> 4th. Condition of the lighting system as to methods, efficiency and cost.
>
> 5th. Recommendations in detail as to improvements in lighting system,- probable cost of alterations and probable cost of maintenance thereafter.
>
> It is desired that all this information be fully detailed--after careful examination--and that the report be accompanied by detailed estimates of cost including cleaning, painting, and all repairs and modifications.[21]

By December 1896 the correspondence was proceeding apace. John M. Wilson, a colonel in the Corps of Engineers and the chairman of the committee on engineering, wrote to the Light-House Board on December 5 on behalf of his committee in favor of several of the recommendations put forth by the engineer: removing the wooden stairway in the Statue, painting the iron stairways in the pedestal, and installing "proper fastenings" in the glass windows of the coronet. In addition the committee recommended that the "proper method of cleaning the outside of the Statue, and the cost be ascertained with a view to having this cleaning done, and that the American Committee be requested to furnish to the Board copies of any plans and estimates that may have been prepared for additional work in connection with the Statue."[22]

Just a few days later John Millis reported that the Board had approved these recommendations but had indicated that the wooden stairway was to be "renewed."[23] A week later the Board decided that the stairway was instead to be removed.[24] Meanwhile, Millis had received a letter from Wilson regarding the best way to clean the Statue, which included recommendations that he had received from noted sculptor Augustus St. Gaudens. St. Gaudens stated that, although he liked the appearance of verdigris and that "sculpters as a rule seek to obtain it on their work," the different parts of the Statue could be cleaned "once a week by simply rubbing them over with a flannel cloth" or by "a simple washing with soap and water," although he also recommended scrubbing the Statue with a dilution of powdered pumice and a stiff brush, followed by "an application of white wax dissolved in turpentine, to the consistency of a very liquid paste" in order to preserve the natural finish.[25] Wilson told Millis frankly that funds were not available for these recommendations and that they would have to be content with cleaning the Statue "once or twice each year, using sapolio, scrubbing brushes and sponges."[26] Sapolio was a popular brand of soap at the time.

The annual report for 1897 stated that the Board had decided to install a more efficient lighting system in order to reduce operating expenses and that they had installed fasteners for the coronet windows "for locking, open and shut."[27] In 1898 the steam engine powering the electric plant was replaced with a 10 horsepower oil engine, in order to reduce operating expenses.[28]

Apparently security at the Statue was still a problem at the end of the nineteenth century. In June 1891 the keeper wrote to the inspector about a group of visitors who had destroyed several hand lanterns that had been "placed along the stairs in the statue and pedestal for lighting visitors to and from the head."[29] The engineer's annual report for 1901 noted the installation of a "new fence and gate built at shoulder of Statue, to prevent unauthorized admission to arm and torch."

NOTES: UNITED STATES LIGHT-HOUSE BOARD

1. The Lights at the Statue of Liberty, Report 1945, Box 20, File 285, Statue of Liberty Collection, Part II, Bob Hope Memorial Library at Ellis Island (hereafter, SOL Part II).
2. John Millis to Chareman [sic] of Light-house Board, Dec. 22, 1886, Box 12, File 188, SOL Part II.
3. Annual Report 1887, Statue of Liberty [this is a document with excerpts from the annual reports 1887-1902], Box 12, File 185, SOL Part II.
4. John Millis, Oct. 11, 1887, Box 12, File 190, SOL Part II.
5. [can't read signature], Major of Engineers, Oct. 12, 1887, Box 12, File 190, SOL Part II.
6. [can't read signature], Major of Engineers, Oct. 14, 1887, Box 12, File 190, SOL Part II.
7. D. P. Heap, May 3, 1888, Box 13, File 192, SOL Part II.
8. Engineer's Annual Report for the Year Ending June 1888, Box 12, File 186, SOL Part II.
9. Extract from the Annual Report of the Inspector, Third L.H. Dist. for the Year Ending June 30th, 1888, Box 12, File 188, SOL Part II.
10. [can't read initials] Rodgers to the Chairman of the L. H. Board, Apr. 24, 1889, Box 13, File 193, SOL Part II.
11. [can't read signature] to Commander Fredk. Rodgers, Apr. 25, 1889, Box 13, File 193, SOL Part II.
12. Engineer's Annual Report for Year Ending June 1889, July 6, 1889, Box 12, File 186, SOL Part II.
13. Engineer's Annual Report for Year Ending June 1890, Box 12, File 186, SOL Part II.
14. Extract from the Annual Report of the Inspector, Third L.H. Dist. for the Year Ending June 30th, 1892, Box 12, File 188, SOL Part II.
15. Extract from the Annual Report of the Inspector, Third L.H. Dist. for the Year Ending June 30th, 1893, Box 12, File 188, SOL Part II.
16. Bartholdi to Heap, Sept. 7, 1893, in Carole Perrault, comp., Statue of Liberty National Monument Historic resources Study, Lighting History, Documentation: Nineteenth Century, pp. 293–294.
17. Carole L. Perrault, "Liberty Enlightening the World: Part I," *The Keeper's Log* (Summer 1986): 16.
18. [can't read signature] to H. M. Adams, Mar. 28, 1896, Box 13, File 205, SOL Part II.
19. Annual Report for Year Ending June 30, 1896, Box 12, File 187, SOL Part II.
20. [can't read signature] to Mr. W. O. Knudsen, The Electric Storage Battery Co., July 2, 1896, Box 13, File 205, SOL Part II.
21. Memorandum, William Ludlow to Mr. Lamy, Oct. 12, 1896, Box 13, File 205, SOL Part II.
22. John M. Wilson to the Light House Board, Dec. 5, 1896, Box 13, File 205, SOL Part II.
23. John Millis to William Ludlow, Dec. 9, 1896, Box 13, File 205, SOL Part II.
24. John Millis to William Ludlow, Dec. 16, 1896, Box 13, File 205, SOL Part II.
25. Augustus St. Gaudens to John M. Wilson, June 20, 1895, attached to John M. Wilson to John Millis, Dec. 14, 1896, Box 13, File 205, SOL Part II.
26. John M. Wilson to John Millis, Dec. 14, 1896, Box 13, File 205, SOL Part II.
27. Annual Report for 1897, Box 12, File 187, SOL Part II.

28. Annual Report 1898, Statue of Liberty [this is a document with excerpts from the annual reports 1887-1902], Box 12, File 185, SOL Part II.
29. A. E. Littlefield to E. M. Shepard, June 13, 1898, Box 13, File 208, SOL Part II.

Figure 34. The Statue of Liberty, ca. 1901. [Irving Underhill, 17 Park Place, New York; Library of Congress]

JURISDICTIONS AND CONDITIONS ON THE ISLAND, 1901-1933

A joint report filed by engineer Lieut. Col. D. P. Heap and inspector Capt. E. M. Shepard of the Third Light-House District on January 2, 1901, had summarized the results of a recent inspection of the Statue by Lieut. Spencer S. Wood:

> He reports that there is some rust on the lower part of the staircase, but that this is unavoidable on account of the dampness. He also states that there are numerous rivet holes in the Statue, through which the light can be seen, but that these holes were in the Statue when originally erected, and are not due to corrosion; that the Statue itself is in no danger, and that the American Committee, for the convenience of visitors, lights the interior of the Statue with kerosene lamps,-the only means available to the Committee. The interior walls were originally lighted with incandescent lamps, paid for from light-house appropriations; they were discontinued on account of the expense.
>
> It is undoubtedly true that the pedestal should be completed and other improvements made. Congress has been asked to appropriate the necessary funds, but so far has failed to do so.[1]

The responsibility for the site continued to be divided among the Light-House Board, the American Committee, and the War Department. The Light-House Board was responsible for maintaining the light in the torch and the power house and plant and for providing and housing the keepers. The American Committee was responsible for repairs to the Statue, including painting and interior lighting; they also provided a watchman. The committee's jurisdiction ended at the walls of the fort. The War Department cared for the remaining buildings and grounds.[2]

Later in January 1901 Capt. Shepard was reminded by the secretary of the navy that the Light-House Board was "responsible for the maintenance and the lighting of the statue as a beacon light" and that he was to take "proper measures…for the care and preservation of the statue, as well as for maintaining the light."[3] In March 1901 the Light-House Board installed a gate and new fence at the shoulder of the Statue to prevent visitors from entering the arm and torch.[4]

Another report, filed in June 1901, by the army post commander, Maj. A. C. Taylor, provided more details about the jurisdictions on the island and the poor conditions at the Statue. The Light-House Board controlled about three acres of the western end of the island, as well as the lighthouse functions of the Statue. The American Statue Committee was "supposed to control and care for the Statue and its immediate surroundings." The War Department controlled the eastern end of the island with the exception of Fort Wood and exercised "police jurisdiction" over the Statue. The report also outlined the situation on both the exterior and interior of the Statue. There was "no evidence that either money or work have been expended" since the Statue was opened some 15 years earlier:

> except inside painting of Ironwork, &c. The exterior of the statue itself is covered with verdigris, the rough cement foundation is cracked, shaling and discolored by the drip from the copper above during rains.

In the pedestal there are four entrances through handsome stone doorways, three of these are boarded up with rough planks, and the fourth, the only entrance, is reached by a wooded unpainted stairway. Inside, the only means of lighting, above the pedestal, is by kerosene [sic] oil lanterns of the cheapest pattern, these are placed at intervals affording a very dim light and giving off an offensive odor.

When it is remembered that hundreds of visitors, climb these dark narrow stairs daily and breathe the suffocating, nauseating air, it is remarkable that so few casualties occur. Cases of ladies fainting are quite common, however. Absolutely nothing of the magnificent interior engineering can be seen, and it is strange that so many people risk their lives by climbing to the head.

Outside the Statue, immediately surrounding its base, the ground is of cinders with occasional patches of wild grass. At one point an old cistern has partially caved in, and at another a small area has an old broken irregular flag pavement. The surrounding interior wall of the old fort is broken and irregular, discolored patches of old mortar and the stain of years. Altogether, inside and out, the statue of Liberty as it now stands is a distinct disgrace to our country.[5]

Taylor also explained that the American Committee, which was charged with maintenance of the Statue, then consisted of only two men, one of whom, Richard Butler, was an elderly invalid. According to Taylor, the other member, Cornelius Bliss, had told the army that the committee "could not, and would not do a thing involving any considerable expenditure of money, and also said that he would urge the War Department to take control." Taylor seconded this course of action, adding that the proposed return of Light-House Board land and buildings to the War Department would also be beneficial. It would, he wrote, "simplify matters, for it would give the War Department control of the Electric Lighting plant, and the interior of the Statue, as well as the entire post, can be lighted by electricity."[6]

THE WAR DEPARTMENT TAKES CONTROL, 1901-1906

In December 1901 Secretary of War Elihu Root wrote to President Theodore Roosevelt regarding the state of the monument, telling him that the "light in the statue is useless so far as navigation is concerned" and advocating the use of the Statue "as a beacon, but not as a lighted beacon," thus eliminating the need for the Light-House Board to be involved. Root also told Roosevelt that turning the monument and site over to the War Department was "in accordance with the desires and recommendations of both Departments." On December 30, 1901, Roosevelt approved this transfer.[7]

The logistics of transferring the Statue of Liberty and its site to the oversight of the War Department were still underway in 1904. In a letter written in May of that year to the adjutant general Capt. G. C. Burnell of the Signal Corps laid out the current conditions along with proposed work and costs, explaining that the Statue was in a "deplorable condition":

The Statue is reached by several flights of wooden stairs, which are urgently in need of repair. They have been in position for some years and many of the planks and stringers

> and uprights are rotted and in a very weakened condition. They should be immediately repaired, for at present they are a constant source of danger to visitors. An estimate has recently been submitted for a concrete walk and approach from the dock to the Sally port entering the moat.
>
> The moat surrounding the Statue and the interior walls of the fort are in bad condition. The walls have caved in at places, and a great many of the stones have been displaced from the steps leading from the moat to the parapet, and are scattered about the moat.[8]

Burnell had also found the interior of the Statue to be poorly lighted. In addition, he wrote:

> There are ten openings or doors leading out to the balconies on the three landings of the foundation of the Statue. At present some of them have rough unsightly doors, and others closed by having rough strips nailed across the opening. Provision should be made to close all entrances at the landings with doors and windows. This would require seven doors and three windows.
>
> It is estimated that it would take about $375.00 to repair stairs, doors, windows and surroundings, and place them in fair shape…[9]

It was his understanding, Burnell wrote, that approximately $40,000 was available for maintenance of the Statue and grounds in a fund administered by the American Committee, but he had been unable to contact Cornelius Bliss, head of the committee. Burnell recommended that a portion of the fund be appropriated for repairs and upkeep of the Statue and its site "until the original plan is completed."[10] On June 30, 1904, Bliss transferred the amount of $38,989.49 to the United States Treasury.[11]

In September 1904 Capt. William E. Horton, the acting chief quartermaster, submitted a letter, along with plans and specifications, to the adjutant general, outlining the work needed at the monument. This proposal included the installation of electric lighting, including three additional lights in the torch; a power plant to serve all of the island; and an electric elevator that could carry up to a dozen passengers and would run to the top landing of the pedestal. An iron bridge and stairs were recommended to replace the wooden structure at the pedestal entrance that was the lament of earlier reports. Horton also advised that the area around the pedestal should have drains installed and "be concreted," that doors and windows be "fitted to the openings on the sides of the pedestal, and that new windows be fitted to the openings in the brow of the Statue." The "walls and interior of the Statue" were to be painted.[12]

Apparently not much progress had been made by the summer of 1905. Charles Kent, a Brooklyn steeplejack, had visited the Statue in June and wrote to William Howard Taft, then the United States secretary of war, detailing his observations and soliciting work for himself and his men:

> I will let you know what I seen on June 14th as I climb from beam to brace inside of the Statue of Liberty…Got up into the middle of Statue (I had a light with me). I found that some of the bolts loose, rusted; and screws which was torn nearly out through from the copper, and corrode, full of rust, and no where you may look pin holes by the hundreds, size of these. And it must leak like a [sieve?] as I found all the braces, beams, and

> stanchions wet, and not wet, with sweat, but rain water; was then 3/4 way up. I then felt a heavy vibration. I held on tight to a brace arms and legs tight around this brace. Mr. Taft, this was from the people coming up the winding staircase; to my judgment there was from 6 to 9 inches sway when they all got up to the crown, that is, under the top of the Statue head, you may say inside of her head, the vibration was greater as they move from place to place. I stay where I was until they all got down to the bottom of the Statue skirt, and to my surprise there was a tremble that went through the Statue like as if some one took you by the shoulder and shook you quickly. This I found out after when I got to the bottom. Later, I start up, was all along under her crown, the only one in the Statue. I then took hold of a brace up there; I push once, the vibration was greater and the trembling lasted say over a 1/4 of a minute. I try to get up into the arm; I could not as the door was lock. I look out and aro[und] and as far as I could see I found that the arm had lot of rust. Scales on it say 1/2 of a 1/6 thick, and all the copper rivets in her neck have work loose [The metal] is say 1/8 thick. I could see partly down along her skirt and I find it heavy corrode all over her arm, the up right one, and her shoulders. I could not go any further on the outside and all could see was with my head through her crown and looking down.[13]

In July 1905 an official report on the state of the monument and costs associated with rectifying the problems was submitted by Sedley Chaplin, a civil engineer and superintendent of construction, to the chief quartermaster on Governor's Island. Chaplin detailed the following conditions of the foundation and pedestal:

> Relative to the incompleted work on the foundation and pedestal of Statue, the designer of the Statue evidently intended that the area inside of the parapet walls from top of same to top of concrete foundation be filled in with earth, the entrance for the Statue to be through the doors on each side at bottom of pedestal.
>
> The height of concrete foundation from existing grade to bottom of pedestal is approximately 35 feet, built in step courses of about three feet wide. To improve the appearance of the face of these courses a skim coat of cement plaster has been applied to same, but the action of moisture, frost, etc. has caused this skim coat to crack, check and become loose and in many places to come off, thereby causing the foundation to have an appearance of disintegration, settlement and dilapidation. The foundation, however, is in excellent condition, only a slight settlement having taken place. The granite of the pedestal is backed up by concrete and this concrete lining is in perfect condition, not a single crack being anywhere visible. There are some slight leakages which are shown by damp places in this concrete lining but this can be easily remedied by repointing the joints of granite where defective. What is most noticeable and probably what causes most comment at the present time is the apparently neglected and dilapidated state of the grounds, together with incompleted work in connection with the foundation and pedestal….
>
> If the area surrounding foundation is not filled in, some steps should be taken to improve the appearance of the face of the foundation. This can be done in various ways, by facing with ashlar, by wire lathing and concrete, by cement wash, etc. but as the cost of this work varies considerably and as nothing is known of amount of money available for this purpose no estimate for same is submitted herewith.[14]

As for the openings for the doors and windows, according to the report they were then:

> stopped up with temporary batten doors. These openings should have appropriate doors and windows and to harmonize with the character of the Statue they should be of metal. Three iron gates should also be placed so as to shut off recesses on first landing to prevent the using of these places as lavatories.[15]

Regarding the lighting, Chaplin stated that:

> The Statue is imperfectly lighted and a larger number of incandescent lights should be distributed throughout the interior of the Statue and pedestal. This especially applies to the upper part of the Statue, many places on the spiral stairway being in shadow at the present time.
>
> In numerous places the electric wiring is in poor condition, insulation of wires being nearly worn off where same rubs against the iron work. All the wiring should be run in conduits to avoid any possibility of grounding or of persons coming in contact with live wires.[16]

As for the condition of the Statue itself, the report noted:

> The exterior surface presents a greenish gray appearance. A small piece of metal taken from a loose piece of ornamentation on the railing on balcony of torch accompanies this report and shows the average condition of the metal. On horizontal parts of the Statue the coating is heavier and slightly darker in color. This discoloration or thin coating of carbonate of copper has not apparently injured the metal to any appreciable extent. To clean or polish the exterior surface of the metal would neither improve the appearance of the Statue or preserve the metal. Cleaning by any known method means only the removal of the surface of the metal and if cleaned the polished surface would be more subject to oxidization than if left in its present condition…
>
> I should consider that at the present time work on the exterior of the Statue is unnecessary, with the exception of regilding the top of the torch and painting floor and inside of railing of the balcony.
>
> The pin holes and other holes that show on the inside of Statue are the result of misplaced rivet holes, cracks or splits caused from the hammering or shaping of the metal…and also from a small number of rivets that have worked loose or were not originally put in place.
>
> The entire interior surface should be carefully gone over, all cracks, holes, etc. should be soldered up from the inside, rivets, where necessary, should be put in and all other little imperfections repaired.
>
> The small openings in the crown and torch should be provided with heavy metal sashes, to keep the weather out, as quite a large amount of water must come in these openings during stormy weather. In numerous places the interior of Statue is covered with patches of verdigris,- no doubt caused by moisture from condensation combined with lack of circulation of air and absence of light. This moisture from condensation, which oftentimes is considerable, has a tendency to produce a certain amount of galvanic action between the iron frame and copper casing of the Statue, especially as the coating of paint becomes worn off.

For the proper preservation of the metal, both iron and copper, and also to improve the appearance of the interior of the Statue, all interior metal work should be painted a coat of red lead and two coats of light colored paint.[17]

As far as the ironwork was concerned, the report stated that

With a few slight exceptions the iron frame of the Statue is in a good condition. The paint, however, is off in many places and some corrosion has occurred, not enough to have injured the iron to any appreciable extent.

The iron railing of stairs at third story landing needs some repairing; new angle irons should be put in angle of gallery railing and this railing needs straightening.

A couple of braces in the arm require rebolting and a few of the copper straps need reriveting.

In general, the interior of the Statue should be thoroughly gone over, repaired and renovated, all metal work to be carefully cleaned and painted, all holes stopped up, bolts and rivets, where needed, being replaced.

The appearance of the concrete lining of the pedestal would be materially improved by being painted.[18]

The report also included the following "approximate estimate of the work necessary to improve and preserve the interior of the Statue." No estimate of exterior work was included except for the repointing needed on the pedestal:

Painting all metal work, regilding torch and painting balcony, etc.	$3,500.00
Three iron gates at first landing	50.00
Repairing iron work	250.00
Repairing copper work	500.00
Electric re-wiring (To be done by Signal Corps on Island; if not cost would be	300.00
Ten (10) metal doors and frames at $150. each	1,500.00
New metal sashes in head and torch	200.00
Repointing joints in granite pedestal	100.00
TOTAL..	$6,400.00[19]

Chaplin's letter to the chief quartermaster on Governor's Island was forwarded to the United States Quartermaster General, seconding Chaplin's recommendations therein.[20] A month later, on August 15, Burnell again wrote to the adjutant general, expanding upon his concerns from the previous year.[21] In terms of the grounds and the monument itself, Burnell noted that he concurred with the plans already submitted by Horton.

That fall, complaints by a visitor prompted Burnell to defend the War Department's custodianship of the Statue thus:

The fact of the matter is that the Statue and its immediate surroundings, since passing under the care of the War Department, have been improved as much as possible without having a sufficient allotment of funds to make the necessary repairs to place them in good condition.

> The defaced walls, plate glass covering the broken glass in the crown…were conditions which existed when the Statue was turned over to the Army by the Civilian Committee and can only be remedied by an allotment of funds. They, however, form only a small portion of the needed repairs to the Statue.

"Since the garrison took charge," Burnell continued:

> estimates have been made from time to time for such work as was absolutely necessary, such as repairing the walk leading from the wharf, repairing the steps and staging at the entrance of the Statue, which were in a dangerous condition; also for the erection of two temporary toilet rooms for the accommodation of the visitors in order to prevent the dark corners and recesses of the Statue and surroundings being defiled. For this funds were obtained and the work was done, together with such other work as could be done by the troops without funds.[22]

For additional work more funding would be needed.

At the beginning of 1906 the quartermaster general prepared a memorandum summarizing the recent history—including the deposit of $38,989.49 in 1904 to the United States Treasury from the American Committee—and the current state of the Statue of Liberty and Bedloe's Island.[23] The document noted that no special appropriations had been received to date for the care of the Statue; instead the War Department had had to defray the cost of repairs from its "current annual appropriation." The War Department had not even succeeded in freeing up the funds transferred from the American Committee. The existing lighting plant was reported to be "worn out, inadequate and almost wholly useless for furnishing the lights required for the Statue proper." A special appropriation of $25,000 was needed for "light and power for the Statue," and more funds were required for other important repairs.

Burnell appealed again to the quartermaster general on February 13, 1906, stating that the work on the interior of the Statue "should be done with the least practicable delay."[24] In terms of improvements to the exterior of the Statue and the grounds, he outlined the following work and cost estimates:

To construct platform on a steel frame, with iron stairs leading to the approach of the Statue, in place of the temporary wooden structure that is now in very bad condition -	$2,500.00
To repair concrete foundation, base of pedestal, with artificial stone finish -	5,000.00
To repair walls around base of Statue, principally on the inside, furnish new cap stone, and to lay concrete floor in area -	5,600.00
For grading, covering with loam, sodding and s[e]eding adjacent ground -	8,000.00
For repair of brick work in sally port, with artificial stone finish -	700.00

To repoint and clean granite base -	3,800.00
For walks, gutters and stone steps, etc., -	4,700.00

Burnell added that an estimate for electric lighting was not included in his list because a bill had been introduced in Congress for that work. Another additional cost would be an elevator "for the visitors to use to ascend the 150 feet to the top of the pedestal," which would cost an extra $9,000.

REPAIRS BEGUN, 1907-1908

In April 1907 the War Department issued a 66-page set of specifications for work to be done at the Statue and on Bedloe's Island,[25] and on May 1, 1907, Burnell placed an advertisement for "sealed proposals, in triplicate, for making Repairs and Additions to Statue of Liberty, including filling and grading, repairs to concrete work, furnishing and installing elevator, painting steel framework, constructing walks and steps, furnishing settees, dredging and making wharf repairs, and constructing house and fence on wharf." In June the United States quartermaster general notified Burnell of the accepted bids, which, as noted in the appendix that follows this chapter, were awarded by section and which the secretary of war had "made sufficient allotment to cover":

James H. Ferguson, bid #6	
Section 1. Filling and grading inside and outside fortification wall	$14,145.00
Section 6. Exterior walks and steps at wharf	2,945.00
Total,	$17,090.00
McHarg, Barton Co., bid #8	
Section 2. Granite facing outside steps, tunnels, etc.	$22,400.00
Section 3. General repairs inside Statue and Pedestal, repairs to guardhouse, elec. work	$7,800.00
Section 5. Painting steel framework of Statue,	$1,800.00
Section 7. Furnishing Settees,	$400.00
Total,	$32,400.00
Otis Elevator Co., bid #4	
Section 4. Elevator and Stairways,	$10,890.00
New York State Constn. Co., bid #7	
Section 9. Wharf house and fence on wharf,	$2,361.00
	$62,741.00[26]

The funds acquired for this work through the Appropriation Deficiency Act would be available through fiscal year 1907. The *New York Times* reported in August 1907 that the Statue's green patina was to remain and that the work being done was, quoting Burnell, "to complete the original scheme of those who planned the memorial. Miss Liberty is to have new windows in her head. The interior framework is to be cleaned and elevators are to be installed. The terrace at the base is to be improved, and a cement covering for the walls of the base will cover up the disfiguring marks which have been there since the statue

Figure 35. Statue of Liberty, ca. 1908, after the new entrance stairs were built.[George Grantham Bain Collection, Library of Congress]

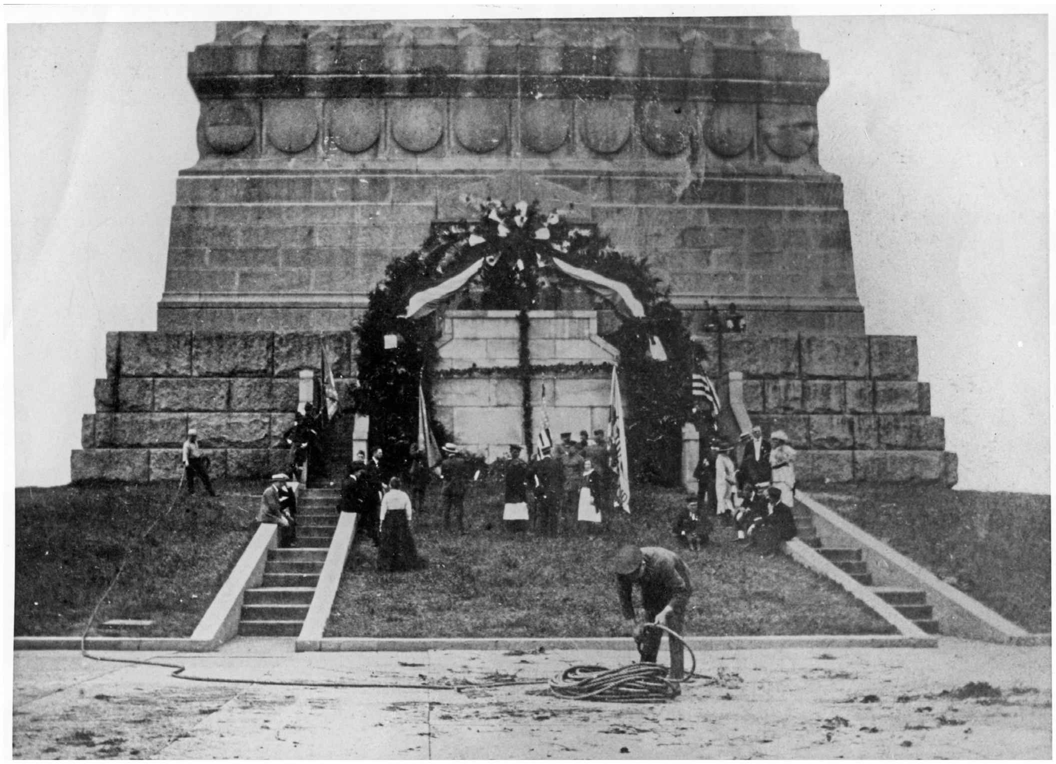


Figure 36. The 1907-1908 east entrance stairs on Memorial Day, May 30, 1921. [NPS, STLI, Ref.Lib., 9.9 #71]

was opened."[27] By October contractor McHarg, Barton was requesting time extensions for portions of sections 2, 3, and 5 of his contract because of circumstances beyond the company's control.[28]

Records of the Otis Elevator Co. show that on June 28, 1907, a passenger elevator with a rise of 105 feet, 9 inches, and a capacity for carrying 3,000 pounds was ordered for the Statue.[29] An Otis publication from 1908 described the impact of the elevator installation:

> Heretofore the long climb from the foundation to the top of the statue was very irksome and few seldom reached the top, having become exhausted when half way up. This has been eliminated to a great extent through the installation of an Otis double screw drum type machine, with a rise of 105 feet eight inches and a lifting capacity of 3,000 lbs. at the speed of 350 feet per minute.[30]

In March 1908 the War Department approved some small, miscellaneous items that were part of a request that Burnell had submitted in February: six door checks for the recently installed "heavy metal covered doors," a covering for the top of the elevator shaft, 30 "Keep off the Grass" signs, 12 bushels of grass seed, and gratings for the scarp openings.[31] Larger requests, like hoods for the tunnel stairways and wrought-iron gates in the north and south tunnels, would require the preparation of specifications; other items, such as waterproofing of tunnels and painting of the "badly scratched and defaced" head of the Statue, were denied outright. Burnell's office issued the specifications that same month.[32]

William W. Bissell, a first lieutenant in Burnell's office, sent a follow-up letter to the quartermaster general in September 1908 requesting permission to move forward with the installation of 6-foot-high "ornamental glass and iron" tunnel hoods, wrought-iron gates, and a "400,000 c.m. type IV lead covered conductor" feeder line for the elevator "from blank switch of switch board in power plant."[33] Specifications for these projects, as well as for electric lighting for the scarp wall and "a triangular wrought iron panel with strong frame, and one and one-half inch mesh of one quarter inch flat wire" as an elevator counterweight protection, were issued the following February.[34] Bissell wrote to the quartermaster general again in September 1910 to request approval for installation of the wrought-iron gates, which he estimated would cost $190 including installation.[35]

RECOMMENDATIONS FOR REPAIR WORK, 1911-1912

By July 1911 concerns were being voiced over the state of the monument. Two letters from staff stationed at Bedloe's Island, which were echoed in a contemporary newspaper article, chronicle the War Department's unease over the condition of the copper skin of the Statue and their opinion that repairs would be needed soon.[36] Engineer W. H. Stair, for instance, reported that:

> an inspection of the interior shows the statue itself to be greatly deteriorated. The iron framework has rusted badly and the sheet copper has numerous small openings through which daylight can be seen and through which water finds its way to the interior in every rain storm. The copper, as seen from the outside, appears to be badly corroded and is covered with a heavy coating of oxychloride. The edges of the perforations appear to be quite thin. This is the usual result of the long exposure to copper to sea air and water and of copper and iron, in contact under such conditions.[37]

The leaks were so bad, Stair concluded, that they were "beyond repair."[38] Another officer stated that "it is merely a matter of time until the entire shell will require renewal."[39]

Advisory architect Francis B. Wheaton inspected the site in early August 1911 at the request of the War Department and filed a report describing current conditions and outlining what actions would be needed to remedy the situation.[40] He noted that the holes that others had observed as a source of leakage were caused by missing rivets that had been sheared off by buckling or by the movement of the copper plates against each other, although "about the head there found holes that have every appearance of having been caused by bullets." He also noted that some small holes had been made intentionally to provide drainage, especially in the "overhanging folds of the drapery"; these holes needed to remain as they were. The majority of the holes were not the result of corrosion. He advised that

> the necessary repairs should consist of replacing the missing rivets and, in some few cases, of the application of patches riveted to the inside surface over the larger of the hammer cracks. The straps on the inside where torn apart by expansion should be reinforced, and the straps tying the metal of the envelope to the steel skeleton inside should be riveted

> wherever they have been torn away by expansion, increasing their size where necessary, so that room for slight movement may be left.

Wheaton had found the structural steel frame to be basically sound, with a "thorough cleaning and painting" being "all that is necessary to preserve it for many years to come." Wheaton had consulted with the head of the bronze-working department of the Gorham Manufacturing Company, who had agreed with Wheaton's findings. Wheaton also recommended that the steel framework of both the Statue and the elevator enclosure be painted and that a turnstile be installed at the foot of the down staircase to prevent people from entering. He believed that this work, plus some repointing of the fort walls, would cost $5,000 all told. The pointing of the pedestal, he reported, was in "very good condition."

Earlier in 1911 an explosion in New Jersey broke 4 windows in the crown of the Statue and 6 of the 35 tungsten electric lights in the torch; the steel frame of the Statue, however, was not damaged.[41]

In 1911 the War Department had the copper sheeting inspected by Hermann Gehnrich, a coppersmith and sheet-metal worker, who estimated it would cost $14,000 to fill the holes.[42]

PROPOSED CONCRETE REPAIRS, 1911

September 25, 1911, saw the submission of a requisition form for $252.50 for repair of concrete slabs on the pedestal and placement of fill underneath them, which was approved by Capt. Charles Wallace. At the request of the adjutant general, a sketch of the work to be done was forwarded in October; it was sent with a note from the chief of staff stating that while the "work is considered necessary it is thought that the amount of estimated cost is excessive." Nonetheless, he asked for permission to advertise for the project. This was done on October 9, 1911, in a circular that stated that 15 slabs of concrete in front of the entrance to the Statue had settled unevenly and out of plumb, although the cause of the settling was unknown.[43] The circular stated that the work included not only installing new slabs "without cracks or other weakness" but also removing broken slabs and filling the cavity underneath that would cause the slabs to be out of alignment. As for materials the circular specified the following:

> **CONCRETE.** All material and labor furnished in connection therewith to be first class in every respect. The slabs that may have to be constructed to be 1-3-5 concrete with a facing of 1-2 mortar, the slab to be 6" thick, and of the same size as slabs they are replacing, the 6" thickness to include the facing which will be 1/2" thick. If necessary the slabs will have sufficient coloring matter added to cause them to resemble as nearly as possible the present slabs.

It is not clear whether this work was undertaken.

REPAIRS TO THE COPPER SHEATHING, IRON FRAMEWORK, AND IRON SUPPORTS, 1911-1922

The office of the United States quartermaster general issued specifications for repairs to the Statue in December 1911.[44] The work was to include repairing the copper envelope of the Statue, painting the iron frame of the Statue, and installing turnstiles. The copper repairs were to include replacing "all missing rivets…with new ones of the same kind and size as those now in place." Where it was possible to see "light shining through the shell when standing on the staircase," a new piece of 48-ounce soft sheet copper was to be riveted to the inside of the copper. The patch was to be "beaten to shape to fit, and be of sufficient size to secure good riveting around the edge of damaged portion." The patch was "to be covered on the side next the shell with a coat of elastic cement put on thick enough to fill all interstices." Only the holes that had lost their rivets and areas that were corroded were to be treated. The McHarg, Barton Company won the contract for that part of the contract.[45] Broken iron straps that had connected the copper to the steel frame were also to be repaired.

In addition, the specifications called for painting the steel framework of the Statue and of the elevator enclosure and cage. Once cleaned of scale and rust, all steel was to be sprayed with "a coat of Cunningham coal tar paint, made by the Maryland Steel Co." Metal turnstiles were to be inserted "in the two stairways leading to and from the head of the Statue."[46] Howard H. Peterson was awarded the contract for this work.[47] In April 1912 the stairs in the Statue were described as having been "in a bad condition for some time," "slippery," and "dangerous," with "a hole clear through in one place."[48]

Discussion began again regarding the state of the Statue's copper skin in 1916.[49] In March 1916 the commanding officer at Bedloe's Island called upon the chief chemist of the American Museum of Natural History and his associate to examine the Statue and its pedestal. They found the copper of the Statue "badly corroded in many places, instances existing, especially in the torch and head, where the original thickness of the metal has been very much reduced by decomposition into soluble copper salts, leaving only a very thin sheet intact." They recommended immediately giving the Statue a "preservative coating." Their investigations further revealed that the granite of the pedestal had become "discolored in places and soiled by the copper soluble from the statue and other depositions caused by exposure."[50]

Another investigation was carried out in August 1916 by Capt. Thomas M. Robins of the Corps of Engineers. He found the interior of the copper shell and the structural steel painted and "in good condition except it was noted that one of the angle iron braces connecting the shell to the tower" had been fractured, perhaps, he surmised, "by wind pressure or shock from the recent explosion at Black Tom Island" in July. He found "no evidence whatever of pitting or corrosion of the copper plates," although the "riveted joints between the plates have parted for short distances and, particularly in the body of the figure, where the plates have fractured forming cracks which in some cases have spread into small elongated holes." He found it "clearly unnecessary to apply a preservative paint to the statue," but he did recommend repairing the broken joints and using patches to fix the cracks and holes. He specified that the patches should be attached by brazing or

Figure 37. Undated aerial postcard of the Statue of Liberty after the construction of the east stairs. [NPS, STLI, Ref.Lib.]

Figure 38. A rare view of the Statue of Liberty from the west, August 9, 1920. [National Archives photograph 111-SC-69357]

"made by the metal spray process."[51] Proposals for this work were sought, but none were received; revised specifications and proposals would be sent out in the spring.[52]

In the fall of 1916 requisitions were issued for labor and material to repair the holes in the copper, but it was decided that the work would be "held in abeyance" until spring.[53] However, in April 1917 advisory architect Wheaton decided that the specifications for the work were unsatisfactory and that the work needed to be deferred until he could come to New York and examine the conditions.[54] A year later a new advisory architect, E. V. Dunstan, wrote stating that proposals for repairs to the copper envelope had been invited but none received.[55]

Dunstan therefore recommended that the work be done "upon a basis of cost of labor and materials plus a percentage of profit," and a $2,000 allotment was made for the work. It was important, Dunstan pointed out, that the drainage holes remain intact.[56] Watson Flagg Engineering Co. was authorized to undertake the work.[57] However, it was soon apparent that the initial $2,000 allotment was not adequate, and an additional $4,000 in funding was made available so that the work could "continue without interruption until completed." It would also include replacing the iron "braces and supports which are found to be rusted and decomposed."[58]

In July 1918 it was proposed that the interior ironwork of the Statue should "be given two coats of paint…to prevent rusting."[59] Watson Flagg felt that they could not give an estimate for the painting; they were unsure how long it would take to scrape and clean the ironwork in preparation for painting.[60] The work of "painting with two (2) coats of paint all iron work in main envelope of Statue upon completion of repairs now being made, to prevent rusting" was requisitioned in November 1918, as it was felt to be "absolutely necessary."[61]

LIGHTING FOR THE STATUE, 1916-1918

Funds for a lighting plant were discussed at the beginning of 1916.[62] That year the lighting system in the torch was replaced, and a floodlighting system installed.[63] The system was paid for through a subscription taken up by the *New York World*, the same newspaper that had organized the subscription for the pedestal in 1885.[64] The floodlighting system was featured in a 1917 article in *The Illuminating Engineer*:

> The illumination is achieved by two hundred and fifty 250-watt lamps installed in fifteen banks of projectors. The surface brightness of the statue is given in the *Electrical World* as about 10 ft.-candles, and it is estimated that the statue itself thus becomes a source equivalent to about 6,000 candles. In addition the flaming torch carried by the figure yields about 4000–5,000 candles, and this alone contains in its glass structure fifteen 500-watt lamps, specially arranged to give even illumination.[65]

During the installation of the floodlighting system, contract and staff electricians had registered their concerns about the interior lights at the Statue and the pedestal, which had been installed about 15 years earlier. This wiring had been "installed in stiff steel conduits" that had "rusted badly owing to the large amount of condensation in the interior of the Statue," and it was recommended that the entire system be replaced.[66] Specifications for rewiring the interior were prepared in October 1917, and proposals submitted in November.[67] At the end of the year the W. B. Perry Electric Co. was awarded the contract for installing a feeder line to the torch, with the balance of the work going to Watson Flagg, although the decision was amended a month later, with all of the work to be performed by Watson Flagg.[68]

A 1923 newspaper article on the monument noted that:

> The lighting of the statue is no small undertaking. The interior lights are kept burning all day long for the benefit of visitors. Lights of 16,500 kilowatts and one of 1,000 kilowatts are burned in the torch. Besides the torch lights, there are 252 highpowered flood lights, which are kept playing on the statue from 7 until 11 PM. These flood lights are distributed through various buildings. The elevators in the statue, when running, are operated by soldiers.[69]

ELEVATOR IMPROVEMENTS, 1920-1922

Repair work on the elevator was performed in 1913.[70] In early 1920 staff at the monument noted that the "elevator in its present condition is unserviceable," and repairs were made in the spring.[71] The condition of the elevator was described thus:

> These repairs are due to wearing out of mechanical parts, which have been in constant use since the elevator was originally installed, and while the elevator may be used in its present condition this office does not consider it safe enough to carry the large number of visitors to the Statue.[72]

In 1922 a letter from the quartermaster general quoted an engineering report that stated that no major repairs had been made to the Statue and pedestal since 1918; the "largest single item of repair" had been the "elevator which was completed last month at a cost of about $400.00."[73] Apparently the elevator problems were chronic, for a letter from June 1923 stated that the elevator "has been out of order since June 2…and the repair thereof is of an emergency nature."[74] The following August $500 was authorized for elevator repairs.[75] In April 1926 the Watson Elevator Co. changed the elevator motor from DC to AC power.[76] A report for the second quarter of 1927 cited the installation of a new cable for the elevator.[77]

In May 1931 the Otis Elevator Co. was awarded a contract to remove the old elevator and install a new one in the existing shaft.[78] The work was to be completed within 90 days.[79] The completion report from October 1932 stated:

> There was installed one self leveling passenger elevator having unit multi-voltage car switch control - of the single wrap traction geared type. Size of car 4'9" x 5'4" - metal and finished in brown lacquer and is provided with solid bronze posts and safety gate. Height car travel 105'-8"; 2500 lbs.; speed 350' per minute.[80]

REPORTS AND REPAIRS, 1925-1933

In the spring of 1922 specifications were drawn up for repairs to the Statue, but it is not clear from the files whether this work was carried out.[81] The same description of work to be done is contained in specifications dated April 26, 1925, which appear to have been approved. The later specifications called for painting the interior steel framework with a coat of red lead and then a coat of black paint such as Sherwin Williams's "Asphaltum." Loose mortar joints in the pedestal were to be raked out and repointed with mortar containing one part portland cement and two parts sand. All composition wallboard "throughout inside passageways of lower part" of the pedestal was to be removed. It was to be replaced with a half-inch layer of "cement by gunnite method, with about 12,000 square feet of surfaces was to be covered"; however, "Asbetos Wood Ceilings" were instead installed in some of the passageways. Finally, repairs were to be made to doors on the second and fourth landings; ten curved-glass windows of various sizes were to be installed in the head of the Statue; and turnstiles were to be repaired. In the torch 15 "pieces of colored glass (size 11" x 9")" similar to the glass then in place were to be installed. The contract for this work was held by Waldemar Mortensen, Inc.[82]

Early in 1925 the assistant secretary of war told the quartermaster general that, since there had previously been no definitive instructions on the treatment of national monuments, he was "therefore directed hereby to administer these National Monuments in a manner similar to that heretofore prescribed for the National Military Parks, and to assume the duty of inspection, maintenance and upkeep, etc."[83] Reports from that spring detailed the conditions and cited the need for sufficient funds to be made available for regular upkeep of the Statue.[84] The findings from an inspection that July included the following:

> 1. The Statue of Liberty and area inside the National Monument Reservation appeared to be in excellent state of preservation and condition excepting minor repairs to the railings and cement walks; slopes need regrading and sodding….
>
> 4. The rooms located in the base of the Monument are unoccupied and were found to be dark, damp, poorly ventilated, and unfit for occupancy.
>
> 5. There is a souvenir stand operated by the Post Exchange located on the 2nd landing of the Monument….
>
> 9. The electric current for operation of the statue is received from a commercial light company in Jersey City…through submarine cable. All lights of the statue are operated with alternating current. The elevator in the Statue is operated with direct current received from a motor generator set maintained in the Power House at Fort Wood for this purpose…[85]

The findings also recommended, among other things, "that the souvenir stand now operated by the Post Exchange on the 2nd landing of the Statue of Liberty Monument be discontinued." A report described work that was done during the first quarter of 1926:

> Repairs made to Elec. Lines controlling Flood Lights - Work commenced on installation of A.C. Line for operation of Elevator. Examination made of Elevator Cables - Repairs made to several interior lights - 12 Lights of Glass replaced in Head - 2 Window Frames

> repaired in Head – Signs made and placed - Work commenced on Elevator Operators Booth - Several Floor Plates repaired.[86]

It also listed work then underway:

> Repairing Floor Plates - Installation AC Elec Line for operation of Elevator - Additional signs being made - Elevator Operators Booth - Iron Grates for Corridors - Grates to keep visitors from outside ledge at 2nd floor - Improving Lawn.

The report on work done in the second quarter of 1926 showed:

> Installation of AC Elec. Line for operation of Elevator completed. Elevator machinery installed and placed in operation by Watson Elev. Co. -Repaired several floor plates. -Repaired Turnstile at bottom of winding stairs.[87]

The report on work done in the third quarter of 1927 detailed the following:

> Painting of …rails of spiral stairway & ironwork of Floodlights. Glass broken from doors & transoms replaced. Elec. clock installed & put in service operating Torch. New Meter on Torch and interior lighting circuit. Switch Boxes on Floodlights installed and placed in service. About 75% of all lighting circuits rewired. Floors necessarily broken in rewiring lower back corridor and 2nd. landing cemented. Removed pigeon manure from three of 3d. floor balconies and opened same to public.[88]

The remaining lighting circuits were rewired in the last quarter of that year.[89] A survey in early 1928 found that "the general condition of the foundation, pedestal, structural steel frame-work and metal envelope is considered good,"[90] although the flood-lighting system was apparently in poor shape due to "natural deterioration."[91] Later that year iron gates were installed on the second floor in the corridors of the pedestal and a scroll was installed on the north side of the ledge.[92] In the third quarter of 1928 the cement walls in the lower corridors were "surfaced," the ironwork painted, and an old iron gate removed from the lower front corridor.[93]

By the beginning of 1930 the quartermaster was reporting that the "general condition of maintenance of the Statue of Liberty has been the subject of adverse criticism by the general public and in order to bring this national monument to a standard of maintenance in keeping with its national significance, the major repairs outlined are essential to place this structure in a satisfactory condition."[94] The estimate that was prepared noted that

> practically nothing has been done towards the necessary maintenance and repair of this national monument in recent years, although the exposed location of the Statue and the nature of the steel framework with other details render such periodic care essential for its preservation.[95]

The recommended repairs were estimated to cost about $45,000. The most costly items were glazed brick for corridors and offices; bronze entrance doors, stanchions, banisters, and screens; a copper canopy; a new automatic elevator; and landscaping. A new floodlighting system would cost $20,590.80.

In June 1931 specifications for repairs to the pedestal, the "star fort," and the stairways and tunnels into the fort were drafted, but it is not known whether this work was done.[96] The same month saw the contract extension of a structural engineer, William F. Van Buehren, who was hired to assist with repairs of the Statue and prepare plans and specifications and make minor repairs.[97] Work also took place that year on the pedestal,[98] and a new elevator was installed.[99] By the end of 1931 plans were completed for "strengthening steel supports of the right arm, neck and torch balcony," "welding of holes in copper of the figure," and providing a "new screen guard on entrance to right arm." Specifications were in the works for cleaning the pedestal and replacing windows in the forehead of the Statue.[100]

In 1931 a new floodlighting system was donated and installed by Westinghouse Electric.[101] A history of the lighting system of the Statue described this installation:

> The modern system was installed under the supervision of Mr. Samuel G. Hibben, director of applied lighting for the Westinghouse lamp division, and Mr. Alfred Pavlus.
>
> Mr. Hibben installed automatic clock controls, set astronomically in accordance with the changing length of day throughout the year for the light in the torch and the floodlighting. Thirteen 1,000-watt incandescent lamps and one 250-watt were installed in the torch. Narrow beam and wide beam lamps were used for floodlighting, the former, using a concentrated filament, illuminated the statue and the latter the pedestal. The floodlighting consisted of ninety-six 1,000-watt lamps enclosed in bronze projectors. Groups of eight lamps were placed in ten of the angles of Fort Wood, and a group of sixteen lamps was placed in the angle directly in front of the statue. Sixteen 200-watt lamps were mounted at the base of the statue to bring out the folds in the gown. Eight 10-inch projectors, containing 200-watt lamps, were placed on the balcony of the pedestal. Two projectors with 250-watt lamps were installed under the torch balcony.

The new floodlights were turned on the night of October 26, 1931 with much ceremony.[102]

A report from March 1, 1932, stated that electric welding would be needed to safely strengthen the arm of the Statue, and bids were being sought.[103] The annual report for fiscal year 1931-1932 noted that the stonework had been cleaned and waterproofed, the promenade resurfaced, and a new elevator and floodlight system installed, as well as the following work undertaken:

> 4. Treads on steps of front and rear lower corridors to promenade.
>
> 5. Hand rails on steps of front and rear corridors to promenade.
>
> 6. Hand rails in front lower corridor to maintain line of visitors to elevator.
>
> 7. Doors in front and rear corridors to prevent drafts.
>
> 8. Cemented floor in switch room.
>
> [d] Removed overhead electric wires, incased them in conduit on floor and cemented over same.[104]

A follow-up letter added that the work also covered installation of treads on the spiral stair, replacement of windows in the observation platform in the head, and welding of holes in the copper envelope and of additional steel members to strengthen the arm holding the torch.[105]

A report filed in July 1933 chronicled the work done in the fiscal year 1932-1933. This included moving the lower turnstile and installing two platforms that connected the two sets of spiral stairs in the Statue, as well as painting the interior of the Statue and the "ironwork."[106] Later that summer, a report noted that the steel structure supporting the right arm had been strengthened. It also listed the application of aluminum paint to the steel framework and the interior of the copper shell of Statue, as well as the installation of two rest platforms. The same report noted that a "still more urgently needed improvement is to take care of the leakage of water which seeps through the seams of the statue, and in rainy weather drips in considerable quantities on the spiral stairs at the top of the statue, drenching visitors and also drips down the entire interior of the elevator shaft and even into the car."[107] The cost was $2,513.07.[108]

In the summer of 1933 the National Monuments across the United States were placed under the jurisdiction of the Department of the Interior.[109]

APPENDIX TO JURISDICTIONS AND CONDITIONS ON THE ISLAND, 1901-1933

The following text was taken from "Specification for Repairs to the Statue of Liberty, December 1911." *[War Department, Plans No. 3-745, April 1907, Box 14, File 219, SOL Part II.]*

SECTION I

REPAIRING CONCRETE ENVELOPE

(See General Conditions, which will govern where applicable.)

4. The work included under this section will consist of furnishing all material, labor and appliances necessary , and repairing the copper envelope of the Statue, as follows:

5. All missing rivets are to be replaced with new ones of the same kind and size as those now in place.

6. All places where the copper is so badly damaged by corrosion that light can be seen shining through the shell when standing on the staircase shall be repaired by riveting a piece of 48 oz. soft sheet copper to the inside of shell; the patch must be beaten to shape to fit, and be of sufficient size to secure good riveting around the edge of damaged portion; and to be covered on the side next to the shell with a coat of elastic cement put on thick enough to fill all interstices. No holes other than those caused by loss of rivets or by corrosion are to be closed, and especial care must be taken not to cover up or stop any of the openings in the sheets that are intended to drain the pockets formed by the drapery either to the inside or outside of the structure.

7. Replace the broken straps connecting the copper envelope to the steel framing; the new straps are to be of similar weight of the metal and where necessary are to be of greater size that they may fit loosely around the steel member to provide for contraction and expansion.

SECTION II

PAINTING STEEL FRAMES

(See General Conditions, which will govern for this work where applicable.)

8. The work covered by this section consists of furnishing all material and labor and painting all interior steel framework of the Statue, and also the elevator enclosure and cage.

9. All the foregoing steel work is to be sprayed with kerosene to loosen the scale and ruse, and hammered until all the scale is loosened; it is then to be thoroughly cleaned by the use of a steel brush.

10. All steel work is to be given a coat of Cunningham coal tar paint, made by Maryland Steel Co., put on by spraying in accordance with the directions furnished by the manufacturer. All materials are to be brought on the premises in the original package.

SECTION III

INSTALLING TURNSTILES

(See General Conditions, which will govern for this work where applicable.)

11. The work covered in this section will consist of furnishing all labor and material and installing turnstiles, in the two stairways leading to and from the head of the Statue. One turnstile is to be placed at the foot of the "going-down:" stairway to prevent anyone from ascending this stairway, and one at the top of the "going-up" stairway to prevent anyone descending this stairway. The arrangement and construction of the turnstiles shall be such as to allow easy passage in the proper direction, but to entirely prevent passage in the wrong direction.

12. The material used in construction shall be metal. The construction shall be strong and substantial; and the moving parts shall operate easily and without requiring any effort of thought on the part of the passer-through. Any screen work necessary must be equivalent in strength and appearance to two-inch diamond mesh No. 8 gauge woven steel wire in ¾ inch rolled steel channel frames. No registering device will be required.

13. A complete plan of the installation and drawings and specification of the turnstile or arrangement it is proposed to use, must be submitted with each proposal.

SECTION IV

REPLACING SLAB IN PARAPET OF OLD STAR FORT

(See General Conditions, which will govern for this work where applicable.)

14. **Description.—**The work included in this section will consist in furnishing all labor and material and raising or replacing certain sunken or cracked concrete slabs in the parapet of the old star fort immediately in front of the entrance to the Statue.

15. The slabs covering the sunken area will be removed; except that those slabs next to the unsunken area which are only slightly settled may be jacked or otherwise brought up

to the proper level and filling to be tightly placed under same; provided that this method assure the permanency of the slab in its new position. Any slabs that are cracked must be entirely replaced.

16. **Filling.—**The material used for filling under the slabs must be broken stone or gravel mixed with a proper proportion of fine material to thoroughly fill the interstices of the coarser material. The filling material must be thoroughly moistened and tamped solidly in place. The present fill must be thoroughly settled in place before placing new fill.

17. The material for filling may be obtained from the beaches of the island outside the sea wall.

18. **Slabs.—**The new slabs are to be 6 inches thick including the finishing coat and of the same size as the present slabs. The concrete for slabs shall be composed in the proportion of one part cement, two and one-half parts of sand and five parts of broken stone or gravel, mixed so dry that it requires to be well rammed to bring water to the surface. The cement and sand will first be thoroughly mixed dry, then water will be added and the mortar mixed to the proper consistency, then the stone will be thoroughly wetted and added, and the whole worked into a uniform mass. The concrete shall be tamped in place with suitable tools until the moisture flushes to the surface, and must be deposited and tamped as fast as it is mixed. No concrete shall be used which shows any signs of having been injured by frost, or having commenced to set.

19. The finishing coat shall be composed of one part cement and two parts sand, and shall be one inch thick. The finishing coat is to be applied before the base has set and to be well troweled with a finish similar to the present work. Sufficient coloring material is to be added o the finishing coat, if necessary, so that the surface of the new slabs when dry shall be as near the color of present slabs as possible.

20. **Materials.—**All cement shall be best quality of American Portland; and the cement used will be subject to the inspection and test in accordance with the methods recommended and adopted by the American Society of Civil Engineers and the American Society for Testing Materials, and the cement offered must meet the requirements of specifications adopted November 14, 1904, by the societies mentioned, and any subsequent amendment thereto.

21. Sand shall be clean, sharp and coarse.

22. Gravel shall be best local of solid composition and be of size to pass through a 2-inch mesh screen and be rejected by a ¼-inch mesh screen.

23. Broken stone shall be of solid composition, free from dirt, and sized same as gravel.

24. Water for concrete or mortar shall be clean and fresh.

SECTION V

POINTING MORTAR JOINTS

(See General Conditions, which will govern for this work where applicable.)

25. The work covered by this section will consist of furnishing all labor and material to repair the mortar joints of all stone work of the old star fort that is exposed on the exterior of the fort walls and on the inside of the parapet wall facing the Statue. All loose mortar is to be raked out; the joint is to be well moistened and pointed with mortar of one part of Portland cement and two parts of sand mixed to the proper consistency immediately before using. The joints to be finished similar to the present. Care must be taken not to splatter mortar on the face of the stone work; all surplus mortar of joints is to be brushed off before it has set.

NOTES: JURISDICTIONS AND CONDITIONS ON THE ISLAND, 1901-1933

1. Condition of the Statue of Liberty, Joint Report by E. M. Shepard and D. P. Heap, Jan. 2, 1901, from Carole L. Perrault electronic files [hereafter, CLP-e], Transfer - 1901.
2. Ibid.
3. Naval Secretary to E. M. Shepard, Jan. 16, 1901, CLP-e, Transfer - 1901.
4. Monthly Report to the Light-House Board by Engineer and Inspector for March 1901, submitted April 8, 1901.
5. Nelson A. Miles to the Secretary of the Treasury, July 10, 1901, CLP-e, Transfer - 1901. Major Taylor wrote in February 1902 that the Statue and pedestal should be illuminated with electric lights, noting that the oil lamps that were in use for that purpose at the time "give off a very offensive odor, and are quite inadequate," adding that "in its present dimly lighted state there is quite an element of danger in ascending and descending the stairs." Feb. 25, 1902, CLP-e, Transfer - 1902.
6. Ibid.
7. White House, Dec. 30, 1901, CLP-e, Transfer - 1901.
8. G. C. Burnell to the Adjutant General, Department of the East, May 18, 1904, Ellis Box 14, File 216, Statue of Liberty Collection, Part II, Bob Hope Memorial Library at Ellis Island (hereafter, SOL Part II).
9. Ibid.
10. Ibid.
11. Secretary of the Treasury to the Secretary of War, July 1, 1904, Box 14, File 216, SOL Part II.
12. William E. Horton to the Adjutant General, Sept. 13, 1904, CLP-e, Completing the Pedestal – War Department.
13. Charles H. Kent, Steeplejack, to William H. Taft, June 16, 1905, CLP-e, Completing the Pedestal – War Department.
14. Sedley Chaplin to the Chief Quartermaster, July 13, 1905, CLP-e, Completing the Pedestal – War Department.
15. Ibid.
16. Ibid.
17. Ibid.
18. Ibid.
19. Ibid.
20. 5th Endorsement, Assistant Quartermaster-General to Quartermaster General, July 15, 1905, Box 14, File 217, SOL Part II.
21. G. C. Burnell to the Adjutant General, Aug. 15, 1905, Box 14, File 216, SOL Part II.

22. G. C. Burnell to The Military Secretary, Department of the East, Nov. 3, 1905, CLP-e, Completing the Pedestal – War Department.
23. Memorandum relative to repairs and improvements on the Statue of Liberty on Bedloe's Island, Fort Wood, N.Y.H., Quartermaster General, Jan. 22, 1906, CLP-e, Completing the Pedestal – War Department.
24. G. C. Burnell to the Quartermaster General, Feb. 13, 1906, Box 14, File 218, SOL Part II.
25. Specifications for Repairs and Additions, Statue of Liberty, War Department, Plans No. 3-745, April 1907, Box 14, File 219, SOL Part II.
26. C. F. Humphrey to Constructing Quartermaster, June 14, 1907, Box 14, File 219, SOL Part II.
27. "Frills for Miss Liberty. Contracts Awarded to Repair and Brighten Up the Statue," *New York Times*, Aug. 7, 1907. "Miss Liberty to Stay Green. Engineers Refurbishing the Statue Not to Remove the Patina," *New York Times*, Aug. 16, 1907.
28. C. L. Barton, Vice President, McHarg-Barton Co., to G. C. Burnell, Oct. 12, 1907, Box 14, File 219, SOL Part II.
29. Record of Electric Elevators, 1879-1907, Box 14, File 219, SOL Part II.
30. *The Indicator* 1, no. 2 (Aug. 1908): 12-13, published in the interests of the Otis Elevator Industry, CLP-e, Elevator 1904-08.
31. G. C. Burnell to the Quartermaster General, Feb. 24, 1908, Box 14, File 220, SOL Part II. 1st Indorsement, Thomas H. S[illegible], March 10, 1908, Box 14, File 220, SOL Part II.
32. Specifications for Repairs, Special Plans, Office of the Constructing Quartermaster, March 1908, Box 14, File 220, SOL Part II.
33. William W. Bissell[?]to the Quartermaster General, Sept. 18, 1908, Box 14, File 220, SOL Part II. Specifications for Repairs to Statue of Liberty, Office of the Constructing Quartermaster, Feb. 1909, Box 14, File 221, SOL Part II.
34. Specifications for Repairs to Statue of Liberty, Office of the Constructing Quartermaster, Feb. 1909, SOL Part II.
35. William W. Bissell[?], 1st Lieut., Signal Corps, to the Quartermaster General, U.S. Army, Sept. 13, 1910, Box 14, File 222, SOL Part II.
36. M. K. Cunningham to Chief Quartermaster, July 7, 1911, Box 14, File 223, SOL Part II. Charles Wallace to the Adjutant General, July 10, 1911, Box 14, File 223, SOL Part II. "Time Has Dug Holes in Liberty Statue," *New York Times*, July 24, 1911.
37. W. H. Stair to the Chief Quartermaster, July 7, 1911, Box 14, File 223 SOL Part II.
38. Ibid.
39. Charles Wallace to the Adjutant General, July 10, 1911, Ellis Box 14, File 223, SOL Part II.
40. Francis B. Wheaton to the Quartermaster General, Aug. 5, 1911, Box 14, File 223, SOL Part II.
41. "Liberty Statue Damaged," *New York Times*, Feb. 2, 1911. [index to *NYT* articles in file says that this explosion was in Jersey City]
42. Hermann Gehnrich to Chief Quartermaster, Sept. 20, 1911, Box 14, File 223, SOL Part II.
43. Specifications for the Repair of Certain Concrete Slabs on the Pedestal of the Statue of Liberty, Oct. 9, 1911, CLP-e, Repairs, Conditions, Specifications – 1911 to 1912.
44. Specifications for Repairs to Statue of Liberty at Bedloe's Island, Dec. 1911, CLP-e, Repairs, Conditions, Specifications – 1911 to 1912.
45. E. W. Clark to Chief Quartermaster, Mar. 18, 1912, Box 14, File 224, SOL Part II.
46. Specifications for Repairs to Statue of Liberty at Bedloe's Island, Dec. 1911, CLP-e, Repairs, Conditions, Specifications – 1911 to 1912.
47. E. W. Clark to Chief Quartermaster, Mar. 18, 1912, Box 14, File 224, SOL Part II.
48. American Abrasive Metals Company to the Office of the Quartermaster General, Subject: Safety Treads for Statue of Liberty, Apr. 3, 1912, Box 14, File 224, SOL Part II.
49. Otto H. Klein and R. W. Tower to A. T. Clifton, Mar. 27, 1916, Box 14, File 227. Thomas M. Robins to Department Engineer, Statue of Liberty, Aug. 31, 1916, Ellis Box 14, File 227.
50. Otto H. Klein and R. W. Tower to A. T. Clifton, March 27, 1916, 14, Box 227, SOL Part II.

51. Thomas M. Robins to Dept. Engineer, Aug. 31, 1916, Box 14, File 227, SOL Part II.
52. [illegible] to Commanding Officer, Nov. 18, 1916, Box 14, File 227, SOL Part II.
53. Requisition, John W. Ward, Sept. 18, 1916, Box 14, File 227, SOL Part II. [illegible] to the Adjutant General of the Army, stamped "recd back" Oct. 14, 1916, Box 14, File 227, SOL Part II. Commanding Officer, Headquarters, Fort Wood, to Department Commander, Eastern Department, Nov. 18, 1916, Box 14, File 227, SOL Part II.
54. F. B. Wheaton to Captain Oury, Apr. 24, 1917, Box 15, File 229, SOL Part II.
55. E. V. Dunstan to Major Clinton, Apr. 3, 1918, Box 15, File 230, SOL Part II.
56. E. G. Marshall Jr., Apr. 6, 1918, Box 15, File 230, SOL Part II.
57. W. S. Solomon to Officer in charge of Construction Division, May 16, 1918, Box 15, File 230, SOL Part II. D. S. Clinton to the Department Quartermaster, May 24, 1918, Box 15, File 230, SOL Part II.
58. Requisition no. 179-14, July 17, 1918, Box 15, File 230, SOL Part II.
59. Ibid.
60. [no file information noted on copy], Watson-Flagg Engineering Co. to the Office of the Quartermaster, War Department, Sept. 25, 1918, SOL Part II.
61. Requisition no. 179-91, Nov. 27, 1918, Box 15, File 230, SOL Part II.
62. New Lighting Plant for Statue of Liberty, New York Harbor, Letter from Acting Secretary of War, Jan. 3, 1916, CLP-e,1916 – Federal - Floodlighting.
63. Moreno, s.v. "Lighting," 152.
64. The Lights at the Statue of Liberty, Report 1945, Box 20, File 285, SOL Part II.
65. *The Illuminating Engineer* 10 (Mar. 1917): 88, Box 15, File 242, SOL Part II.
66. EVD to Major Zollars, Oct. 5, 1917, Ellis 15, File 229, SOL Part II.
67. Rewiring for interior lights in Statue of Liberty, Officer in Charge of Cantonment Division to Department Quartermaster, Eastern Department, Oct. 30, 1917, Box 15, File 229, SOL Part II. Specifications for Rewiring the Interior of the Statue of Liberty for Electric Lights, Oct. 1917, Box 15, File 229, SOL Part II. Office of the Quartermaster, Nov. 7, 1917, Ellis Box 15, File 229, SOL Part II.
68. E.[?] J. [illegible] to Officer in Charge of Cantonment Division, Dec. 18, 1917, Box 15, File 229, SOL Part II. George A. Knight to the Department Quartermaster, Jan. 14, 1918, Box 15, File 230, SOL Part II.
69. "Statue of Liberty Draws Multitude," New York Times, Mar. 4, 1923**.**
70. Appropriation: Regular Supplies, Requisition, May 12, 1913, CLP-e, Elevator – 1911 to 1920.
71. Allotment of funds, Christian Wahl to Chief, Construction Division, Mar. 4, 1920, CLP-e, Elevator – 1911 to 1920. Irving M. Madison to the Office of the Utilities Officer, Apr. 15, 1920, CLP-e, Elevator – 1911 to 1920.
72. Edw. J. Glynn to the Quartermaster, CLP-e, Elevator – 1921 to 1930.
73. H. L. Rogers to the Assistant Chief of Staff, G-4, May 26, 1922, Box 15, File 234, SOL Part II.
74. Vincent J. Tanzola, Allotment of Funds, June 11, 1923, CLP-e, Elevator – 1921 to 1930.
75. Repairs to Statue of Liberty, H. R. Casey, Aug., 25, 1924, Box 15, File 236, SOL Part II.
76. Ralph E. Fleischer, Contract No. 9116 - Watson Elevator Company, Inc., Apr. 1, 1926, CLP-e, Elevator – 1921 to 1930.
77. Quarterly Report for Quarter ended June 30, 1927, June 30, 1927, Box 15, File 239, SOL Part II.
78. This information, dated May 28, 1931, comes from CLP-e file Elevator 1931-39, but no source is given.
79. Weekly Progress Report Covering repairs to Statue of Liberty for Week Ending June 5, 1931, June 5, 1931, Box 16, File 245, SOL Part II.
80. Completion Report, Oct. 31, 1932, Box 16, File 246, SOL Part II.
81. Office of the Quartermaster, Specifications for Repairs to Statue of Liberty, April 6, 1925, attached to H. L. Rogers to Assistant Chief of Staff, May 26, 1922, Ellis Box 15, File 234.
82. Ibid. H. R. Casey to Quartermaster, June 13, 1925, Ellis Box 15, File 237. J. D. O'Connell to Quartermaster, July 15, 1925, Ellis Box 15, File 237.
83. Dwight F. Davis to the Quartermaster General, Jan. 23, 1925, Box 15, File 237, SOL Part II.

84. Office of the Quartermaster to the Commanding Officer, Mar. 14, 1925, Box 15, File 237, SOL Part II.
85. T. J. McGrath, Capt. QM Corps, Personnel Adjutant. Proceedings of Board of Officers Convened Pursuent to the Following Order: New York General Intermediate Depot, Office of Depot Quartermaster, Office Orders: No. 33. 1, July 11, 1925, CLP-e, Island Development – 1920's.
86. L. W. Redington, Major, QMC, Assistant to Quartermaster Supply Officer, New York GI Depot, Condition Report, National Monuments, submitted by W. A. Simpson, Apr. 15, 1926, CLP-e, Island Development – 1920's.
87. Alex. C. Doyle, Captain, QM Corps, Assistant to the Quartermaster General, Quarterly Report - Statue of Liberty, submitted by W. A. Simpson, Aug. 16, 1926, CLP-e, Island Development – 1920's.
88. Quarterly Report for Quarter ended September 30, 1927, Sept. 30, 1927, Box 15, File 239, SOL Part II.
89. Quarterly Report for Quarter ended December 31, 1927, Dec. 31, 1927, Box 15, File 239, SOL Part II.
90. A. B. Kaempfer,Priority estimates – Statue of Liberty, Feb. 21, 1928, CLP-e, Island Development – 1920's.
91. Annual estimate, Feb. 15, 1928, Box 15, File 240, SOL Part II.
92. Quarterly Report Quarter ended June 30, 1928, A. E. Williams to the Quartermaster General, submitted by William A. Simpson, July 25, 1928, CLP-e, Island Development – 1920's.
93. George A. Davis to the Quartermaster General, Quarterly Report for the period ending Sept. 30, 1928, submitted by William A. Simpson, Oct. 26, 1928, CLP-e, Island Development – 1920's.
94. Estimate of Maintenance and Repair for the Statue of Liberty, Jan. 9, 1930, Box 15, File 243, SOL Part II. I. L. Hunt to the Quartermaster General, Jan. 15, 1930, CLP-e, Repairs, Conditions, Improvements – 1930's. H. E. Ely to the Adjutant General, Jan. 18, 1930, CLP-e, Repairs, Conditions, Improvements – 1930's.
95. Estimate of Maintenance and Repair for the Statue of Liberty, Bedloe's Island, N.Y. (exclusive of lighting), Jan. 9, 1930, Box 13, File 243, SOL Part II.
96. Specifications Covering General Repairs to the Granite Pedestal of the Statue of Liberty, the Star Fort Surrounding the Base and to the Stairways and Tunnels Entering the Same, June 18, 1931, Box 15, File 244, SOL Part II.
97. Leased Wire, June 22, 1931, Box 16, File 244, SOL Part II.
98. A. D. Hughes to the Quartermaster General, Sept. 12, 1931, Box 16, File 244, SOL Part II.
99. Weekly Progress Report Covering Repairs to the Statue of Liberty for Week Ending May 29th, 1931, Box 16, File 244, SOL Part II.
100. Progress Report as of December 28, 1931, Covering Repairs to Statue of Liberty, Box 16, File 244, SOL Part II.
101. Moreno, p. 152.
102. The Lights at the Statue of Liberty, Report 1945, Box 20, File 285, SOL Part II.
103. W. A. Danielson to the Quartermaster General, Mar. 1, 1932, Box 16, File 246, SOL Part II.
104. Jesse D. Elliott to Commanding General, Governors Island, Oct. 26, 1932 CLP-e, Repairs, Conditions, Improvements – 1930's.
105. Engmann A. Anderson to the Quartermaster General, Oct. 28, 1932, CLP-e, Repairs, Conditions, Improvements – 1930's.
106. Annual Report, William A. Simpson, to Quartermaster General, July 14, 193, Box 16, File 2483, SOL Part II.
107. John K. Herr, Lieut. Colonel, IGD, Assistant CA Inspector General, to Commanding General, Governors Island, CLP-e, Repairs, Conditions, Improvements – 1930's.
108. To Commanding Officer, July 28, 1933, CLP-e, Repairs, Conditions, Improvements – 1930's.
109. J. L. DeWitt, Major General, Quartermaster General, to the Adjutant General, Aug. 2, 1933, CLP-e, Repairs, Conditions, Improvements – 1930's.

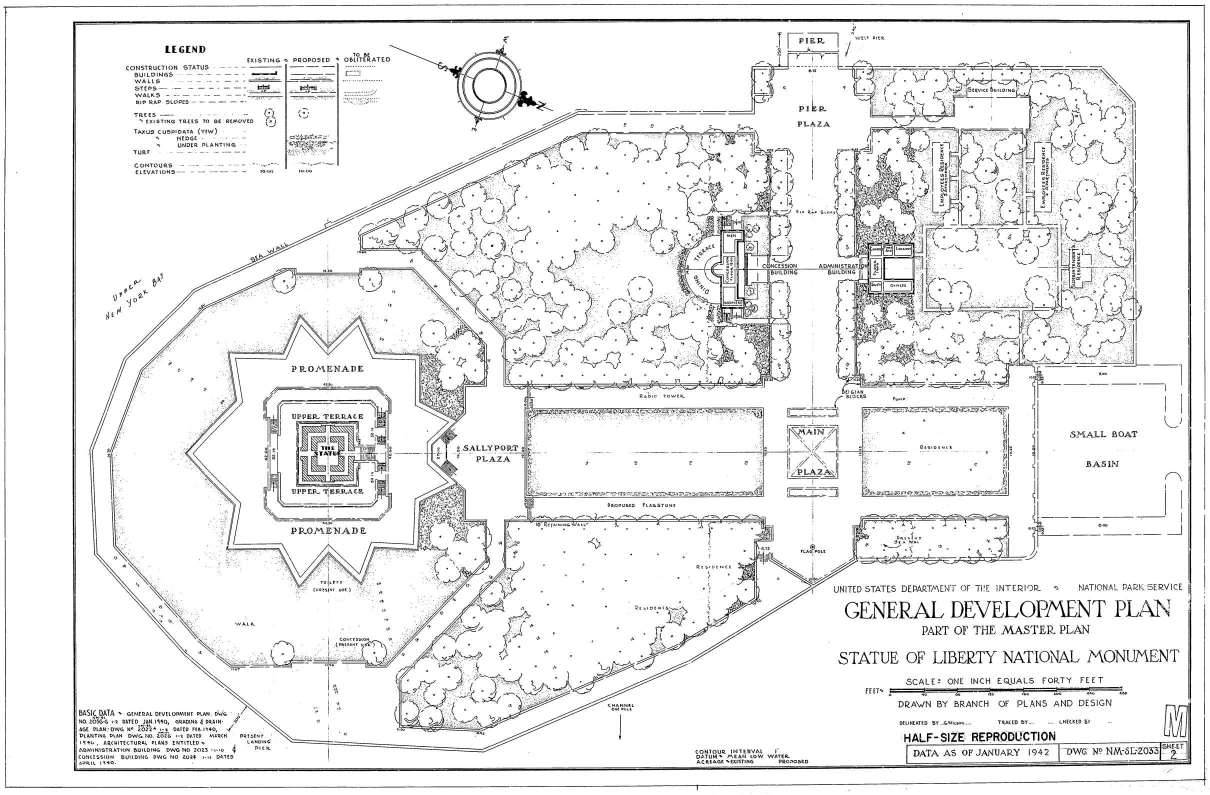


Figure 39. The National Park Service's "General Development Plan" for the Statue of Liberty National Monument, January 1, 1941. [NPS, STLI, Ref. Lib., 2033]

NATIONAL PARK SERVICE YEARS, 1933-1979

REPAIRS FUNDED BY PUBLIC WORKS ADMINISTRATION PROJECT 223, 1933-1934

On August 9, 1933, nine years after President Calvin Coolidge had decreed the Statue of Liberty a National Monument, President Franklin D. Roosevelt transferred the jurisdiction of the Statue from the War Department to the Department of the Interior, where it was to be overseen by the National Park Service.[1]

Within a month, the sum of $25,000 in public works funds was allocated for "routine repairs" to the Statue.[2] The repairs were to include "the construction of granite waterproof kiosks over the stairway entrances on the old fort terreplein or promenade, renovation of the second landing in the pedestal to provide some visitor services, improvement of the interior lighting, and the lining of the fort corridors and the fourth landing of the pedestal to prevent water seepage."[3] In September 1933 William A. Simpson, then superintendent of the Statue of Liberty National Monument, strongly urged that the problem of water seeping into the Statue be addressed first. This seepage had been apparent since at least 1931, but the problem had not yet been corrected.[4]

In early October 1933 a more comprehensive investigation was carried out. Simpson, along with military personnel from Fort Jay, Fort Wood, and the quartermaster's staff, inspected the Statue, and later that month another inspection was undertaken to determine what projects should be carried out with Public Works Administration funding. By that time work on "preliminary" drawings and specifications had begun, and more information was needed so that contract drawings could be prepared for work to be carried out under the recently appropriated Public Works Administration funding.[5]

The recommendations made after these inspections dealt largely with the need for a new dock to accommodate boats bringing visitors to the island, the transfer of land from the War Department to the National Park Service, and the water supply to the island, but a few recommendations dealt with the Statue itself. One concern focused on the "steps leading from the promenade around the Star Fort to the front entrance in the pedestal of the Statue." The existing stairway "was entirely out of keeping with the pedestal of the Statue," according to the report, and it appeared "to have been stuck on by someone who had in mind only the utilitarian features of such an entrance." In addition, the granite of the steps "was not similar in color or character to the pedestal itself." The report suggested allotting $15,000 to construct "a granite approach of suitable architectural proportions and of granite matching the pedestal."[6]

On November 11, 1933, the Department of the Interior announced in a press release that "the historic Statue of Liberty will be repaired, visitors there will be made more comfortable, and 2,500 man-days of work, or approximately 5 months' work for 25 men, will be provided through an allotment of $25,000 in Public Works funds."[7] Some of these improvements were planned for the leaky "walls and ceilings of the tunnels through the old fort" that led to the Statue, but work was also to be done on the Statue itself, including installing "waterproof canopies" above the "two stairway entrances leading from the tunnel system to the promenade," renovating the second-floor landing to make it the "principal room in the Statue," and placing "a canopy over the fourth floor landing to protect the landings, stairways, and elevator below" from rain and condensation that seeped through the seams of the copper of the Statue. The interior lighting system was also to be rehabilitated: officials wanted to experiment with indirect lighting since the interior of the Statue was brightly painted with aluminum paint.[8] The work would also include removing a "small wooden structure at the foot of the elevator, which was built to keep attendants warm." A November 1933 memorandum noted that "some screening needs to be placed in front of high tension wires in the electric room" and that a lightening rod in the electric room should be insulated.[9]

By mid-December 1933 cost estimates totaling $439,500 had been prepared for 29 items "needed to complete the reconditioning of the statue and develop the island as a park." Many of these tasks dealt with the fort or the island, but several pertained to the Statue and the pedestal. Work to be done at the Statue included the following:

> 1.-- Providing the new guide rails for elevator $1,000
>
> 2.-- Providing Insulating Fans and Ventilating head 2,500
>
> 3.-- Heating of second floor landings 1,500
>
> 4.-- Painting of stairways and metal work.........................1,200
>
> 5.-- Replacing paving on promenade............................. 15,000
>
> 6.-- Providing comfort stations in tunnel system
> inside statue.. 20,000
>
> 7.-- Fund to inspect structural framework, partic-
> ularly stairways 2,000
>
> 8.-- Fund to study heating of statue ....1,500 [10]

Specifications for "Improvement to the Statue of Liberty," dated December 21, 1933, provided more details on the work to be undertaken under what was then identified as Public Works Administration Federal Project No. 223:

> (a) The installation of tile walls, asbestos wood ceiling, concrete floor base, stone wearing surface on floors, gutters and drains, drain line, water line, hose bibbs, interior and exterior doors, lighting fixtures, and a new wiring system within the existing tunnels under the pedestal and promenade of the Statue.
>
> (b) The installation of entrances over the two stairways to the tunnels and skylights over the two vent openings on the north.
>
> (c) The installation of a ceiling, stair enclosure, interior doors, exterior doors, platform in front of the elevator, wearing surface on top of existing floors, handrail around the stairway, lighting fixtures, and a wiring system, all on the second floor landing of the Statue.

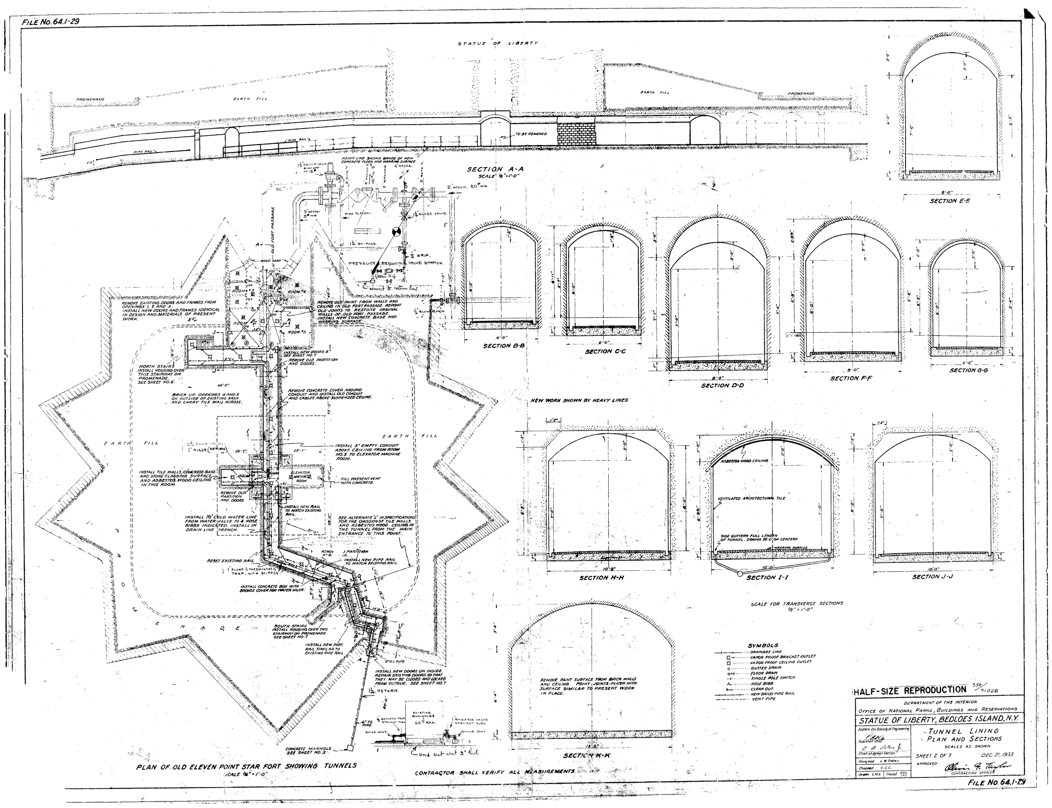


Figure 40. The National Park Service early plans included plans for the tunnels into the pedestal, December 1, 1933. [NPS, STLI, Ref.Lib., 41028]

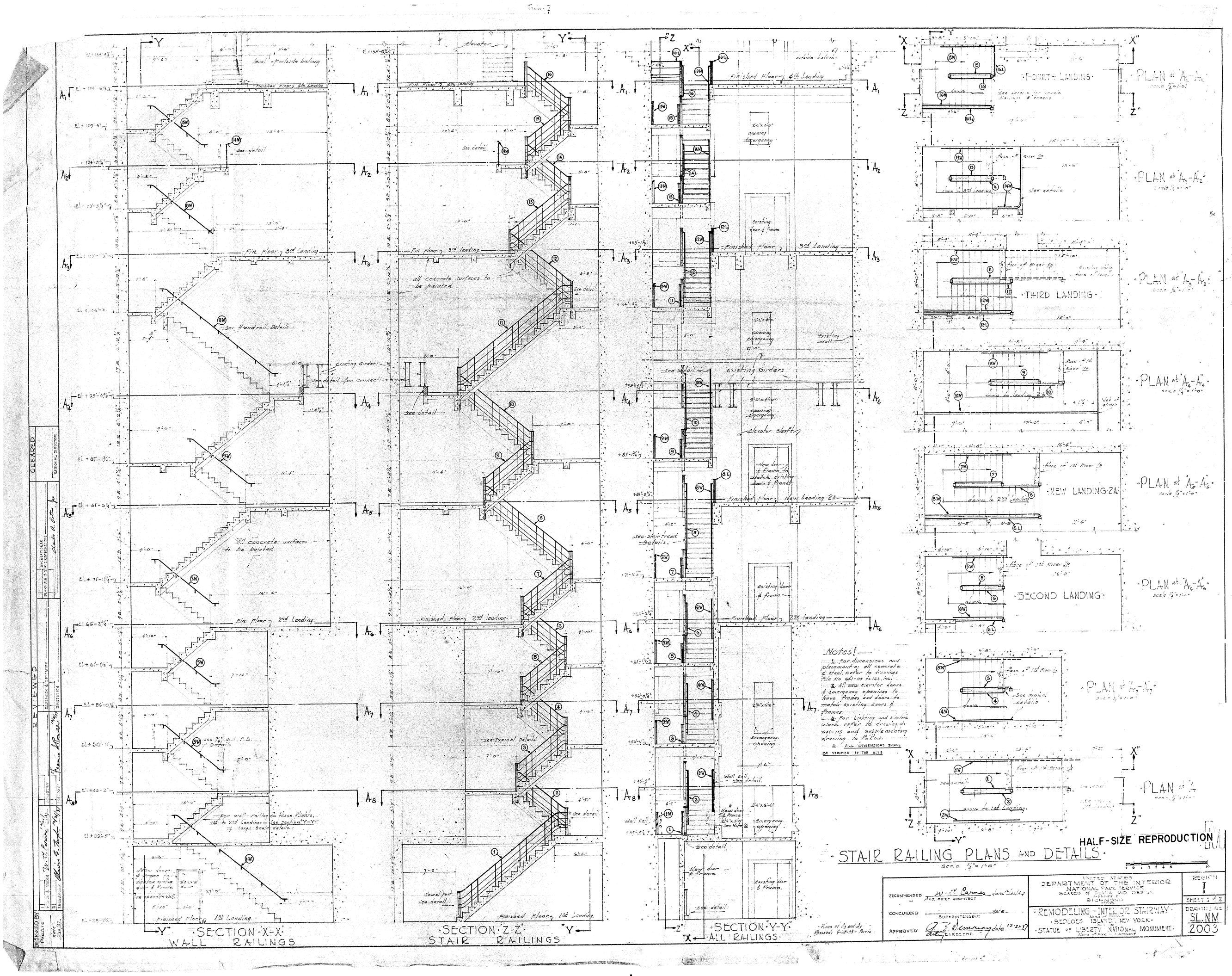


Figure 41. Plans for remodeling the interior stair, December 21, 1937. [NPS Denver Service Center E-tic 2003; also found at NPS, STLI, Ref.Lib., 36716]

(d) The installation of a ceiling, exterior doors, lighting fixtures, and a wiring system at the fourth floor landing of the Statue.

(e) The installation of new lighting fixtures and a new electrical system for the stairways in the pedestal, the spiral stairway, the ladder in the arm, and the stairs and windows in the head in the metal portion of the Statue.

(f) The painting of all the interior concrete surfaces of the pedestal of the Statue, the painting of new direction signs, and the painting of existing and new metal work.

(g) The installation of new exterior doors, lighting fixtures, and a new wiring system on the third floor landing of the Statue.

(h) The installation of a concrete floor, drain, drain line, new wood door, and frame to replace existing door and frame, hose bibb, water line, lighting fixtures, and a wiring system in Room No. 2, in the tunnel.

(i) The installation of wire grille partitions, self-closing door and hardware, lighting fixtures, and a wiring system within the elevator machine room in the tunnels.

(j) The installation of a metal platform under the left shoulder of the Statue.

(k) The installation of new steps, handrail, lighting fixtures, and a new wiring system within the head of the Statue and the repairing of the existing turnstile.

(l) The installation of new wood doors and frames in Rooms 3 and 4 in the old Fort passage to replace existing doors and frames.

(m) The installation of a new concrete base, wearing surface, drains and drain lines, lighting fixtures, removal of existing paint and repointing of joints to restore original walls in the old Fort passageway.[11]

In addition, "all existing work and equipment which interferes with the installation of the new construction" was to be removed.[12] Included in that category were the "structural steel and temporary ceiling within the tunnels, the concrete floor in the tunnels," and the "metal and wood partitions in the tunnels," along with the "existing timber structures on the second floor landing, any existing doors and frames which will be replaced, all conduit, wiring, fixtures, etc."[13] A contract was awarded to Joseph Sarne of New York, and on March 29, 1934, he was notified to proceed with the work. His contract included "new floor coverings, new wall coverings, rewiring of the interior lighting system and some other general repairs to the structure." In his annual report for the year ending June 30, 1934, the acting superintendent, George A. Palmer, estimated that 30 percent of the work under this contract had been completed, but he also told the director of the National Park Service that the work was "not yet to the point that pictures can be included which show the changes." In June 1934 a total of 11 changes were made to that contract, making the price $28,089.[14] By early October the contractor was ready to paint the walls on the second landing.[15]

In December 1934 the National Park Service announced that the "improvements made possible through PWA funds amounting to $33,000 were completed December 15" and promised that the "Statue of Liberty will welcome its thousands of visitors next year with a bright, new interior."[16] The following work had been done:

> Terra cotta walls, arched enameled-copper ceilings and sandstone floors have transformed the damp, musty, dungeon-appearing corridors into modern hallways. Completely new lighting fixtures have replaced the plain electric lamps of the old. Where visitors once climbed twelve floors up the interior of the half-lighted Statue, they are now able to see the remarkable steel supporting structure through a newly installed indirect lighting system. Gloomy cement walls have been brightened by ivory paint. New green enameled and gilded directional signs lead the visitors in their long climb to view the New York skyline from the crown of the Goddess.[17]

The release also stated that "two bronze tablets, one designating the Statue as a gift from the French people and the other that the pedestal was built from American contributions," had been cleaned and moved to more "prominent locations on the rearranged second landing of the pedestal where they can be better appreciated." These bronze tablets had been made by Tiffany Studios about 40 years earlier.[18] The release explained that the granite used in "two kiosks over formerly open stairways to the promenade around the walls of old Fort Wood which encircle the base of the Statue of Liberty" had been quarried at Deer Island, Maine, and "great care and much time" had been taken to ensure that the new granite would match the existing granite of the pedestal. The copper roofing on the kiosks had been "chemically treated to give the aged green coloring of the copper Statue above it." This construction project, the press release concluded, was the "first step being taken by the National Park Service to make the Statue of Liberty a shrine worthy of its place in our national veneration."[19]

Work apparently continued beyond the December 15 announcement, however, for acting superintendent George Palmer later reported that the period from 1933 through March 1935 had been "consumed in physical remodeling of the interior of the structure."[20]

REPAIRS FUNDED BY PWA PROJECT NUMBER 223A, 1934-1937

The original allocation of Public Works Administration funds had proved inadequate. As a result, in February 1934 the National Park Service drew up a list of additional work that needed to be done. The top priority was to be given to "repairs, improvements, and investigations including ventilation of the interior, insulation of head, heating on the second floor, painting of metal work, repaving of promenade, a study of structural framing and general heating, etc."; this work was estimated to cost $30,000. Also requested was $20,000 for the installation of new exterior granite steps that would lead to the second floor.[21]

In January 1935 George Palmer, as the acting superintendent, prepared a document justifying Public Works Administration funds for the island. The list apparently included items from the completed PWA contract, as well as work still needed, but it also provided valuable information on the recent conditions before the first PWA contract was underway. The top priority on the list remained a suitable dock with a waiting room, but many of the other items were related to the Statue itself (the numbers at the left indicate the priority of the task):

2. Heating plant, first and second floors. 13,250

To maintain the physical plant within the Statue, to provide comfort for the visitors and to provide healthful conditions for the staff, it is necessary to install a heating plant to keep the temperature of the first two floors of the Statue above frost point at least.

3. Repairs on torch 1,300

A large number of the molded glass panes in the enclosed torch are broken and need to be replaced. This estimate includes the installation of a ventilating system to prevent further breakage from the intense heat.

4. Bronze handrail on spiral stairs 1,200

The present handrail rusts in the moisture from condensation so badly that it does great harm to the visitors' clothing. It should be replaced by a rustless bronze rail.

5. Comfort station in Statue [8,735?]

The present comfort station is provided in a cinder block building crowded into the space between the points in the old fort wall and toward the front entrance. The building is out of keeping with Statue. The allotment would provide the construction of a modern comfort station within the Statue where it would be completely concealed with entrances off the tunnel system of the first floor.

6. Painting Statue interior 8,000

The interior of the Statue and the structural steel have not been painted for several years. Repainting is necessary to improve the appearance and to protect the steel work from rust.

7. Detailed inspection of condition of steel frame and preparation of complete structural drawings 4,000

There has been no recent inspection of the copper or of the supporting structural steel frame of the Statue. Such an inspection should be made regularly to locate any possible flaws. There are no detailed drawings of the frame in case repairs are needed. At the same time an inspection is being made, drawings should be prepared.

8. Ventilation of Statue interior 8,000

The lack of ventilation in the interior of the Statue makes the climb to the top dangerous for the visitors in extremely hot weather. This allotment would provide for the installation of supply and exhaust fans to ventilate the interior.

9. Repairing Floodlights 800

The floodlights need new lens gaskets, some need new lens, and some new reflectors.

10. New pavement on promenade 6,000

The present asphalt pavement is worn to the point that it needs replacement.

11. New granite approach to entrance of pedestal 20,000

The present steps are constructed of material which does not match the pedestal of the Statue and their design does not harmonize with that of the pedestal. This allotment would provide funds for a suitable granite approach to the second landing from the promenade.

12. Safety treads and wire mesh on 4th landing 200

50′ of safety tread is needed on the worn iron steps on the 4th landing. An unsightly wire mesh partition on the same floor needs replacement.

13. New copper deck on top of pedestal on 4th landing 1,500

The copper deck over the top of the masonry pedestal to protect it from rain and moisture is corroded to an extent that it needs replacement.

14. Repair of the side sheets of the Statue at top of pedestal 1,000

Corrosion and storms have loosened the copper sheets of the Statue along the top of the pedestal. This allotment would provide funds for their repair.[22]

Palmer noted at the end of this document that while no plans had been drawn up for any of the above projects, there was no reason "with the exception of weather" that work could not begin as soon as the Washington office of the National Park Service had developed those documents.[23] The director of the National Park Service requested that $4,000 in funding be allocated under the Emergency Relief Appropriation Act of 1935 for the inspection of the steel frame of the Statue, work that had been included as item four on the above list.[24]

Oswald E. Camp succeeded George Palmer as the superintendent of the Statue of Liberty National Monument in December 1935. Because the 50th anniversary of the unveiling of the Statue was scheduled for the island on October 28, 1936, it was recommended that much of this work be postponed until after the celebration.[25]

In March 1936 Camp reported his concerns about not only the peeling ceiling paint in the pedestal at the main entrance to the Statue but also the larger problem of water leakage in other parts of the pedestal. He noted that "the packing in many of the joints in the Pedestal have deteriorated to such an extent that they need attention." "This is true of joints within seeing distance on the vertical outside wall of the Pedestal," he continued, "as well as the floor joints at the two platform levels" of the observation platform and just "below the balcony at the half-way level."[26] The water from the observation platform appeared "to leak down and through the pedestal, causing a bad looking streak about 18″ wide practically all around the interior wall of the Pedestal at this level." Funding had been sought earlier but was not available.[27]

Two months later Camp submitted a six-year plan for the Statue of Liberty National Monument to the director of the National Park Service. The goals for 1937 through 1939 were listed as follows:

Fiscal Year.	Priority.	Project	Estimated Cost
1937.	1 Al.	Heating plant for first two floors for comfort of visitors and protection of structure……..	$ 13,250
	2	Rest rooms inside the Statue………………	8,735
	3	Interior reconditioning of Statue……………..	9,400
1938	1 Al.	Inspection of steel frame of Statue………………	4,000
	2	Repair of floodlights….	800
	3	New granite approach to the entrance of Pedestal……	20,000
1939	1 Al.	Repair of copper around Statue and top of Pedestal	5,000 [28]

Camp also explained that because requests had been made earlier for repairs to the torch and new paving for the promenade, they were not included in the plan. Furthermore, plans for 1940-1942 could not be included because of the uncertainty of the transfer of more of the island to the Department of the Interior.[29]

In June 1936 Charles Peters of the Washington office of the National Park Service sent along to the director estimates for two items that had appeared in George Palmer's January 1935 priorities list of repairs—repairs to the torch and a study of the Statue's structural-steel framework. Peters' communication provided additional details about the need for the work on the torch, which was estimated to cost $1,300:

PROJECT

This project contemplates the replacing of broken glass, resetting existing glass, installation of a ventilating fan, duct work, and electrical connections.

JUSTIFICATION

The glass in the structure, shaped to represent the flame on the arm of the Statue, has been cracking due to the excessive amount of heat generated by the electric lights. The broken glass has fallen out and rain has been getting into the Statue, causing corrosion of the interior structural steel work which presents a serious problem. All glass in the flame structure should be replaced and repaired and adequate ventilation should be provided.

ESTIMATE

42 –	New pieces of glass @ $10.00	$420.
1 –	Reset existing glass	275.
	Fan and motor	125.

Duct work	350.
Electrical connections	50.
Engineering and Contingencies	80.
	$1300.[30]

The second project, the study of the steel framework, would include the "hiring of engineers who would make a study of all connections in the structural steel, calculate all the stresses in the various members, and prepare complete drawings"; this work was estimated at $4,000. Peters also included a request to "repoint, repair and waterproof the exterior stonework" at a cost of $5,000. This project would include "cutting out of all joints in the stonework of the base, the repointing of all joints, and the waterproofing of the whole exterior." As Oswald Camp had explained in March 1936, interior paint had been peeling. The situation, Peters explained, was "most serious at the Fourth Floor and Second Floor landings where they are noticeable to visitors." Studies had shown that the paint failure was caused by "moisture coming through the stonework and collecting under the film of paint."[31]

In February 1937 Camp was notified that there was sufficient money in the existing Public Works account to undertake some of the work that he wanted to have done, "principally the replacing of broken lights in the torch, installing ventilating system and flagpole, and such other small miscellaneous work as can be done within funds." A portion of an additional allotment of $10,300 was to be applied to "making complete plans of the Statue and pedestal, computation of stresses in structural members and studies of their sufficiency."[32] With this supplemental allotment, known as Public Works Administration Project 223A, the total budget was increased to $43,300, and the work was given the go-ahead in February 1937.[33]

The engineers apparently were at work soon, for on April 21, 1937, the Statue was closed above the second-floor landing after "structural defects" were found during the engineering inspection; the engineers had condemned the "steel work for the floor framing landings and stairways" in the pedestal.[34] Their inspection continued through May 1937.[35]

MAINTENANCE WORK, 1936-1937

Meanwhile, the monthly reports filed by the superintendent of the monument beginning in 1936 contain details of routine work at the Statue. In August 1936, for example, Superintendent Camp reported that "Statue personnel [have] practically completed a two-coat painting job in the corridors of the Statue Pedestal" for a new museum project.[36]

The September 1936 report noted that "the brick wall was removed which closed the east half of the north corridor in the Pedestal, which will be used for the Museum. This was the work of one day, since [t]hen the painting of this whole corridor has been completed, including the three grated iron gates."[37] Visitors had been writing on the walls located at the "foot of the stairs at the entrance to the museum space," so these walls were painted "palm green to a height beyond which no one can reach" in an effort to deter such vandalism.[38]

In October 1936, in preparation for winter weather, "the outside, copper-sheathed doors of the Pedestal of the Statue, that open from the museum corridor, were fastened shut and weather-proofed." These "dutch-door type" openings had

> leaked badly at the joint between the upper and lower halves of the door, and at the bottom, through both of which joints heavy winds have blown rainwater to such an extent that there have been standing pools of water within the Pedestal at the second floor elevator landing. It is hoped this condition has now been corrected. The doors were firmly locked shut, hooked on the outside, and a thin sheet of copper was soldered over the joint, between the two halves of the door. A concrete block was then cast at the joint at the bottom of the door, against a tar paper backing to prevent its sticking. This block extends all across the door-sill, is about 8" thick from front to back, 6" high against the door, and 3" high in front, being well graded from back to front to carry off rain water.[39]

Camp reported in December 1936 that "the screen partition in the head of the Statue was replaced with a new one" because "the old one had become very ragged through continual use."[40] He also noted that

> a tight hood top of galvanized iron was placed over the entrance door to the Torch platform from the spiral stairway. In spite of the fact that the opening over the door was 10 inches in extreme span between the top of the door and the inside of the Statue, persons had wormed their way in and out of this small space over the doorway and had ascended to the Torch platform, unauthorized. This condition has now been corrected.[41]

WORK DONE UNDER WORKS PROGRESS ADMINISTRATION PROJECT 8001

Known as the Works Progress Administration Project 8001, this next phase of work began on May 25, 1937, when "twenty-one laborers, and a scow loaded with materials, arrived at Bedloe Island." By the end of the month the number of laborers had been increased to 37. The workers unloaded the scow, stored some materials "inside the old fort structure," and erected about half of the scaffolding on the observation platform.[42] An article published in the *New York Times* on May 25, 1937, stated that "WPA workers, repairing parts of the Statue of Liberty, are fashioning a 250-foot copper apron to keep Miss. Liberty's feet dry" and to prevent water from seeping into the pedestal. The article also reported that "a group of stone masons will begin pointing the masonry of the pedestal" where storm water "pouring off the statue and beating against the pedestal" had "damaged the exterior joints and caused some leaks through the thick walls." Inside, according to the Baltimore *Morning Sun*, workers would be "getting rid of twelve coats of preservative paint which have been applied to her inner plates in her fifty-one years." Red lead paint was then to be applied "to prevent corrosion."[43]

Superintendent Camp reported that during June 1937 the following work was carried out as part of the WPA project, with a daily average of 50 workmen on site. The Statue remained closed above the second landing.

> a. Scraping and cleaning paint inside the Statue at the head; the tin roof at the base of the Statue; some paint in corridors at second floor level of the Pedestal.

b. First coat, red lead, applied on tin roof at the base of the Statue.

c. Removed manufacturer's bronze tablet at base of Statue, and lattice girders behind the copper overhang at base of the Statue.

d. Raked some of the joints in the masonry above the Observation Platform.

e. Cut out topping of ledge outside the Pedestal at the second floor level; this work is practically complete. Worked on copper sheet flashing to be installed below the new concrete topping for this ledge.[44]

In July more progress was made on Project 8001, according to the superintendent's report for that month:

a. The burning off of the paint within the Statue has progressed downward to a point about 40 feet below the head.

b. Raking and recaulking masonry joints above the impost course above the Observation Platform has been completed. In recaulking the joints, strips have been inserted to which will be crimped the copper counter flashing to be installed.

c. Some vertical joints were raked and recaulked below the ledge around the second floor landing.

d. The old paving material was completely removed from the ledge around the second floor level. Some wire mesh and copper joint flashing were put in place, form boards installed and the ledge was completely covered with a new concrete topping. This work was finished July 22, except for the final waterproofing on the joints.[45]

The WPA work completed in August included the following:

a. The burning off of the paint within the Statue has been continued.

b. The repointing of joints on that portion of the Pedestal below the ledge at the second floor level has been practically completed.

c. Considerable repointing of the joints has been done in that portion of the Pedestal between the ledge at the second floor level and the base of the Observation Platform.

d. Cleaning of the paint from the brick work of the rear entrance to the old fort is being carried on, and considerable progress has been made in its removal.

e. Repaving of the upper surface of the ledge at the second floor level is practically completed. That is, being on a slant, it has not yet been possible to complete the filling of the joints with the plastic material. Probably one more application will complete this portion of the work.

f. Material has been received on the Island for the fabrication of the new lattice work to be placed in rear of the present copper overhang at the base of the Statue. This will also carry the new copper counterflashing and to it will be fastened the manufacturers bronze tablet, when replaced.[46]

Between the beginning of September and November 10, 1937, the Statue remained closed above the second floor as work continued. By mid-November burning off the paint and wire brushing within the Statue were 95% complete, leaving to be done only the "steel bands and secondary struts in the lower 20 feet of the Statue and a very small amount in the right or torch arm, together with the interiors of the 8 main supporting girders." The scraping had revealed that the "steel in the main tower" that had been exposed appeared to be in "excellent condition." Raking and repointing the masonry of the pedestal was 99% finished. Repaving the upper surface of the ledge at the second floor level was completed. The material for the new steel lattice work for the rear of the present copper overhang at the base of the Statue was given two coats of red lead preparatory to fabrication and installed, but further painting was incomplete. Work began to apply red lead paint to the "main members in the Statue." The work of cleaning the "concrete surfaces within the Pedestal" was about a quarter done. Copper sheets to be used for flashing had been fabricated but not yet installed.[47]

On November 10, 1937, WPA officials closed down the project at the Statue and assigned the workers to other projects because of a shortage of funds. Two days later the equipment and materials for the Statue work "were loaded on a barge and removed from Bedloe Island, except the staging used for cleaning and painting the steel framework." [48]

Work was started up again on December 10, 1937. Laying the copper flashing was completed in early February.[49] Scraping off the rust and paint and repainting the steel was not finished until November 1938, after various delays.[50]

THE MASTER PLAN AND EXISTING CONDITIONS IN 1937

Meanwhile, on September 7, 1937, the National Park Service had taken over the responsibility for all of Bedloe's Island and soon began work on a master plan that addressed not only the Statue but also the entire island. Contributors to the plan included National Park Service designers and managers and outside advisors. The plan was approved in 1940, and it included information on recommendations, as well as existing conditions.

The plan began with this statement: "the fundamental purpose for which the Statue of Liberty was designated a National Monument, and the Monument then expanded to its present extent, is the adequate preservation and interpretation of the most significant symbolic structure in the United States."[51] One aim of the master plan was "to remedy in the Statue itself the deficiencies as to structural strength, circulation of pedestrian traffic, waterproofing, etc."[52]

An important part of the plan was its delineation of existing conditions at the Statue in 1937: the "Statue itself consists of a shell of copper, 3/32" thick, in sections held together by several types of joint, each section being supported by bands of iron formed to the inside contour of the section and in turn connected to a central system of supports that are anchored to two sets of structural iron grillage far below in the body of the pedestal." Despite the Statue's size, it was "actually comparatively light." "The structural needs," the report continued, were listed as "(1) holding the separate sheets together, and (2) securing the whole to its anchorage to prevent overturning by windpressure." A 1937 investigation

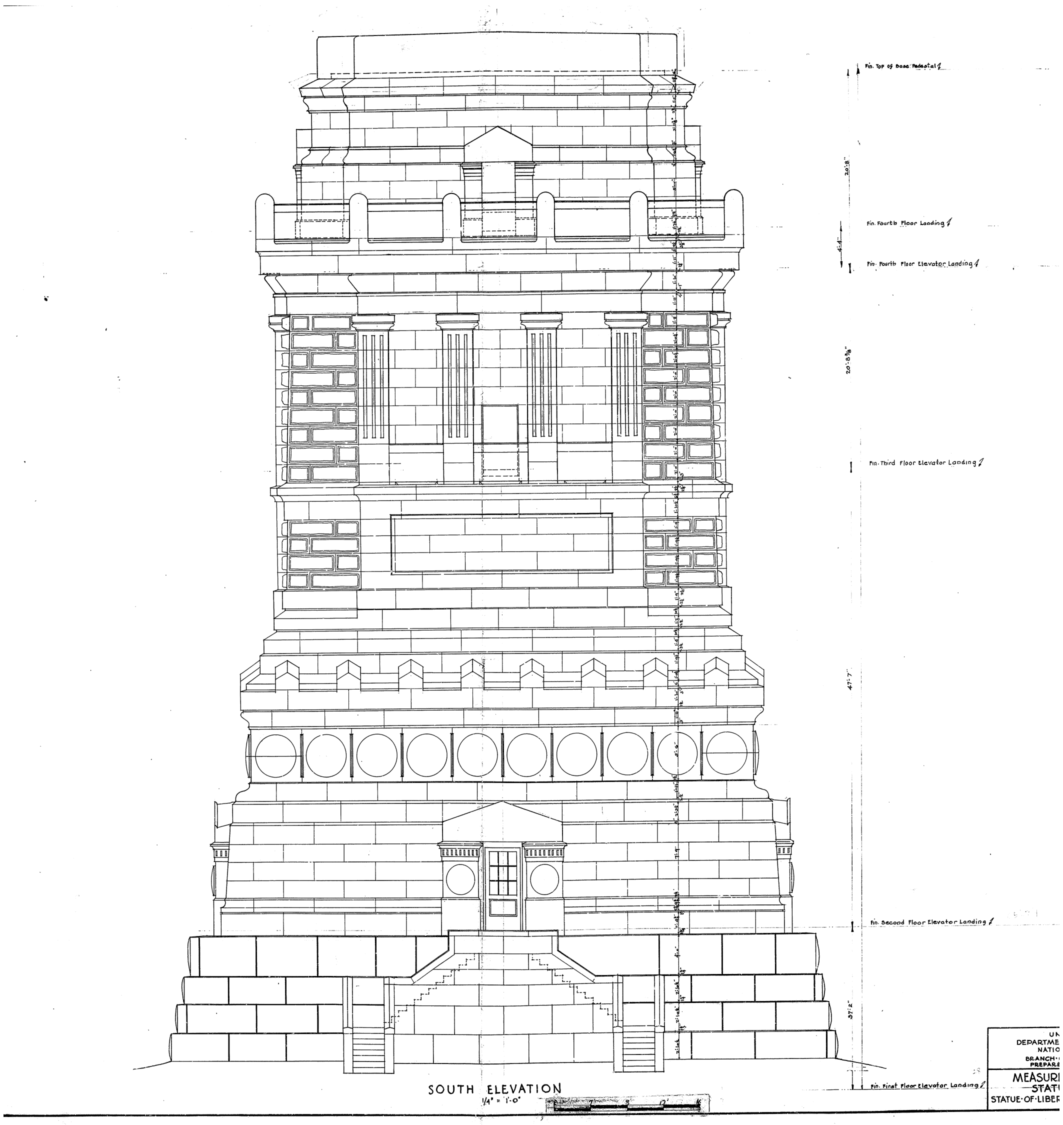


Figure 42. Measured drawing of the pedestal, November 1937, showing the 1907 entrance stair. [NPS Denver Service Center, E-tic 2057]

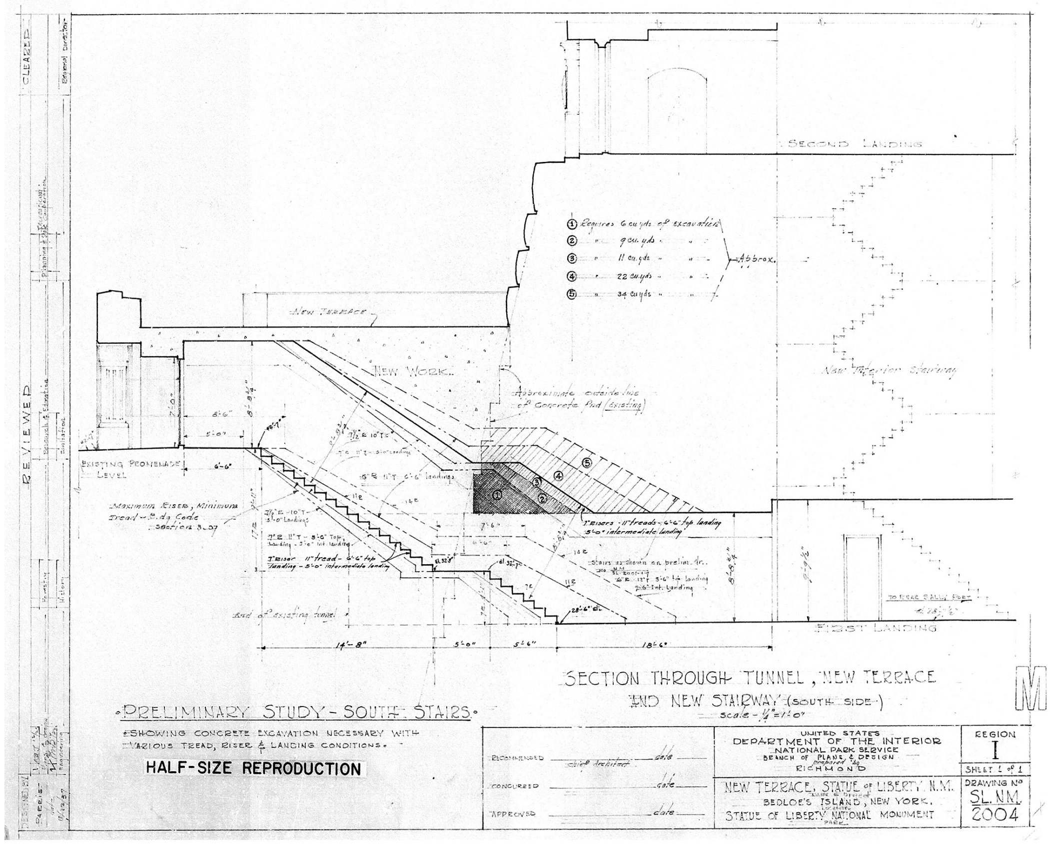


Figure 43. Section for a proposed terrace at the base of the pedestal, December 1, 1937. [NPS Denver Service Center, E-tic 2004]

had “revealed that much of the metalwork in the supporting system had become badly corroded,” but the “copper of the Statue was in good condition.”[53] This investigation also “showed the whole interior of the Statue, including the spiral stair, ladder, and torch, to be in need of repair.” The spiral stairway led from the landing at the top of the pedestal to a “platform in the crown, with an intermediate ladder from the shoulder up the right arm to the torch.”[54]

The pedestal, described as a “granite-faced concrete structure,” had “four floors or Landings: the First at or near the level of the former parade ground of Fort Wood; the Second some 37 feet above, with a door in each face of the pedestal, and with space occupied by the concessionaire for sale of souvenirs, etc; the Third at the level of the exterior loggias; and the Fourth only a few feet below the actual top of the pedestal.” Within the interior of the pedestal “was a shaft 10' square from the First Landing to Second, and 27' square from Second Landing to Fourth. A stairway ascended from First Landing to Fourth, as did a small elevator with stops at the other Landings.” According to the plan, this stairway was in “very poor condition, and the elevator needed repair.” The stone stairway that “descended on the outside of the pedestal from the Second Landing to the Promenade Level (former gun platform or terreplein) of the old fort” was described as being “totally inadequate” and “had obviously been added as an afterthought or as a temporary expedient in construction of the pedestal.”[55]

Investigations had also “revealed another peculiar condition”:

> The main body of the pedestal above the Second Landing level had been faced with Leetes Island (Connecticut) granite, virtually the same as the “Stony Creek” type known to modern practice. From early sketches it appeared that the architect of the pedestal, Richard M. Hunt, had intended to use granite facing on the rest of the concrete core, which slopes outward and downward from the Second Landing level in a series of steps. For some reason, presumed to be the scarcity of construction funds, only the top four steps had been faced with stone and even so with Deer Isle (Maine) granite, quite different from the principal stone of the pedestal. Originally there had been a central doorway in each face of the pedestal at the First Landing level. These had been closed on the east and west faces, leaving blind passageways from the interior shaft. From the doors in the north and south faces, tunnels had been built to the corresponding Sally Ports in the walls of Fort Wood, together with supplemental tunnels over the stairways, one near each Sally Port, that led up the inside face of the fort walls to the Promenade Level. The whole space between the pedestal and the inner face of the fort walls had then been filled with earth from the grade of the parade grounds to the gun platform or Promenade Level.[56]

The master plan also noted continuing problems in the pedestal with “the narrow stairs and their poor arrangement,” which “had led to extreme congestion of traffic” and significant dampness in “the lower part of the interior of the pedestal, including the tunnels.” The dampness was caused by “condensation and leakage through the concrete and the wash of water down the old steps in the fort wall.” In addition, the “earth slope at the bottom of the exterior granite of the pedestal had also become subject to constant erosion, which further induced leakage through the tunnel roofs.”[57] The National Park Service had tried to address the leakage and condensation problems during the 1933 improvements by “placing a kiosk of granite over each of the two open stair hatchways on the Promenade Level; lining the tunnels with glazed tile and false ceilings of copper; and adding a grilled drainage channel along the bottom of the tunnel walls." However, according to the master plan, this work "had not corrected the circulation problem, and had given the tunnels an appearance not entirely in harmony with the spirit of the rest of the structure."[58]

The work done in 1933 had not included installing a false ceiling in the room on the first landing where transformers and elevator equipment were located, and by 1937 moisture in the room had become a "serious hazard." By then it had also "become apparent that a new heating system was needed in the pedestal to offset condensation, as well as for the comfort of personnel and public."[59]

In the master plan the Works Project Administration proposed that the following work, already underway, be completed in 1939:

> Replacement of defective band iron, rivets, structural steel, etc.; cutting concrete to extend 27' x 27' shaft of Second Landing down to First Landing; installation of new stairs and treads, with bronze head railing, from First Landing to Fourth; rearrangement of Fourth Landing for better flow of traffic; removal of present interior doors at Second Landing and rearrangement of that floor with removal of concessionaire space; renovation of elevator and casing; installation [of] new emergency escape doors from elevator shaft; installation [of] new heating system; extension of water supply, with added drinking fountains; rearrangement of electrical system to accommodate new stairs; removal of false lining and tile from First Landing tunnels; repainting interior of Statue and pedestal throughout; repointing of mortar joints in fort wall.[60]

The WPA also proposed to replace all exterior doors in the pedestal, remove the elevator transformers and equipment in the east tunnel and install them in the old fort, adjust the lighting in the tunnels of the first landing, and construct a utility trench for heating, water, and electrical lines under the floor of the first landing tunnel.[61] A new terrace was also proposed to be built "between the Second Landing and the Promenade Level, in order to correct difficulties of traffic circulation and inadequate waterproofing of lower tunnels."[62]

ALTERATIONS UNDERTAKEN AS WORKS PROJECT ADMINISTRATION PROJECT OP-365-97-2-8

In June 1939 the resident engineer at the Statue of Liberty National Monument filed a completion report outlining the work that had been done beginning in December 1937 under WPA Project Number OP-365-97-2-8. First in his report was a description of the removal of "a solid concrete block extending from the first to the second landing" in order to accommodate the new stairway. This concrete had been in place since 1884; it "consisted of 1 part cement to 4 parts of track rock screenings." It "had been placed in layers ranging from 6"to 14" in thickness, thus leaving a cleavage plane between each layer."[63] "Ingersoll-Rand R-63 paving breakers with chisel edged steel" were used to remove the concrete.[64] Because the concrete was unusually hard, "the bits wore down very rapidly" and required frequent sharpening; sometimes the "bits had to be changed every nine minutes." The concrete was "much harder near the surface, where it was exposed to the air, than in the center."[65] The cutting of the concrete was "started at the second landing and removed concrete was chuted to the first landing." It was then transported by wheelbarrow to a "dump truck which hauled it to a stock pile at the west end of the island."[66] Ingersoll-Rand L-54 demolition hammers were used to cut the chases and beam seats.[67]

Supporting structural steel from the landings was then removed in order to leave "an open wall from the top to the bottom of the pedestal through which the new steel could be hoisted."[68] Welders worked from scaffolding to "cut the members with an acetylene torch. Beams were cut approximately 18" from the face of the wall thus leaving a projecting stub which was later used for snubbing lines, supporting scaffolding and from which could be suspended block and tackle."[69] These projecting stubs were later "removed by chipping the concrete a few inches back from the face and cutting off the stub with a torch."[70]

This same method was used to remove sections of the stairs, and "wherever possible an entire flight of stairs was taken out at a time."[71] Structural members, as well as the stairways, had become "badly corroded," and in some cases "the entire top flange of the I beams was eaten away." Paint had concealed rust on several beams.[72]

Nineteen tons of structural steel for the stairs and landings had to be installed before the new concrete could be poured.[73] According to the report, a "one-sack concrete mixer was located in the rear of the lower tunnel," and from this location "the concrete was delivered by two wheel steel buggies, which were specially built to fit inside the elevator, to the elevator and thence by chutes into the forms."[74]

The copper sheets of the Statue were 3/32"thick and, according to the completion report, were "fastened to the supporting framework by sheet copper clips." These clips, in turn, were "riveted to the copper by 3 rivets above and 3 rivets below the supporting band iron." During the original assembly of the Statue, the band iron had been "insulated from the copper by sheet asbestos soaked in shellac," but the insulation had "dried out and crumbled over a period of years," resulting in "a powdery mess between the band iron and the copper which retained moisture and made an excellent place for electrolysis to take place." Originally the band iron measured 3/4 by 2 inches, but in many cases the electrolysis had reduced the iron to 1/2 by 3/4 inches.[75] The band-iron elements varied greatly in length, from 18 inches to 10 feet, and there were one to six bands in each section, making it "impossible to pre-fabricate the new iron." Each corroded iron band was "used as a template for forging the new iron band" at a blacksmith shop set up on the promenade outside. Each new piece "was drilled, tapped for bolts and given a coat of red lead before being installed. Pieces which were only slightly corroded were rebuilt by oxy-acetylene welding."[76]

Many of the clips that secured the copper to the iron bands had to be removed. These clips "were originally riveted with copper rivets"; replacing the rivets in kind would have required erecting extensive exterior scaffolding.[77] After research and discussions with manufacturers of bolts and toggles, it was determined that a self-tapping screw was the best substitute. The Parker-Kalen Company of New York supplied these screws for the Statue, manufacturing them of Monel metal to reduce corrosion.[78] With this type of screw it was possible to do all the work from inside the Statue. To ensure a connection that was

Figure 44. WPA workmen cleaning the double helix stairs on June 8, 1938. [NPS, STLI, Ref. Lib., 4 12 #4]

Figure 45. The tunnel into the pedestal with the new 1937-38 finishes. [NPS, STLI, Ref.Lib., 14 5 #1]

watertight, each screw was dipped in caulking compound before being inserted. The size of the original rivets was 1/4", and the self-tapping screws were 3/16" [5/16"?] and 3/8".[79]

According to the report, the sheet-metal skirting of the circular stairs "was removed and replaced with new 16 gauge sheeting." In addition, broken and cracked stair treads "were replaced with new cast-iron treads," which duplicated the originals.[80] The I-bars, which served as anchor rods, "were corroded where the metal floor plates at the fourth landing had come in contact with them." These I-bars "were repaired, and the corroded spots built up, by acetylene welding."[81]

The completion report also described the existing conditions of the spikes in the Statue's head, as well as the repairs:

> The seven spikes in the head of the Statue, ranging in length from 7' for the shortest to 11' 5" for the longest, are composed of two cast bronze side plates and a sheet copper top and bottom plate. The top and bottom plates being fastened to the east side pieces by countersunk oval head brass screws [sic]. The east side pieces are composed of two sections, connected at the mid-point with a splice plate. Inside the side plates are two supporting steel braces.
>
> The side castings were bolted to the steel plates which in turn were bolted to supporting steel bands within the head.
>
> The original bolts and splice plates were of steel, which had become badly corroded and reduced in section to a point where there was little or no strength left in them. The top and bottom plates of the spikes had also pulled loose from the screws in a number of places allowing rain to enter and cause further rusting.[82]

The spikes were completely disassembled, and "new steel plates and brackets made to replace" the originals. The new plates and brackets were "completed encased in soft sheet copper with all seams soldered" to prevent corrosion. "Bolt holes, drilled and tapped into the steel, were tinned after being tapped, and Everdur Brass bolts replaced the original steel bolts." In addition, "broken screws, in the top and bottom copper plates, were drilled out, the holes re-tapped and new screws put in."[83]

Weakness was discovered in the splice plates that joined "the two sections of the cast bronze side plates," so the splice "plates were replaced with much heavier copper plates." New supporting steel plates were "made long enough to extend past the center splice plate," so that the entire weight would be "carried by the canti-levered steel plate" and the splice plate would act "only as a filler and stiffener." The edges of the side, top, and bottom plates were tinned to increase waterproofing.[84]

A hatchway with a cover made of a sheet of the original copper was placed in the head of the Statue.[85] The completion report noted that "in all probability this hatchway will not often be used, but it will greatly facilitate inspection, or repairs, to the outside of the head in future years." Previously the only egress to the outside of the head was "by rope from the platform below the torch." The glass in the torch was replaced by the Bostock-Rhoads Co. of New York.[86] [87]

During the project, work was also done on the wiring for lighting in the pedestal. Brass pipe was substituted for the original galvanized conduit, which the "outlet boxes, junction boxes, switch boxes and panel board cases" were "dust, water and vapor proof." All the conduits below landing 2A were "concealed in the walls and all panel boards below

Figure 46. The 1937-38 stair. [NPS, STLI, Ref.Lib., 14.4 #9]

Figure 47. View of the double helix stairs, circa late 1930s. Note the wire screen installed over the Statue framing. [NPS, STLI, Ref.Lib., 14.4 #5 and Int. #30]

this point [were] set flush with the wall surface."[88] Except for new lights on the fourth landing, all wiring above that point was left in its galvanized conduit.[89] To prevent wiring inside the lighting fixtures from drying out, the new wire was covered with asbestos.[90]

The elevator was "completely overhauled and the spring buffers for the car and counterweight replaced with oil buffers." In addition, a "new counterweight, counterweight guide rails, governor cable, hoisting cables, trail cables, car guide rail lubricators and annunciator system [were] also installed."[91] At landing 2A a "new elevator door identical with the existing doors and complete with interlocks was installed," and emergency doors were also put in.[92] All materials for the elevator work, except for the doors, were provided by the Otis Elevator Company of New York.[93]

A "new five station telephone system" was also put into the Statue, but "unlike the old system, which was the magneto type," the new system was powered by a 110 volt electric circuit. The old conduits were reused. Telephones were located in the "elevator motor room, the elevator car, in the torch, head and on the 4th Landing."[94]

Painting was another important part of the project. Red lead had been used to coat the new band-iron elements before they were installed, and during the summer of 1937 another coat was applied to "all structural steel and band iron."[95] Sherwin-Williams Kem Kromie was used for the prime coat on the exposed metal, and Kem Elastic was used for the finish coat."[96] The exposed concrete surfaces inside the pedestal were painted with Inertol Ramuc Enamel Type 3, made by the Inertol Co. of New York.[97] "In order to assure a complete coverage each coat of paint was of slightly different color, the final finish being [illeg.] gray."[98]

In the pedestal "a low pressure steam heating system was installed"; three radiators were put in at each landing except the first one. However, the radiators were not connected to a boiler because the connection through a tunnel was postponed.[99] Two drinking fountains were installed on the first and second landings in the pedestal.[100]

The completion report also made suggestions for future care of the Statue. Included was a recommendation that the interior of the Statue itself, including both arms, be thoroughly inspected annually to be sure no bolts or rivets had come loose."[101] Any breaks in the painted surfaces of the structural steel should be repainted. The report suggested that "consideration be given to a different type of luminary in the torch which would generate as little heat as possible," so that the size of the openings under the torch platform that afforded ventilation but also allowed "rain and snow to enter and run down inside the arm" could be reduced. Other recommendations dealt with moisture on electrical conduits, cleaning beam seats at the top of the pedestal and above, and installation of a barrier at elevation 98′-4 5/8″ "to prevent the public from climbing out on the structural steel."[102]

Resident engineer W. Mickell deemed the project a success, noting in his report that "the results obtained on this job were as good as if the work had been done by a contractor." "The skilled mechanics," he wrote, "were of a very high type and a great deal of interest was taken in the work, not only by the skilled mechanic but by the labore[r]s as well." Mickell praised J. C. Maxwell, the WPA construction superintendent, and his foremen. Superintendent George Palmer and the resident landscape architect Norman T. Newton also received thanks.[103] The report further noted "that there were no serious accidents, and very few minor ones, on the entire job," despite many parts of the project being "unusually dangerous."[104]

The Statue had been reopened to the public on December 15, 1938, having been closed for 23 months, even though construction work was continuing on the stairs in the pedestal. Until those stairways were completed, visitors were carried up the elevator to the fourth landing, where they could then climb up the spiral stairs inside the Statue.[105]

NEW SIGNS AND LABELS FOR THE STATUE, 1940s

In January 1942 John R. White, the superintendent of Sequoia National Park, reported on a visit he had made to the Statue of Liberty in December. Many improvements had been made over the past three years, but more were needed. The "corridors, and halls and rooms are bare, cold and unattractive," he wrote: "the few exhibits of F.W.A. activities are entirely inappropriate, but better than the bare walls. I could not but think that there is needed the touch of an artist and an interior decorator." "In short," White concluded, "the Statue of Liberty should be made warm, attractive and inspirational rather than be left cold and somewhat drab."[106] Much work was undertaken in the 1940s to address these issues, including the installation of new signs and labels throughout the Statue.

In March 1942 the National Park Service planned to place interpretive labels "in appropriate places in the pedestal of the Statue of Liberty where they may be read by incoming visitors," as part of its project "to emphasize in the national historical parks and monuments the enduring principles on which the greatness of the Nation has been built." For the third landing it was "planned to include quotations from a number of outstanding champions of American liberty, as well as from a noted American writer, Henry W. Longfellow."[107]

In February 1943 eleven masonite labels were received "from the Director's Office for hanging in the pedestal of the Statue of Liberty," and Superintendent Palmer hoped "to have all the labels in place before the end of March."[108] In March eleven labels arrived from the Chicago office of the National Park Service; apparently these were in addition to those received in February. Four labels were hung by the end of March; the other seven were framed and "prepared for hanging."[109] These labels were hung in the pedestal in April, and "the seven labels with quotations were installed on the third landing."[110]

Contracts for new directional signs were awarded in August 1943 because the existing signs were "in very poor condition."[111] The new signs, which were received later that month, were made of "structural glass, in light jade green with incised letters of umber" and were "mounted in the present cast bronze frame." Another report noted that the signs were "made on jade vitrolite structural glass"; the letters were "hand painted with a paint used for glass."[112] Superintendent Palmer reported that "we are very pleased with them and will begin installation after Labor Day."[113] In November almost all of the directional signs were installed. Palmer commented that "the finished appearance of the new signs pleases us very much."[114]

Towards the end of the decade, in August 1948, more interpretive labels were crafted for the Statue. Newell H. Foster, who had taken over as superintendent in December 1947, reported that "two new interpretive labels 'The American Story' and 'The French Story', carved in beautiful jade carrara glass were completed by Harriton Carved Glass"; they were "installed on the walls of the entrance corridor."[115]

In July 1949 Roy E. Appleman, the regional historian, reported that he had been "studying with Superintendent Foster proper placing of the nine recently manufactured jade Carrara glass markers, and they are now ready for installation."[116] Foster noted that during July Harriton Carved Glass had completed the nine carved glass labels and that they had been installed in the pedestal. There was now a "total of twelve labels, all of the same type."[117]

Work was underway on more labels in July 1949.[118] In August "'The Story of Fort Wood' and the Inscription on the Liberty Bell" labels were "completed and mounted on the walls of the Pedestal."[119]

INSTALLING NEW LAMPS IN THE TORCH AND FLOODLIGHTS, 1941-1945

Work at the Statue in the 1940s also included the installation of new lamps in the torch and floodlights. In October 1941 David S. Youngholm of Westinghouse Electric and Manufacturing Company told Superintendent Palmer that the company "had approved the gift of the necessary lighting equipment to remodel the flame of the torch" and "several new flood lights at the base." The company was planning to use "mercury vapor lamps since they are one of the newest types of lighting developed in the last few years." Youngholm explained that "with this kind of installation, we believe that the statue will be several times as bright as it is now." Furthermore, he wrote, "mercury vapor irradiated on the green surface of the statue will produce a dramatic color effect never before possible with ordinary incandescent light." "As a patriotic gesture," Youngholm concluded, "Westinghouse would like to donate the lamps and necessary transformers for the work."[120]

An October 1941 press release prepared by the National Park Service announced that "on the occasion of the fifty-fifth anniversary of the Statue of Liberty something new will be added—a newer and brighter flame for the torch of America's 'goddess.'" The press release also noted that "for the additional lighting of the metal-work of the right arm holding the torch, some of the floodlights of the base may be replaced by narrow beam mercury floodlights."[121] Another National Park Service press release, issued in mid-December, announced that "a new torch of liberty will blaze brighter in a dictator-ridden world in a few weeks." "In place of 13 1,000-watt incandescent lamps once considered the last word in illumination," the release continued, "three newly developed 3,000-watt mercury vapor lamps that will cast their beams over a 20-mile radius are to be installed and will envelop Bartholdi's famous statue in a blue-white light, outstanding in beauty and visibility."[122]

After the Japanese attack on Pearl Harbor on December 7, 1941, the lighting project would be dropped.[123] A February 26, 1942, press release announced that the torch and floodlights had been blacked out but that visitors would still be allowed to visit the Statue.[124] It was not until D-Day, June 6, 1944, "a half hour after sunset," that "the floodlights of the Statue of Liberty, blacked out since Pearl Harbor," were lit "for fifteen minutes while the V-for-Victory message was flashed to the world."[125]

In September 1944 Westinghouse "sent repair parts and a crew to the Statue to recondition the floodlights in anticipation of their being relighted with the fall of Germany." Three men remained in the area for 10 days "and installed repair parts worth several hundred dollars." The work was being done at no charge. Westinghouse also anticipated "doing some experimental work with sodium mercury floodlights in order that the color may more nearly match that during day time" as soon as the floodlights were to be turned on again.[126] The installation was finished in December, and it was said to be the "most modern that can be installed." No trials would be made until the lights were relit, "when V-Day comes."[127]

Palmer reported in February 1945 that in addition to re-servicing the floodlights, Westinghouse had "installed 16 vapor floodlamps to bring out the color of the Statue." The company believed that "the blue mercury vapor will counteract the yellow from the incandescent lamps and make the Statue more nearly the same color as during daytime."[128] The "modernized floodlighting system" would also be "turned on to full brilliance, 'painting' Miss Liberty with light of doubled intensity," according to an April 1945 press release from Westinghouse.[129]

The same press release also noted that the "60-mile-an-hour winds which buffet the torch made 'electrical reproduction of a living flame in the unsheltered tower extremely difficult. The winds are so strong that they literally can hurtle a 10-pound weight from the torch balcony.'" Furthermore, "ordinary light sources would be unable to withstand the oven-like heat generated by the cluster of lamps within the unventilated torch, particularly in summer when evening temperatures outside often hover near 90 degrees."[130]

To give the flame in the torch a "new bluish-white brilliance," the engineers from Westinghouse "added six 400-watt high intensity mercury vapor lamps to the 13 1,000-watt incandescent lamps and one 250-watt incandescent lamp which simulated the flame before the war." The incandescent lamps had been retained in order to help "maintain proper color balance."[131] The old and new lamps were "grouped in a cluster which is enclosed by the outer wall of the torch. The wall is made up of more than 600 panes of glazed cathedral glass supported by steel ribs."[132] The panes were specially curved and "set in non-hardening putty to waterproof the torch and yet allow the wall to 'give' under pressure from high winds." The color of the glazing was "graduated from a deep amber at the base to clear white at the top to make the flame appear to burn bright and hot."[133]

The overall floodlighting system was "reconditioned and refocused" with the addition of "16 special floodlight projectors, each containing a modern quartz inner bulb 400-watt high intensity mercury vapor lamp." It was expected that this change would "double the robes of light in which Miss Liberty was clothed before the war."[134]

On April 18, 1945, S. G. Hibben, Westinghouse's director of applied lighting who had also directed the lighting of the Statue in 1931,[135] reported to Palmer on the new lamps:

> On the two bastions toward the Battery, and to cover the left side of the Statue, we have added a total of 16 new floodlights each equipped with Type D-H1 400 watt high intensity mercury lamp.
>
> Within the torch flame we have added a total of 6 400 watt Type A-H1 high intensity mercury lamps, for which the control transformers are fastened on the platform at the shoulder level. The secondary circuits to these mercury lamps were brought up within a

> conduit and the upper ends water-proofed with cambric tape so as to form a reasonably permanent job. For the time being we have hung these 6 mercury lamps from the old colored dome so that they will be generally in the middle of the torch, and after a few nights of burning test we may later determine whether the spacing or the position need be changed.
>
> These mercury lamps are fed from the existing safety switch and circuit to which we had formerly considered connecting a 3000 watt mercury lamp. This circuit I believe is turned on along with the floodlights on the lower parapet which seems to be a good arrangement for flexibility and eventual economy. During the early part of each evening the complete floodlighting, plus the mercury lamps in the flame, will come on together and will, of course, be extinguished together when say at 11:00 P.M. the floodlighting is cut off.[136]

In his May-June 1945 superintendent's report, Palmer noted that at 8:39 p.m. on May 8, 1945, V-E Day, the floodlights were turned on, and "the effectiveness of the new mercury lamps has already been reported."[137]

DEALING WITH LIPSTICK DEFACEMENT AND PAINTING THE STATUE'S INTERIOR, 1944-1947

In addition to the installation of new lamps in the torch and floodlights, the entire interior of the Statue was repainted in the 1940s. On July 14, 1944, Superintendent Palmer requested an increase of $2,383 for painters' salaries because the Statue desperately needed painting. He stated that "the interior of the Statue of Liberty has not been painted since 1938 when it was reconditioned under a WPA project. The interior appearance is decidedly unsightly as a result of both dirt and names written by the visitors. In addition to the appearance, there is a considerable amount of rust appearing throughout the framework."[138] The only painting that had occurred since 1938 was "the repainting of the frame work and spiral stairway in the Statue itself" in March 1942.[139]

According to one report, visitors to the Statue had been climbing "over the ironwork to inaccessible but quite visible places on the interior of the Statue" and scrawling on "names, dates, initials, etc., with lipstick." This practice had resulted in "a terrible mess," which could not be cleaned satisfactorily. The lipstick's chemical composition had "an affinity for paint"; "normal cleaning practices" served "only to smear the surfaces further without removing the coloring." The extent of the condition at the Statue of Liberty is extreme," the report continued, and "only repainting will change it."[140] In September 1944 experiments were begun "with paint products that might offer a solution to lipstick defacement."[141]

Early in September Palmer met with Dr. A. S. Fistor, chief chemist at the Inertol Company. This firm had "furnished the Ramuc enamel for the painting of the pedestal in 1938," and the National Park Service had used the same paint "for spot painting in the Statue." Fistor explained that the "problem of sealing and removal of lipstick" was "one of the most difficult problems of painting now facing them." Palmer had found "the enamel that was used in the pedestal" so satisfactory that he wanted to use it in the Statue.[142]

Later that month Thomas J. Allen, the regional director of the National Park Service, reported to the director that "plans for post war work at the Statue call for construction of a wire grill to prevent persons going very far from the spiral stairway or reaching the Statue" in hopes it would curb the defacement of walls. A repainting of the entire interior was also needed but was estimated to cost at least $12,000. Allen noted that "Superintendent Palmer has requested several paint companies for advice as to the best method of solving his problem. So far it has stumped these companies, and they do not know just what type of paint must be used to keep the lipstick from coming through again."[143] However, Superintendent Palmer noted that in November "experiments with paints were continued and we believe that we may have a fairly satisfactory solution to the problem of handling lipstick defacement." He had also been notified that $1,700 in funding would be available "to recondition the interior."[144]

In January 1945 specifications were drawn up for the paint to be used on the steel framework in the Statue's interior and in the pedestal and on the concrete walls inside the pedestal. The paint had to be able to "withstand atmospheric conditions present in New York Harbor," and it had to "be impervious to lipstick and mascara defacement."[145]

The concrete walls of the pedestal had earlier been painted with three coats of Inertol Ramuc enamel. About a quarter of that surface had been defaced "with names written with lipstick that has penetrated at least the first coat of paint."[146] The iron and steel in the pedestal and Statue "has had a prime coat of red lead and three coats of Sherwin Williams Kem-Kromatic and Kem-Elastic. One half of the area for which paint is to be purchased has been defaced with lipstick writing and half the area has had at least one coat of Inertol Ramuc enamel over the Kem-Elastic."[147]

The paint specifications stated that:

> The paint for cement plaster and concrete walls, ceilings and stair soffits and edges shall be of a type specially manufactured and approved for use on concrete surfaces. This paint shall be a synthetic resin enamel, which will be and will remain proof against the attack of water, acids, alkalies and fats to the extent indicated below. The material shall adhere firmly to the concrete to which it is applied and shall be unaffected when applied directly to a concrete surface without first neutralizing the surface.
>
> The sealer furnished shall prevent all bleeding of lipstick color after the surface has been cleaned of lipstick without the removal of the present paint. Tests for this sealer will be based on the sealer itself and with two coats of the accompanying paint. The sealer shall adhere firmly to the present paint and lipstick defaced areas without crazing, checking, cracking, blistering or peeling off and shall provide a satisfactory base for the prime coat of paint.
>
> The paint for the prime coat shall be rapid drying and shall make a satisfactory bond between the sealer over lipstick or the present paint and the finish coats.[148]

The specifications further stated that "the paint for the finish coat shall be a synthetic resin enamel which will be and will remain proof against the attack of water, acids, alkalies and fats." Each bidder was expected to submit samples that would then be tested. Bids were opened in late January 1945. It was expected that a contract for painting the pedestal would be made in February, while "the painting inside the Statue itself will be done by staff members."[149]

In a February update Palmer reported that the lipstick on the walls had been "actually dissolving the Ramuc Enamel and allowing the pigment from the lipstick to penetrate at least the first coat of paint." An Inertol Company chemist determined that "the vegetable fats contained in lipstick dissolved the enamel and permitted the color to penetrate." During the early 1940s "the amount of lipstick defacement has increased a great deal," Palmer reported; visitors had "climbed to unbelievable spots in the framework to write their names and in areas that can be partially cleaned, the color has now turned to varying shades of pink and red rather than the original gray."[150]

Palmer further reported that by working

> with the Inertol Company's chemist, we find that that company does have a product that is impervious to samples of lipstick that we have used on it and can be cleaned without leaving any trace. In areas now painted with Ramuc Enamel that have been defaced, it is necessary to clean all the surface lipstick off and to lightly sandpaper the paint. A sealer is then applied and followed with a primer and a finished coat of synthetic enamel with a hard, glossy finish. The chemist has not disclosed the formula for the synthetic resin enamel but we have tested the lipstick with beeswax, vaseline and stearic acid and in two weeks time we have seen no reaction on the paint.[151]

The paint was to be purchased from the Inertol Company, which was the only bidder.[152] In March 1945 the Empire Contracting Company was awarded a contract for the painting inside the pedestal for $1,764.[153] Palmer had planned to "hire our own painter for the Statue itself," but apparently that was not done.[154]

The problem with the lipstick defacement, however, continued. In August 1946 Superintendent Charles S. Marshall, who had succeeded Palmer about a year earlier, reported that during 1945

> no painting was done in the metal portions of the Statue; and in the pedestal a strip about eight feet high was painted, on the theory that lipstick writers could not reach higher than that point. As a temporary expedient, and for experimental purposes, that was an excellent job but it gives the appearance of being a "patching" job and the lipstick writers have proven better athletes than was anticipated. Consequently, in our opinion, there is a need to paint the entire pedestal interior under single job in order to give a smooth appearance to the job. We find that the metal work in the pedestal is showing signs of rapid rusting and, if allowed to continue, this might soon become a construction problem.
>
> The paint which was used in 1945 is the only paint which has ever been used here that is impervious to lipstick. Experience has shown that it is quite easy to wash off the lipstick from the painted areas but that in other unpainted sections of the Statue the lipstick has eaten through the older paints.[155]

The Inertol Company estimated that it would cost $4,000 for materials and $10,000 for labor to paint the pedestal and entire interior of the Statue. It was planned to first sandblast the "rust from portions of the metal work in the pedestal" and then "sandblast lipstick from the worst spots in the Statue itself."[156]

In October 1946 further tests were made "to determine the best type of paint for use where lipstick defacement is a major problem."[157] Specifications for painting the "entire interior" of the Statue were again drawn up, and the job advertised in November.[158] These specifications also covered previously painted masonry surfaces inside the pedestal, including the east corridor at the first landing, the stairwell, part of the corridor west of the elevator and east of the temporary corridor partition on the first landing, and doors and frames between the corridor and rooms at the first landing.[159] The specifications provided for the paint for cement plaster on concrete surfaces were the same as those in the January 1945 specifications.[160]

The specifications noted that "in the application of this paint the manufacturers' instructions as to methods of application shall be followed strictly and exactly at all times." In addition the following procedure was to be followed:

> Those concrete surfaces which were painted in 1945 shall be cleaned of lipstick, grease and dirt and shall receive only the final coat of enamel. The remaining concrete surface, which was not painted in 1945, shall be thoroughly cleaned, as above and shall then receive a seal coat, prime coat, and two finish coats. The second finish coat shall be applied contemporaneously with the single coat on the other surfaces so that when completed they shall present a smooth and continuous surface with no evidence of the present line of demarcation.[161]

The "synthetic resin enamel" used on the metal surfaces of the Statue was to match the color and texture of the paint used on masonry surfaces. In addition to following the manufacturer's instructions for application, the contractor was to adhere to the following procedure:

> The entire area shall be cleaned of all dirt, excess grease and other foreign matter, including all rust accumulation. All present lipstick defacement shall be removed, except that if the contractor demonstrates that the materials to be used will effectively seal in this lipstick against bleeding through, he may paint over old lipstick after removing all excess material which might injure the appearance of the completed job.[162]

For areas at risk for further defacement the contractor was to apply an additional "coat of primer and two coats of lipstick proof synthetic resin enamel."[163]

The areas being painted would be closed to the public while the job was in progress. The specifications noted that

> the interior of the Statue itself (as contrasted with the pedestal) shall be considered as one unit for this purpose and shall be the first area painted. Upon completion of this work, the area painted shall be inspected and, if found to be completed in a satisfactory manner, shall be accepted by the Contracting Officer before it is re-opened to the visiting public. Upon completion of the Statue, the pedestal, excepting the first floor corridor shall then be closed to the public, painted and accepted by the Contracting Officer. Finally, the first floor corridor shall be painted.[164]

The contract was awarded to the Inertol Company in the amount of $23,300 on December 19, 1946. Work would begin in January.[165] The contractor planned to steam clean the Statue's shell the week of January 6 and to start painting the steel framework and shell on January 13.[166] Superintendent Marshall reported in December 1946 that the contractor proposed to set up his pumps, boiler, and other steam-cleaning equipment on the landing at the top of the pedestal. Once the cleaning was completed, visitors would be allowed "to go as high as the balcony at the top of the pedestal." The spiral stairway, however, would remain closed until the painting contractor's work was completed.[167]

Another contract was awarded to the Inertol Company in February 1947 for painting other sections of the Statue's interior, in the amount of $985.[168] This contract covered

> the painting of all joints, as needed, and the painting of the entrance corridor from the east doorway into the pedestal of the Statue, including the stone walls and brick ceilings, starting at the doorway and extending to the point in the corridor where the walls and ceilings have already been painted in 1947 by the Inertol Company under Contract I-56np-3; the painting of the walls in the stairwell leading from the above corridor up to the Promenade, but not including the granite walls at the top of the stairway, nor the ceiling above the granite walls; and the painting of the interior of the east (doorway) side of the elevator shaft including all metal trim, doors, emergency doors and walls of the interior of the east side of the elevator shaft.[169]

The contract also instructed that the "priming coat shall be mixed in accordance with the following formula:"

Dry red lead	100 lbs.
Raw linseed oil	3 1/8 gal.
Turpentine	2 ½ pts.
Drier	2 ½ pts.[170]

The body and finish coats were to be mixed using this formula:

	Body Coat	Finish Coat
Paste white lead	50 lbs.	50 lbs.
Paste zinc oxide	50 lbs.	50 lbs.
Raw linseed oil	1 1/2-2 gals.	3-4 gals.
Turpentine	2-3 gals.	1/2-3/4 gals.
Drier	4 pints	2-3 pints
Water-resisting spar varnish		1½ gals.[171]

In February 1947 the Inertol Company finished painting the interior of the Statue.[172]

To protect the painted areas from further defacement woven wire guards were installed on the spiral stairway in the Statue. In July 1946 the General Wire Mesh Company was awarded a contract for $3,770,[173] but the installation apparently did not begin until late February 1947.[174] In early March the acting superintendent, Minnie C. Stein, reported that "21 panels out of a total of 100 panels have been erected and the contractor is erecting these at the rate of about 7 per day. After they get going properly, he feels that they will be able to install about 10 per day."[175]

On March 13, 1947, the following additions were made to the contract with the General Wire Mesh Co.:

> Place a ‘roof’ over the entire floored area of the second rest platform, this roof to furnish protection against persons climbing over the sides which are outside of the main derrick area.
>
> Replace eber and side fla[n]king the eber at the platform landing into the torch.
>
> Add two vertical panels, as directed, on two sides where persons may climb out of the derrick area immediately above the panels labeled on your shop drawings as #14 and #50.
>
> Add panels, as needed to bar off the “nose” of the Statue against vandals.
>
> Add panels, as needed, for crescent shaped area at top of stairway in crown of Statue alongside telephone cabinet.[176]

On April 4, 1947, a newspaper reported on the re-opening of the Statue and the lipstick problems:

> The Statue of Liberty, closed to visitors since Jan. 6, will reopen today, her 70,000-square-foot interior covered with a new coat of lipstick-proof cream-gray enamel from base to crown.
>
> It took a crew of fourteen workmen six weeks to remove lipstick and other dirt and paint from the walls of the statue’s inside, according to Charles B. Marshall, superintendent. In some places the lip grease was a quarter of an inch thick where sentimental visitors had left their names, initials and inscriptions.
>
> A protective wire mesh also has been installed to prevent persons from climbing to the supporting beams of the statue to leave their marks on the upper walls. In all, 700 gallons of paint were applied to the statue at a cost of $24,000.[177]

The installation of the woven wire guards was completed on April 29.[178] The Statue painting had been completed at a total of $24,195.75.[179] Superintendent Marshall told the *New York Times* that the “days of the ‘lipstick autograph hound’ are over.”[180]

INSTALLING A NEW HEATING SYSTEM, REPAIRING THE ELEVATOR, AND IMPROVING CIRCULATION, 1947-1949

In October 1942 Jesse H. Dennison, an associate engineer with the National Park Service, visited the Statue in order “to obtain first-hand information on the state of completion of the work which was left unfinished” by the Public Works Administration. He described the existing conditions of the heating system as follows: “In the Statue pedestal, the steam heating radiators and piping are installed, ready for steam, from the pedestrian tunnel up to the fourth landing. This part of the heating system has 15 radiators of 105 square feet each, a total of 1,575 square feet of radiation. The balance of the heating system for the Statue remains to be provided.”[181]

Installing a new heating system at the base of the Statue was a high priority “because of condensation conditions inside this structure.” In the proposed improvement program for the Statue, Superintendent Marshall noted that sometimes we tell visitors that "the Statue makes her own weather." During the winter, the huge mass of stone, concrete and earth (estimated at 48,000 tons) becomes progressively chilled, and is at its coldest in March when the air outside begins to warm up. This air, coming off the water, is very damp, and the moisture condenses on the walls until they are dripping with water, adding to the discomfort of visitors, impairing the health of those who work here, and causing deterioration of structure and fixtures. The same thing happens, to a lesser degree, throughout the year.[182]

Early in 1946 the sum of $24,000 had been allocated for a heating system in the pedestal,[183] but work was not begun until 1948, when it would be overseen by Newell H. Foster, who had taken over as superintendent in December 1947. In January 1948 the cost was estimated at $54,200.[184] The *New York Times* announced on May 27, 1948, that "the Statue of Liberty is due for a $500,000 beauty treatment." The article reported that "the House Appropriations Committee recommended that amount today to 'clean up' Bedloe's Island in New York Harbor on which the Statue is located and to install a heating plant in the Statue for the comfort of winter visitors."[185]

A July 2, 1948, work program listed tasks to be done at the Statue in order of priority. Number two on the list was some limited work on the heating system, now estimated at $2,860. This work was described as including "placement of 12 lengths of steam pipe (Ric-wel @ 21′ per section) under paved walks at specified grade; welded and capped. 252′ @ 10.00 per ft. 5 caps required. Placement of electric conduit under paved walks; cap ends. 340 lin. ft. @ 1.00 per ft. 3 caps required."[186]

After an inspection in early August 1948 by three National Park Service employees—Stanley W. Abbot, regional landscape architect; W. E. O'Neil, Jr., regional engineer; and Charles E. Peterson, regional architect—it was recommended it would be most cost effective to install the heating system "in the Soldiers' Guard Room using exposed supply and return mains to be temporarily hung on the passage walls."[187] In mid-August H. D. Balsinger, an engineer from the American Radiator and Standard Sanitary Corporation, who had installed the radiators and steam risers on the pedestal's five landings in 1940, reported to O'Neil at the end of the month that

there is 1237½ sq. ft. of installed steam radiation in the pedestal of this Statue, but due to the cold condition and the high condensate which will be prevalent, I would recommend an SO-736 water tube boiler, rated at 2350 sq. ft. of installed radiation as being the proper heating unit to put on this job.

I feel that the boiler should be installed in the Old Guard Room in the base of the monument, as there is a chimney there which comes up through the parapet, and being oil fired, the burner could be inspected and adjusted frequently, so that there would be no smoking, but due to the low height of the chimney it would be connected to, it would be necessary to use an induced draft fan in order to furnish the proper draft, as this boiler would normally require a chimney 16x16, 30′ high, and would require a draft in the fire box of around .02″ of water.[188]

The specifications for the new heating system outlined the scope of work as follows:

The work to be performed under this contract shall include the furnishing and installing of a complete low pressure steam heating system of the vacuum return type in the Statue

> Pedestal...The risers, radiators, traps, valves, etc. above the first elevator landing are now in place and shall be utilized for the part of the heating system above the first elevator landing. The examination of the piping, radiators, traps, valves, etc. now installed above the first elevator landing and any necessary replacements, repairs, cleaning, etc. found necessary for proper operation shall be included in this contract. The furnishing and installing of a low pressure steam, oil fired boiler, oil burner, breeching, induced draft fan, new chimney, vacuum pumps, controls, piping, miscellaneous accessories and electric wiring necessary to complete the heating system shall be included.[189]

On March 10, 1949, Johnston Heating Company was awarded the contract for $13,100 for the heating system.[190] In June the company was reported to have made "good progress on this installation during the month,"[191] and in July the work was nearly finished.[192] Superintendent Foster also noted in July that "all work under this contract has been of a high grade, and has been satisfactory to date."[193]

The August 30, 1949, completion report summarized the heating work as including "furnishing of all materials and equipment necessary to install a low pressure, oil fired, steam heating plant in the old guard room of Fort Wood, to furnish and install six radiator[s] with 588 square feet of radiation in the main corridor of the pedestal, and to connect the feed and return lines to existing lines supplying radiators already in place on the upper landings of the pedestal."[194] The work had started on April 15, 1949, and was completed on August 10.[195] The completion report also noted that "much of the work was performed during the height of the season for visitors at the Statue. The installation of the system in the main corridor at this particular time without inconvenience to the public is a credit to the contractor and his employees."[196] In December 1949 Superintendent Foster reported that the heating system was "performing very satisfactorily."[197]

Meanwhile, in February 1949, "extensive repairs" were finished on the elevator. The "control panel was completely overhauled, a new hoisting cable installed, bearings and sheaves checked for wear, worn parts replaced and the completed job tested."[198]

Later that year the superintendent reported that "new removable bronze stanchions" had been put in place in the entrance hall. The staff found that on busy days the stanchions effectively divided the traffic lanes and reported that "they were in place over the Labor Day weekend and the confusion which has occurred heretofore at the narrow outside entrance to old Fort Wood was eliminated. They are very neat and greatly enhance the appearance of the entrance corridor."[199]

INSTALLING NEW WINDOWS IN THE CROWN, 1948-1949

The 23 windows in the crown of the Statue needed to be reconditioned. Superintendent Foster reported in November 1948 that "all of these 'jewels' need new glass and much of the sash is missing. The windows have not been closed during the past eight years." Foster also noted that "there is a strong up-draft in the structure which could be appreciably reduced by closing the windows." "The job requires installation of new bronze sash glazed with a heavy shatter proof glass," he continued, as well as "some repairs to the existing frames and runs." In addition, a tamper-proof method for securing the sash open and closed was required.[200]

The specifications for the replacement windows in the crown were issued on April 1, 1949:

> All existing window frames, sash and glass shall be removed and replaced with new frames, sash and glass. All metal work shall be of copper and shall conform to the following composition: 92% Copper, 1½% Tin, 2% Lead and 4½% Zinc. The large sash in the center of the crown shall be fixed. The five (5) adjacent sash on the right of center and the five (5) adjacent sash on the left of center shall be movable sash. The balance of the sash shall be fixed sash.
>
> <u>Movable sash</u> shall be designed to slide into a pocket below sill level when in open position. The top of each pocket shall have a hinged metal flap to cover both sash and pocket opening when the sash is in open position. An overhanging lip shall be provided in the lower member of each movable sash frame to provide a weather-proof feature when the sash is in closed position. Vertical frames of moveable sash shall have spring devices to provide a tight fit at all times and contribute to the weather tight design._
>
> All hardware shall be of copper alloy and shall be removable. Pockets of all movable sash shall be of sheet copper construction, the metal to be of not less than 1/8″ thickness. Pockets shall be removable for access to sash and runs.
>
> <u>Fixed sash</u> shall have removable frames designed for ease in glazing.
>
> All sash shall be made in accordance with templates which shall be prepared by the Contractor to fit the individual openings in the crown of the Statue of Liberty.
>
> All templates shall be approved by the Contracting Officer prior to fabrication off the work.
>
> <u>Glass</u> shall be of 1/4″ safety type in all vertical sections of sash.
>
> Angular sections of sash adjacent to the electric lights shall be double glazed, having ribbed glass on the outer face and safety glass on the inner face.[201]

Superintendent Foster reported in September 1949 that the "windows in the crown of the Statue are being repaired by maintenance personnel and glazed by a commercial outfit" and in October that "all windows in the crown of the Statue of Liberty have been reglazed, using duo-plate safety glass. Several sections of missing bronze sash were made and installed by our maintenance force."[202]

In April 1948 the work of installing "protective frames over the lights on the spiral stairway" inside the Statue was completed. The frames were intended "to prevent removal of the light bulbs by visitors," and according to the superintendent "to date have proved to be vandal proof as they cannot be removed without tools."[203] Similarly, in August 1950 "heavy bronze mesh was installed in the closed openings on the second and third landings" in the pedestal, and the doors could then be "opened to admit light, and for ventilation."[204]

SALLY PORT STEPS AND RAILINGS, 1941-1952

On May 13, 1941, Superintendent Palmer wrote to Major Irving V. A. Huie, an administrator of the Federal Works Agency of the Works Progress Administration, regarding WPA project number 65-2-97-37, which was known as "General Improvements to Bedloe's Island." One of the tasks underway as part of that project was job number 17, listed as "Demolition of Old Stairs and Construction of New." Palmer wrote that

> it was proposed that the old and inadequate stairs at the Statue entrance be removed and that new stairs be constructed. At the present time the old stairs have been removed but no work has been started on the construction of the new steps. The continuation of the present stone cutting force beyond June 30 would make it possible to complete these stairs by late summer. Unless the stairs are completed, we will be without means to take the public through the entrance for which all of the landscape work has been developed. At the time the old steps were removed, it was anticipated that this job would be completed, otherwise we would not have permitted their demolition.[205]

The project apparently did move forward, for in his November 1941 superintendent's report, Palmer noted that the "principal work" done during the month "included the spread of cinder sub-base for proposed walks and excavation for the foundation of the new rear sally port steps." Palmer also reported that "the stone cutting for the construction of the steps continued."[206]

In January 1942 Superintendent Palmer reported that during some warm weather "we were able to pour the footings for the rear sallyport steps to the Statue."[207] During February work continued on the foundation of the steps, although the existing WPA work force was "reduced sharply" and the availability of future workers was uncertain.[208] As a consequence, Palmer reported, "we have made every effort to have the rear sallyport steps completed to such a point that the work can be terminated at any time and yet make the rear entrance accessible." He was pleased with the quality of the work: "the construction of the granite steps," he wrote, "is unquestionably the best WPA job that we have secured in this area."[209]

Palmer stated in his April 1942 superintendent's report that the current WPA project, number 65-2-97-37, "confined its activities entirely to the construction of the rear entrance sally port steps." He reported that "the steps themselves were completed and about half the stone flagging at the top landing was placed. The remainder of the stone has not been cut but should be completed by the end of May."[210] However, in May Palmer noted that the WPA had notified the Statue staff that the sally-port work would be terminated on June 10.[211] It actually closed on June 26, Palmer wrote, so that "we might finish the rear sallyport steps to the point where they could be used if necessary."[212] Palmer explained that "there appeared to be no prospects of renewing the construction work in this area until after the war."[213] An engineering inspection report of October 1942 noted that "the new stone steps and landing at the rear sally-port" were "complete except for the iron railing."[214]

Specifications for the iron railings for the rear sally port stairs and platform were not drafted until July 1950.[215] Wood treads were to be "furnished and erected by others," along with the erection of the railings.[216] The materials needed for the work included:

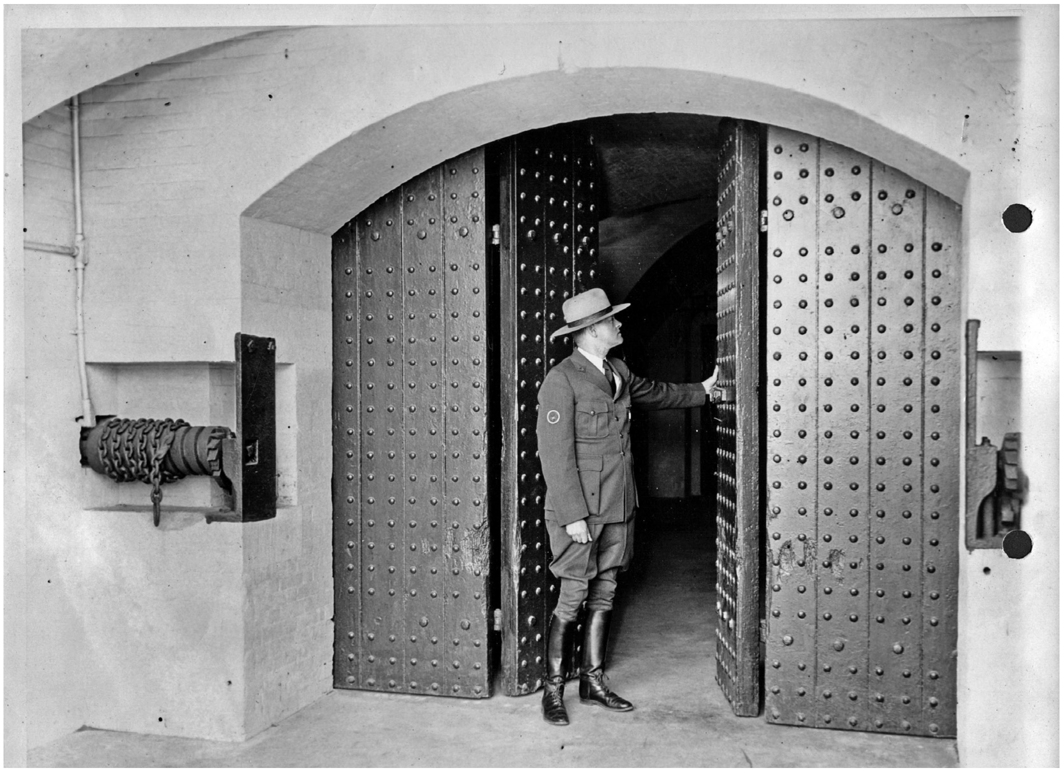


Figure 48. Ranger at the entrance doors. [NPS, STLI, Ref.Lib., 14.2 #5 and Int. 29]

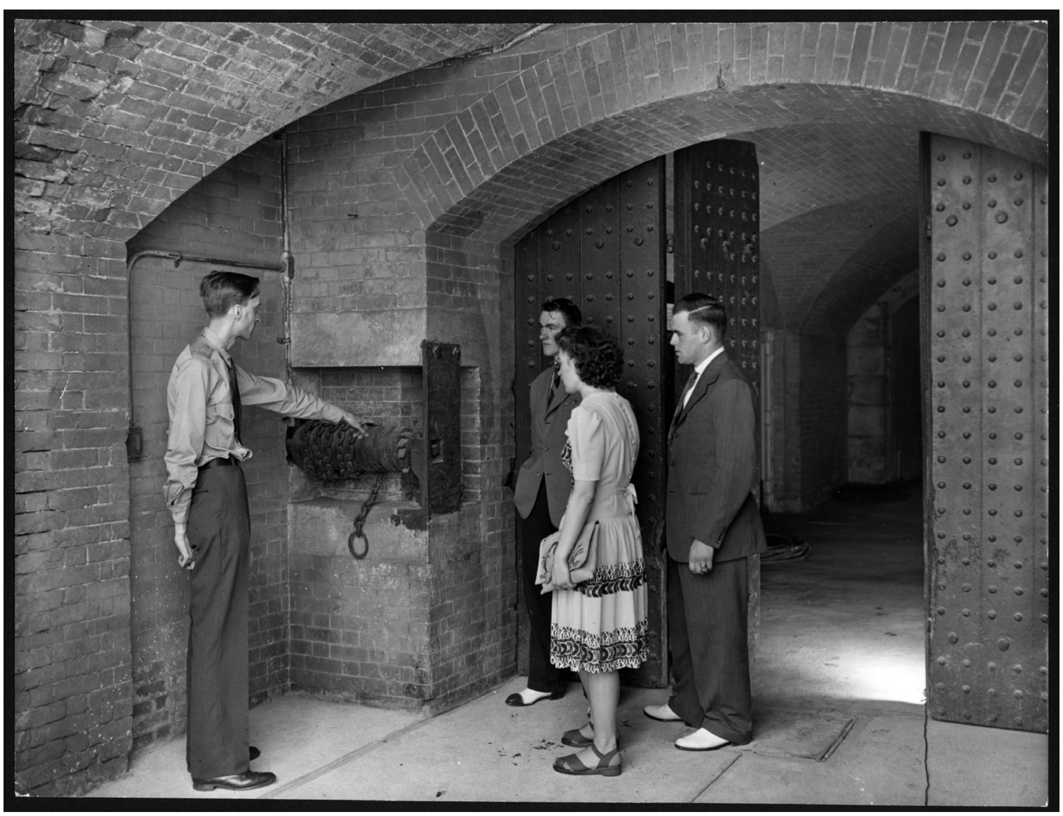


Figure 49. The west entrance in 1943. [NPS, STLI, Ref.Lib., 7.2 #2]

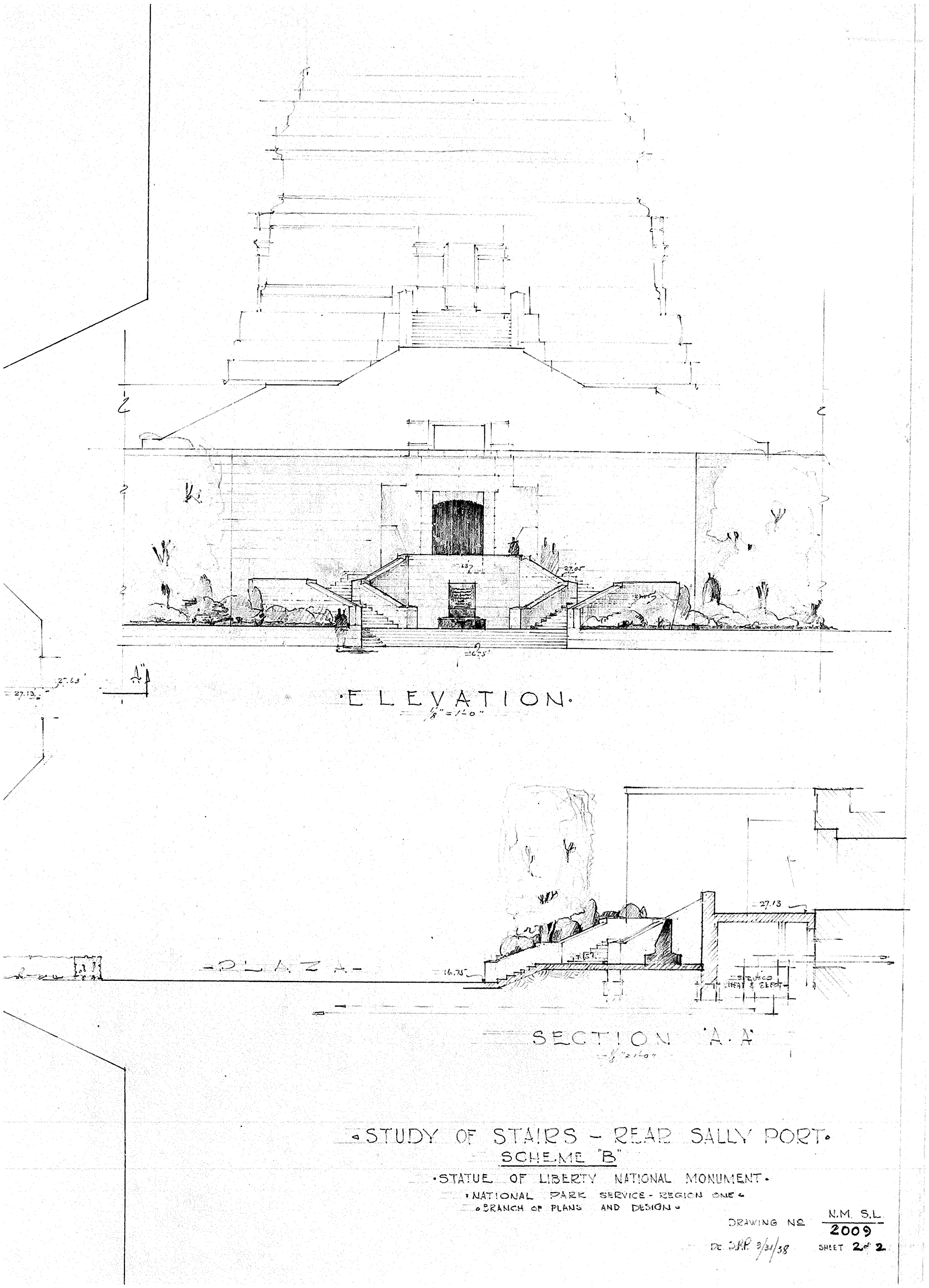


Figure 50. Detail of sketch for a new entrance at the rear sallyport in 1938. [NPS Denver Service Center, E-tic 2009]

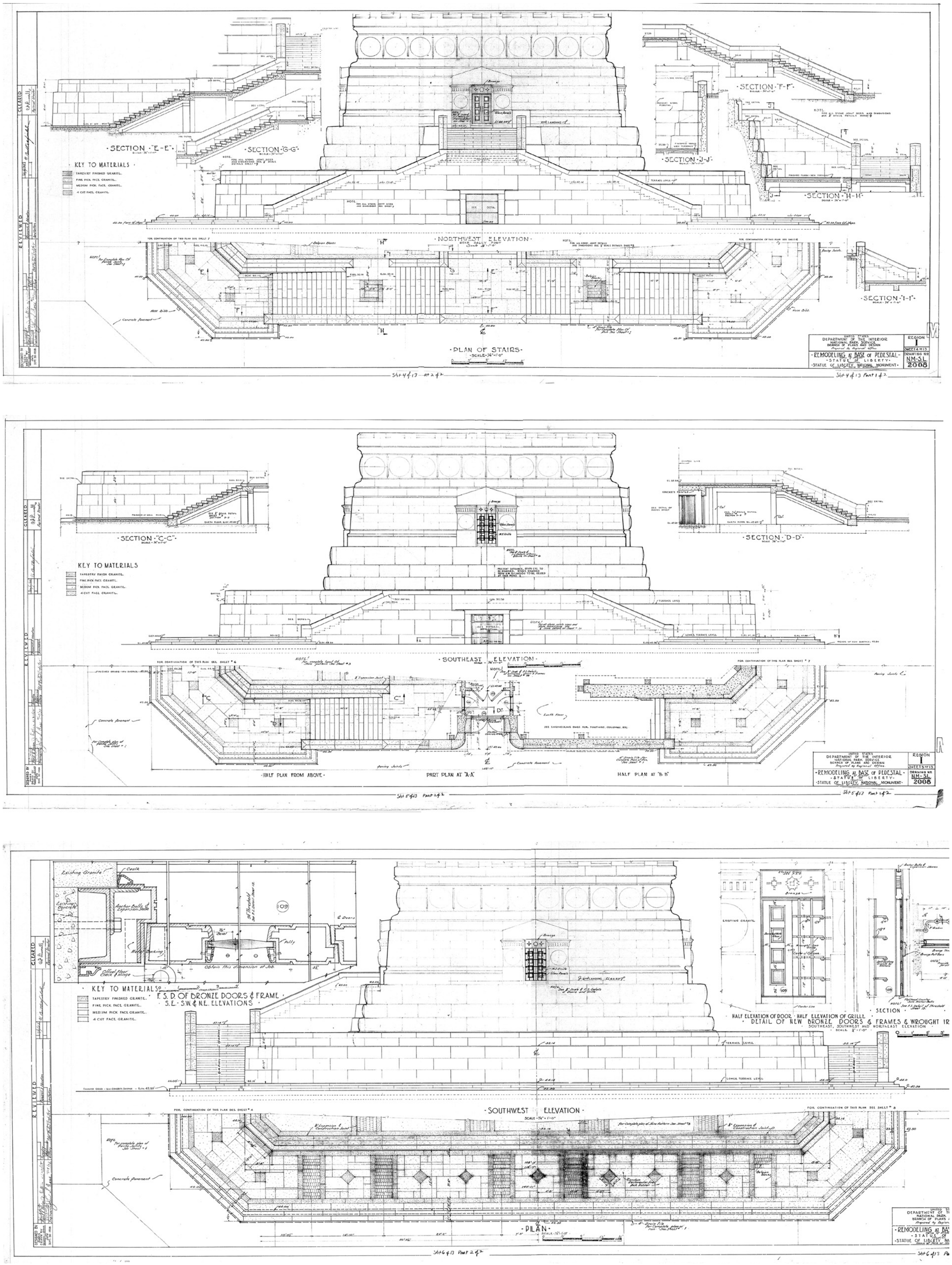


Figure 51. Studies for remodeling the base of the pedestal, January 1, 1939. [NPS Denvr Service Center, E-tic 2008]

A. Wrought iron bars: best quality, tough homogenous, ductile, forge iron conforming to Fed. Spec. QQ-I-686a, Grade B.

B. Handrails: wrought iron.

C. Stock patterns will be permitted subject to approval of the Contracting Officer.

D. Bolts, screws, fasteners, etc: types indicated on drawings.

E. Paint: red lead base, ready mixed, Fed. Spec. TT-P-86a, Type I.[217]

The specifications also gave the following instructions related to workmanship:

A. Insofar as possible, work shall be fitted and shop assembled, ready for erection.

B. Joints between balusters and handrails shall be welded.

C. Parts of handrail shall be fastened together with machine screws.

D. Jointings and intersections shall be accurately made, tightly fitted, and made in true planes.

E. Bolts and screws, unless otherwise shown on drawings, shall be countersunk and finished flush with surfaces to which applies.

F. Field connections shall be bolted.[218]

The railing was to be "painted one shop coat of red lead."[219]

In December 1950 Superintendent Foster noted that the contract for the sally port railings was 50% completed. He also noted that the installation and "wooden treads for winter

"Center Railings," and "Winter Treads for Sally port Steps" was completed on January 18, 1952.[220]

Meanwhile, in March 1951 the superintendent reported that while "most of the joints in the great granite masonry pedestal" appeared to be "in good condition," a "few along the lower courses and in the vicinity of the water table at the second landing" needed "attention at the earliest possible date." The cost of this work was estimated at $1,000.[221]

PAINTING AND CLEANING, 1948-1951

Although the painting of the Statue's entire interior was completed in April 1947, touch ups and further painting were required during the rest of the decade and into the early 1950s. In May 1948 Superintendent Foster noted that "all paint used in repainting and touch-up work on the interior of the Statue will be the same as specified" in the 1946 contract, which was supplied by the Inertol Company. The treads and risers of the spiral stairs would be painted a darker gray than that previously used.[222]

During the summer of 1948 two painters were busy at the monument area; they worked on the interior landings, primed and painted "the metal stairs from the balcony down to the entrance corridor," renovated the motor room, and made "a start…on the spiral stairs and also on the main corridor." [223]

In June 1949, the superintendent reported, "all writing (lipstick artists) on the granite faces of the outside steps leading to the 2nd landing of the pedestal was removed by use of sand blast equipment early in the month."[224] Later that summer "considerable painting was accomplished inside the Statue Pedestal by the regular labor force."[225] In September "WAE painters working the night shift, painted the spiral stairs in the Statue, all landings and stairways in the pedestal and the main corridor from the North sallyport to front entrance and the outside of the temporary utility building." In addition, the "extensive inside steel aprons immediately above the top of the pedestal were cleaned and painted" by the island's labor force.[226]

In February 1950 initials and names of visitors on the balcony of the pedestal were removed by sandblasting,[227] and "all landings and stairways in the pedestal were painted."[228] In April and May all of the heating radiators and one landing in the pedestal were painted.[229] The work continued into June, when "all the landings in the pedestal were painted."[230]

In August 1950 "the transformer room in the Statue Pedestal was painted up to the transformer, panel board, bus bars, etc.,"[231] and in September the labor staff worked nights to paint all landings and stairways in the pedestal.[232] Painting continued into October, when "the platforms which are used for celebrations on the promenade were painted prior to the ceremonies of the Ladies Auxiliary to the Veterans of Foreign Wars and the French Speaking Societies." The promenade's pipe railings and grille work were also painted, as well as the stairways and landings of the pedestal.[233] Painting of the Statue and pedestal continued in November.[234]

In March 1951 Superintendent Foster reported that in the Statue and pedestal "this year over one hundred gallons of paint will have been applied by the laborer and maintenance staff."[235]

REWIRING THE TORCH, 1951

In February 1951 regional engineer W. E. O'Neil inspected the lighting system of the torch at the request of the superintendent. O'Neil reported that

> the large bulbs which consist of a mixture of incandescent and sodium vapor are suspended from two rings of conduit. The sockets are not rigidly fastened to the conduit so that the bulbs are free to swing in a wide arc. This situation is resulting in excessive breakage. All of the conduit in the torch itself is quite light in weight and very badly corroded. The conduit should, of course, be replaced and the bulb sockets installed in a manner which will at leas[t] reduce the arc in which the bulbs are allowed to swing sufficiently to reduce the breakage.[236]

Seconding O'Neil's analysis, Superintendent Foster reported in March that the torch needed to be rewired. He stated that the "iron conduit is rusted badly and the insulation on the wiring is very dry and brittle." In addition, "the large pear shape 1,000 W. lamp sockets are not firmly affixed to heavy conduit, but hang from the wires. This installation is expensive due to high lamp breakage—the updraft during high winds through the arm apparently causing the lamps to strike each other." The cost of this work was estimated at $3,000.[237]

The Geller Electric Construction and Maintenance Company of New York began rewiring the torch on May 7, 1951, and completed the project on May 19.[238]

The completion report for rewiring the torch was submitted on May 22, 1951. The total cost of the project was $990. The materials and equipment were listed as follows:

Construction Items	Quantities
New Conduit	50 lf
New Conductors #12 Neoprene	700 lf
New Sockets & Outlets	21
New Transformer	1
New Distribution Panel	1
New Switch – Safety Type	1
New Waterproof Receptacles	2

The completion report also noted that "this contract was completed in a workman like manner with a minimum of inconvenience to the visiting public and with uninterrupted flow of current to the Torch. The old wiring was in very poor condition as were the conduits. It is a job well done."[239]

STEEL PLATES AT THE BASE OF THE STATUE, 1951

On January 19, 1951, Reals Roofing Company was awarded a contract for $818 to do work on the steel plates at the base of the Statue. The specifications gave the scope of work as follows:

A. Furnish all labor, materials and equipment necessary to fabricate and install approximately 210 sq. ft. of steel plate in the west side of the apron at the base of the Statue of Liberty. Plate thickness shall be 3/31″.

B. The removal of the defective plates and the disposition of these plates as directed is part of this contract.

C. The new plates furnished under this contract shall be the same size and shape as the plates they replace. All joints shall be formed, covered and fastened in the same manner as the existing joints in this apron, using new cover strips of the same weight stock as the plates. Joints shall be accurately made, tightly fitted and in true planes.

D. All fastenings shall be of slotted round head brass bolts 1/4″ diameter of sufficient length to expose one full thread when the Hex brass nuts are set. Fastenings shall be spaced one foot on center along the joints. Existing drill holes in the supporting members shall be utilized to the full extent.[240]

The specifications also required that "All plates and joint covers furnished under this contract shall be painted one shop coat of red lead, one coat of special primer and one coat of special lipstick-proof paint prior to installation," which would be supplied by the contracting officer.[241]

The work of replacing the steel plates was accepted on March 30, 1951.[242]

The completion report for the project noted that the work was finished by March 30, 1951, at a cost of $1,124. The report summarized the work as "furnishing, fabricating, priming and installing 3/32″ steel plates in the apron roof above the elevator shaft and alongside the walkway leading to the spiral staircase within the pedestal of the Statue of Liberty."[243] Other work included "painting installed work on both sides following installation."[244] The report also explained why the work had been done:

> Moisture within the structure over a period of years oxidized the metal plates forming the roof above the top of the elevator shaft within the pedestal of the Statue of Liberty to such an extent that the plates were unsafe for the cleaning staff to move over them. Under this contract the defective plates have been replaced. A similar plate was also installed in the space adjacent to the walkway leading to the spiral staircase above the fourth landing in the pedestal of the Statue.[245]

ALUMINUM TREADS ON THE SPIRAL STAIRS AT THE STATUE, 1950-1952

In February 1950 Superintendent Foster reported that the "detachable aluminum treads on the stairs in the Statue of Liberty are in poor condition, the diamond design, non-slip surfaces are worn smooth and the nosings are rounded off to the point where they will soon be a hazard." He estimated that the new treads, to be cast using an aluminum alloy, would cost $1,000, including the patterns, which would become the property of the government. The treads would be installed by the regular maintenance staff.[246] The existing cast aluminum treads had replaced the original iron treads.[247]

In December 1950 "a complete set of cast aluminum treads" was ordered from a "local foundry,"[248] and the project, estimated to cost $1,500, was underway by March 1951.[249]

The completion report for replacing the treads was prepared on March 25, 1952. The quantity for the cast-aluminum treads for the spiral stairs inside the Statue were listed at 500, with the total project cost at $1,411.83. The report stated that

> Cast aluminum treads in the spiral stairs within the Statue of Liberty became worn to such an extent, especially on the nosings, that they were a hazard. Funds for the replacement of the existing treads plus the acquisition of additional spares eliminates the hazard for the hundreds of thousands of visitors who climb these stairs each year.[250]

REPAIRING THE BOILER-ROOM SKYLIGHT, 1950-1952

In December 1950 Superintendent Foster reported that the skylight in the boiler room needed to be repaired due to recent storm damage. High winds had blown "the copper framed skylight from the roof of the boiler room in the Statue pedestal." The copper framework and glazing had "suffered extensively." Foster also noted that "it is questionable whether or not repairs should be attempted which will probably cost as much as a new unit." "In any event," he continued, "the repair or replacement cost of the skylight is estimated at $200."[251]

By March 1952 the copper frame of the skylight had been repaired and reglazed with shatterproof glass. The total cost of the project was $200. The completion report stated that "the hurricane force winds which accompanied the severe easterly storm of November 1950 wrenched the skylight over the transformer room in Fort Wood from the concrete casing, bending and tearing the copper frame and breaking much of the glass." The report also noted that "this job replaced all broken parts of the copper frame, straightened and realigned all bent and twisted members and reglazed the completely repaired frame."[252]

AMERICAN MUSEUM OF IMMIGRATION, 1950-1972[253]

PLANS FOR THE AMERICAN MUSEUM OF IMMIGRATION, 1950–1952

In late spring of 1949 a sorely disappointed tourist wrote to the *New York Times*, complaining that during her visit to Bedloe's Island she had found the Statue of Liberty to be badly in need of a "bath." She had also expected "perhaps, a museum" on the site, "depicting friendly relations existing between France and the United States."[254] In response to this letter Thomas J. Allen, the regional director of the National Park Service, wrote to the *Times* that the National Park Service was well aware that the Statue lacked interpretive facilities and that plans for such a space would be underway as soon as possible. As it was, the "existing space under the pedestal," Allen wrote, was "entirely inadequate for such uses."[255]

As the number of annual visitors to Bedloe's Island gradually increased after each world war, there were calls for an educational installation at the site not unlike the suggestion by the unhappy tourist who had written to the *New York Times* in 1949. The National Park Service had recognized the need for an on-site interpretive component ever since it took over administration of the monument in 1933. There was ongoing debate, however, as to what the educational program should entail. As the physical development of the island progressed under the master plan set forth in 1937, inquiries about the nature of the interpretive facilities arose.[256]

Questions about the content of the interpretive program were perpetuated mainly by the changing notions of what the Statue of Liberty represented to Americans in the cultural climate of the 1950s. In the three decades between 1914 and 1945 the U.S. had fought hard and emerged triumphant, with a dominant position in global politics. But the boom of the post-war years was sullied by the rampant paranoia bred by McCarthyism

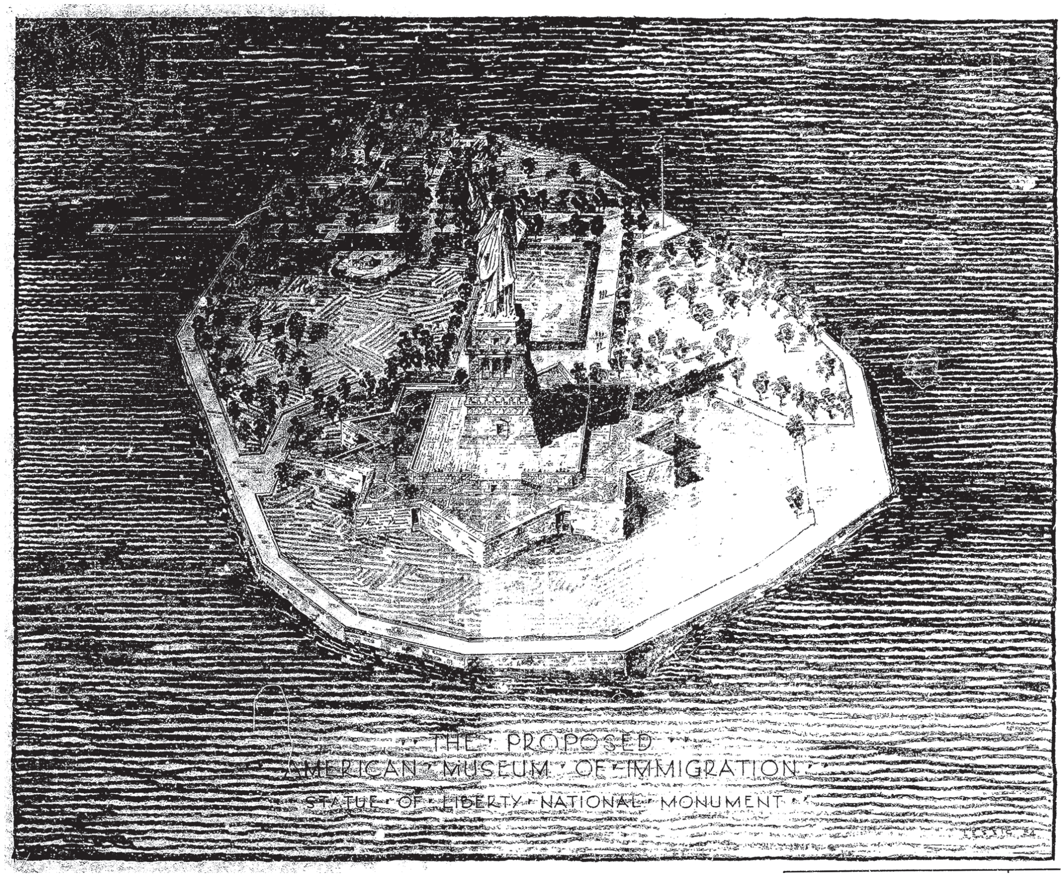


Figure 52. Rendering of proposed American Museum of Immigration, February 1954. [NPS, Denver Service Center, E-tic 1021B]

and the Red Scare. An obsession with stamping out Communism infiltrated all aspects of American life and became an impetus for creating the American Museum of Immigration. The Statue, moreover, had become an absolute, sacrosanct symbol of American freedom.[257]

In 1951 the idea of establishing a museum of immigration in New York City was suggested by William H. Baldwin, a trustee of the American Scenic and Historic Preservation Society. Like most Americans at the time, Baldwin and the Preservation Society were not immune to the widespread paranoia about Communism infiltrating the U.S., and they proposed that an immigration museum would galvanize the country, reminding Americans of their collective immigrant heritage and the freedoms that had enticed their ancestors and families to come to the U.S.[258] Baldwin and the Preservation Society suggested that an immigration museum be built inside Castle Clinton, at the southern tip of Manhattan, in an attempt to protect the fort from destruction at the hands of the Triborough Bridge and Tunnel Authority, then under the direction of Robert Moses.[259] However, that idea was quickly scuttled in favor of establishing a facility on Bedloe's Island, particularly the area immediately surrounding the Statue of Liberty within the walls of Fort Wood. Not only would that site afford ample space for exhibits; its position at "the foot of our great symbol of the American Ideal" was considered by those involved in the planning to be "the most appropriate place for presenting the fruits of that ideal."[260]

Further support for locating the museum on Bedloe's Island came from National Park Service officials, who agreed that architect Richard Morris Hunt's original plans for the pedestal had never been fully realized for lack of funding. Building the museum within Fort Wood, they argued, would bring Hunt's vision closer to fruition if the design for the museum included the wide, stepped promenade around the pedestal that was part of Hunt's initial design.[261] On August 11, 1954, President Dwight D. Eisenhower endorsed the construction of the American Museum of Immigration at the base of the Statue of Liberty.[262]

On January 28, 1955, the American Museum of Immigration, Inc., (AMI) was chartered by New York State "for the purpose of constructing and developing a museum at the base of the Statue of Liberty in cooperation with the National Park Service."[263] U. S. Grant III was president of the new organization; Pierre S. du Pont 3rd was vice president and chairman of the executive committee; William H. Baldwin was secretary; and Alexander Hamilton, great-great-grandson of the first U.S. secretary of the treasury, was treasurer.[264] A joint development committee was established in 1956 to serve as the main body through which National Park Service officials and the AMI would collaborate on the museum. In April 1957 the committee was ready to move ahead with the development of architectural plans; the Eastern Office of Design and Construction (EODC), the office that was then responsible for National Park Service building projects in the eastern part of the U.S., developed the plans.[265]

Plans were prepared by EODC supervising architect John B. Cabot, assisted by Donald F. Benson, in cooperation with National Park Service supervising historian Thomas Pitkin and museum specialist and exhibit planner Alden B. Stevens. Cabot presented plans to the joint development committee on January 9, 1958. Early concepts for the museum, as conceived by the AMI, were lofty, and the EODC design reflected this grandeur, with a 50,000-square-foot, three-story facility having a lower or entrance level, a main level, and a promenade level. The facility would include exhibit halls on the main level arranged around the existing pedestal base and additional galleries in the star points of the fort on the lower and first levels. There were also plans for a library, office space, work and storage rooms, a hall of records, and a 300-seat auditorium. The cost for interior and exterior construction, including the preparation of exhibits, was placed at $4,479,000. Contributing to the high price tag was the museum's location on Bedloe's Island: labor would be nearly twice as expensive as in Manhattan, and there was the added cost of removing excavated material and construction debris from the island.[266] In the midst of the fundraising campaign, the name of Bedloe's Island was officially changed to Liberty Island.[267]

Initially, the $5 million fundraising campaign, called Operation Unity, had aimed to raise the entire $5 million from contributions made by the American public between October 28 and Thanksgiving Day 1956, a span of only a few weeks. The campaign attracted several small donations but fell far short of its intended goal. By November 14, 1956, only $50,000 beyond the organization's expenses had been raised, so the drive was extended to March 31, 1957. In late May 1957 AMI board members voted to terminate the campaign.[268] However, in August 1958 the project received a boost when the AMI was brought under the canopy of Mission 66, the National Park Service's current construction program, making the museum suddenly eligible for the matching-funds program provided by the National Park Service for the restoration of the pedestal.[269] Still, even with the matching funds, the AMI conceded in the fall of 1959 that it would be able to raise only $1 million.[270]

If the museum were to become a reality, the plans needed to be scaled back considerably. The Eastern Office of Design and Construction submitted revised plans and estimates to the joint development committee in February 1959, which incorporated the recommendations of Conrad Wirth, director of the National Park Service, for a smaller facility. The revised plans trimmed the museum to 24,000 square feet. A second-floor exhibit area and corridor would occupy roughly 9,000 of the 24,000 square feet. The new plans retained the two-story lobby from the original plans because this feature was considered essential to the "dignity and impressiveness needed for the museum." Other spaces were sacrificed, but a new feature was introduced, the Statue of Liberty Story Room, which would satisfy the long-held public desire for an on-site interpretive exhibit on the monument. The price tag for the revised plans amounted to $2,350,000, which included $350,000 for the development of exhibits.[271] The federal government pledged $1,250,000 toward the project; New York State and New York City each donated $50,000; and the AMI pledged $462,000. This meant that an additional $538,000 in contributions was needed from private sources in order to carry out the project.[272]

Over the next several months the revised plans were examined by the AMI Executive Committee and Park Service officials Conrad Wirth, Newell Foster, and Ronald F. Lee. The plans were formally approved by the NPS in October 1961.[273]

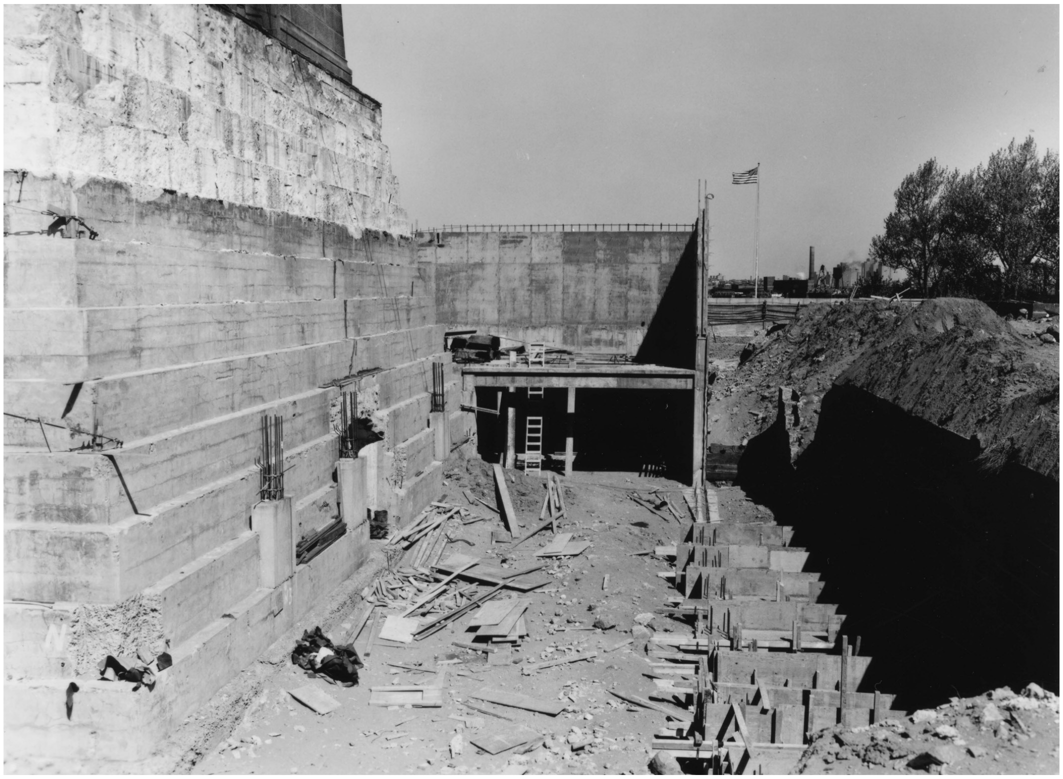


Figure 53. The east side of the foundation during the 1960s excavation. Note the remnants of the 1907-08 east entrance stair. [ACC 2463 STLI 1000-21.jpg]

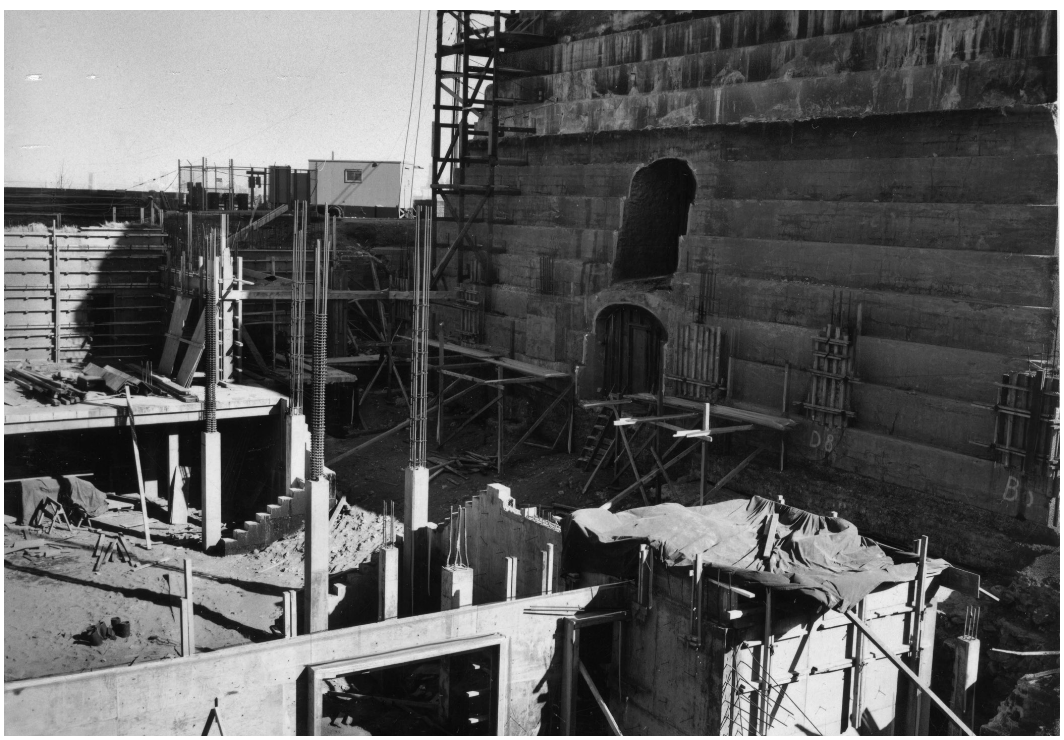


Figure 54. The west side of the foundation during the 1960s excavation. The new west corridor has been cut into the foundation. [ACC 2463 STLI 19631000-20.jpg]

EXCAVATION OF THE 1907 FILL IN THE INTERIOR OF FORT WOOD, 1961

Because the museum was to be located within the perimeter of the walls of Fort Wood, the plans required that the fill deposited in 1907 between the fort walls and the Statue pedestal be excavated to the level of the original parade ground.[274] Invitations for bids for the excavation work went out shortly after the revised plans and specifications were approved in late October 1961, and in November the National Park Service entered into a contract with the Acme Excavation Corp., of the Bronx, New York, for $69,000. Ground was broken that same month, and the first phase of construction, removal of the 1907 fill, was nearly completed by the end of March 1962.[275]

The specifications for the excavation work indicate that a portion of the "inner fort wall" would need to be removed to permit drainage. The contractors were instructed to be "especially careful not to damage the granite of the fort or the pedestal." The "hedge, concrete pavement, curb, and stairs" located over the fill needed to be removed, and the specifications required that "materials of every nature and description" encountered in the excavation were to be taken away.[276] In all, approximately 12,000 cubic yards of fill was excavated; much of it was piled immediately outside the fort wall and used to create a ramp on which the construction equipment could be moved into and out of the fort.[277] The initial plan was to remove the excavated material from the island and dispose of it elsewhere. However, work progress reports from 1962 and 1963 indicate that the material was dumped over the seawall "in the vicinity of the dock, for later removal by barge."[278]

When the excavation was completed in the spring of 1962, "remains of structures between the fort walls and the Statue pedestal" that had been left behind and covered by the 1907 infill were also removed. The 1907 concrete tunnels that connected the fort and the pedestal base were also removed at this time, except for a section that linked the sally port on the south side of the fort to the new construction.[279]

The second phase of the building process — the construction of the concrete and steel base for the museum and completion of the pedestal — was initiated in April 1962, just as the excavation was wrapping up. The National Park Service advertised for bids for the job, and on June 8, 1962, entered into contract with the lowest bidders: the Peter Reiss Contracting Company and the Lew Morris Demolition Company, both of Forest Hills in Queens, New York. The two companies were to collaborate to construct the "basic structure" of the museum around the base of the pedestal. The work would consist of erecting a "concrete structural shell," as well as "mechanical, plumbing, electrical work, waterproofing, soil tests, and foundation work." The contract was for $944,220, and work began on July 9, 1962. The completion date was set for April 21, 1963, in time for the New York World's Fair of 1964.[280]

CONSTRUCTION OF THE AMERICAN MUSEUM OF IMMIGRATION, 1962–1967

In spite of the ambitious schedule, work got off to a slow start. To power the project, a new electrical substation was necessary. This work took several weeks because the substation needed its own foundation and required extensive excavation for an underground electrical conduit through the area to the north of the fort. Transformers were delivered in mid-August, at which time project supervisor David O. Smith of EODC noted that carrying out "most other work" on the job was dependent upon the installation of the

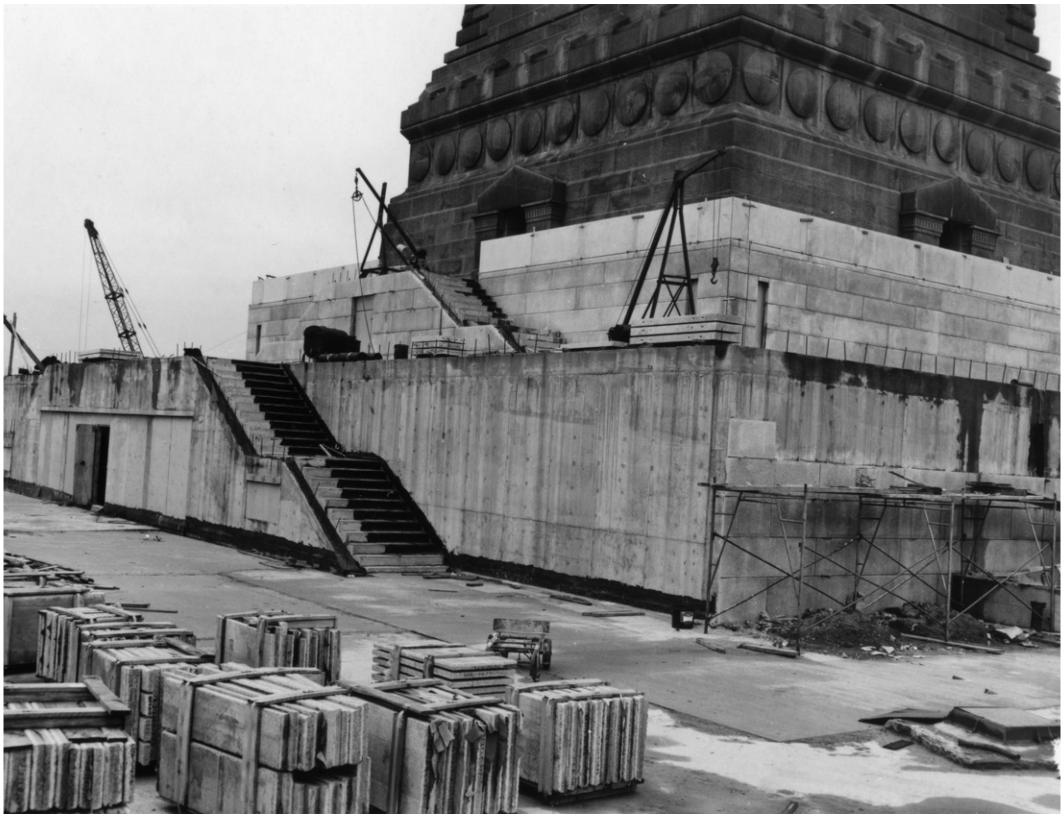


Figure 55. The American Museum of Immigration under construction. [NPS, STLI, Ref. Lib., ACC 2463 STLI 36810-03.jpg]

transformers. An additional eight electricians joined the existing team of two in mid-August, and the substation was completed by mid-September.[281]

In addition to getting the power source up and running, significant work completed by the end of the summer of 1962 included demolition of the north entrance tunnel and dungeons at the northwest corner of the fort; some cutting of tunnels through the base of the Statue; exploratory excavation at the north entrance; and removal of granite at the north entrance and on the south, east, and west faces of the pedestal. The new dock was also completed in mid-September. Project supervisor Smith reported that other work, including “cutting the foundation for corridors 4 and 5” and further excavation “to the elevation of 17.00 at the northeast corner of the proposed building” was intermittent and very slow moving. The removal of the granite paving stones at the north entrance, he noted, was a “slow and difficult job”; granite facing was also removed at the north entrance. Nearly all of the stones were damaged during removal; several were broken into small pieces, in spite of direction to remove them whole. The masonry subcontractor claimed that the granite paving had faults that caused spalling.[282]

Work continued in a halting manner. On several occasions the electrical substation shut down, hampering progress considerably. Fierce storms, high winds, and often freezing temperatures during the winter of 1962–1963 also had a hand in delaying work. Malfunctioning equipment was an ongoing problem.[283]

Contractual disputes and labor relations proved to be two of the biggest obstacles in moving this phase of the project forward in a timely manner. In early December 1962, for example, David Smith accused Lew Morris of the Lew Morris Demolition Company of "dragging his feet in not cutting back the masonry at the north entrance."[284]

The dispute over extra work was a major source of contention and resulting sluggish progress. Time and again the contractors objected to undertaking what they perceived to be extra excavation and cutting, arguing that this work was not included in their contract.[285] Most of the extra work arose after soil-bearing tests conducted in October 1962 and ongoing exploratory excavation revealed that much of the ground where the foundations were to be set was composed mainly of rubble, including bricks, granite blocks, and loose sandy fill, and were unsuitable for the foundation.[286] EODC chief architect Robert E. Smith had made recommendations on how to proceed with construction of the museum in light of this discovery in an October 1962 report, outlining the now-needed "extra work." Smith's report included observations about the construction's impact on Fort Wood.[287]

The contractors uncovered "large masonry and stone structures such as cesspools, walls, etc., between the North side of the base and the South side of the old underground structures" that needed to be removed.[288] In spite of these difficulties, enough of the foundation was in place that the cornerstone of the museum was laid in a ceremony held on October 28, 1962, the seventy-sixth anniversary of the Statue's dedication.[289]

Much of the contracted demolition work included alterations to Fort Wood and the Statue pedestal. In October 1962 the buttresses of the north parapet wall of the fort were removed. Portions of the Statue pedestal were removed to make room for an escalator.[290] During the following weeks the construction crew trimmed the cut surfaces around the elevator shaft, the north entrance, and the north side of the Statue base as the form work for the walls in the lobby area was built, and concrete was poured into the footings.[291]

The walls of the fort adjacent to the north walls of the new construction were cut in late November to accommodate the section of the museum structure that would extend through to the scarp of the fort. On all but that side, the museum is essentially an independent structure, "although the beams of its lowest slab are tied into the lower parts of the parade wall and the rear barracks wall"; the "beams of the slabs that extend to the Statue pedestal are tied into the concrete base."[292]

As work continued at the end of 1962, the contractor's superintendent "quit in disgust" over the team's inability to resolve the ongoing question of the extra work and who was responsible for undertaking it. After the superintendent's departure project supervisor David Smith described the situation at the site as lacking "adequate supervision and proper coordination, with each group seeming to be left to their own devices, which resulted in something less than first class work."[293]

In spite of these delays, on December 31, 1962, Smith reported to Newell Foster, the Statue of Liberty superintendent, that the demolition work was "substantially complete"; the actual construction work, however, had not progressed much. Only 15 percent of the concrete was in place at that time, and already, Smith reported, there was evidence of "many indications of poor quality work, due to inadequacies of the Contractor's organization or attempts to circumvent the requirements of the specifications."[294]

Figure 56. Aerial view of the Statue of Liberty in 1978 by Jack Boucher, after construction of the American Museum of Immigration. [HAER NY, 31-NEYO, 89-1, Library of Congress]

Figure 57. 1978 photograph of the new American Museum of Immigration, by Jack E. Boucher. [HAER NY, 31-NEYO, 89-6, Library of Congress]

The contractor hired a new superintendent, who started work on January 21, 1963. Smith reported that in the three weeks without a superintendent "each group of workers seem[ed] to be following their own devices, with some conflict of interest."[295] The superintendent quickly fired many of the workers, reducing the labor force to six men, and then hired a new carpenter and foreman. With a diminished workforce and subzero temperatures, work proceeded slowly in the winter of 1963.[296]

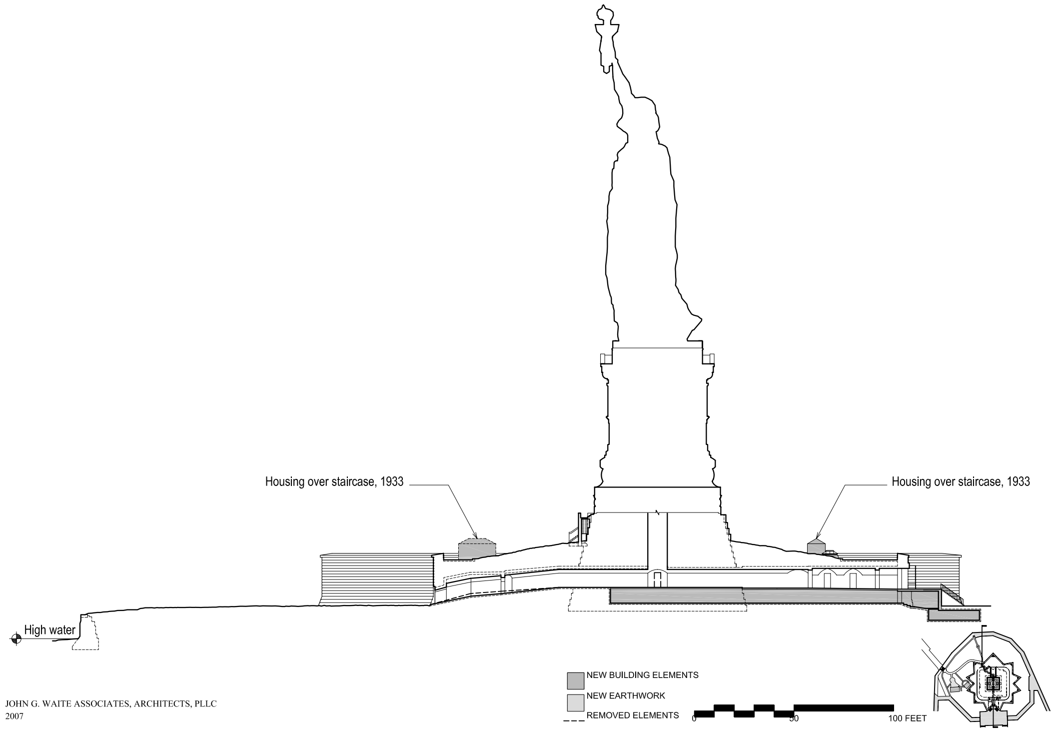
When the architects discovered that the foundation for the south wall of the new construction could not be laid with the tunnel in place, it became clear that the sally-port tunnel on the south side of the fort would have to be removed. Removal of the tunnel would create an additional 3,000 square-foot space that could be used for storage or perhaps as a fallout shelter, a desirable feature during this time when cold-war tensions were at an all-time high.[297] By March 1, 1963, all work on the east and south sides of the Statue was at a standstill "awaiting decisions and redesign of foundations." Architect Robert Smith estimated that demolition of the sally-port tunnel would cost an additional $15,000 to $20,000.[298] Furthermore, the project supervisor, David Smith, noted that a decision was urgently needed for the east side, "so that work may proceed there, which, when completed," would allow for investigation of the west side.[299] Demolition of the sally-port tunnel began in March 1963 and was completed within a week.[300]

Continuing excavation in early February 1963 had exposed the walls of old army barracks at five locations on the east side of the Statue base.[301] John Cotter, an archaeologist from the National Park Service, visited the site in early March 1963 to confirm the findings.[302]

The prohibitively cold winter weather finally broke in mid-March 1963, and with the warmer temperatures the tempo of the job picked up. However, new problems soon arose: test holes dug along the south and west walls of the fort showed loose debris below elevation 26. The findings were turned over to the EODC, and the architects immediately prepared revised drawings for the footing and columns at this location. These new drawings, as well as new drawings for the east side, were submitted to the contractor.[303] Another labor shake-up occurred at this time, when the contractor fired his "so-called engineer," much to the approval of David Smith, who had repeatedly advised the contractor that he did not have a "qualified technical man on the job to attend to the numerous details," a factor that contributed to slowed work.[304] The dismissal of the engineer was indicative of the looming problem of poor-quality workmanship.

Work progressed nevertheless, and early in June 1963 one of the change orders long sought by the contractors was approved in the amount of $69,884.85. This sum covered the demolition of the sally-port tunnel on the south side of the fort and the construction of the extra room. This change order, in addition to others that covered the modifications to the foundation and exploratory excavation, brought the total cost of this phase of construction to $104,836.85. By June 7, 1963, 71 percent of this phase of the work was completed.[305]

Throughout June 1963 electrical and plumbing work continued as concrete was poured, forms were erected, rooms were enclosed, walls were waterproofed, and the heating system was installed.[306] By June 30, 1963, the federal government had put $1,020,400 of its pledged $1,250,000 into the construction. Congress appropriated another



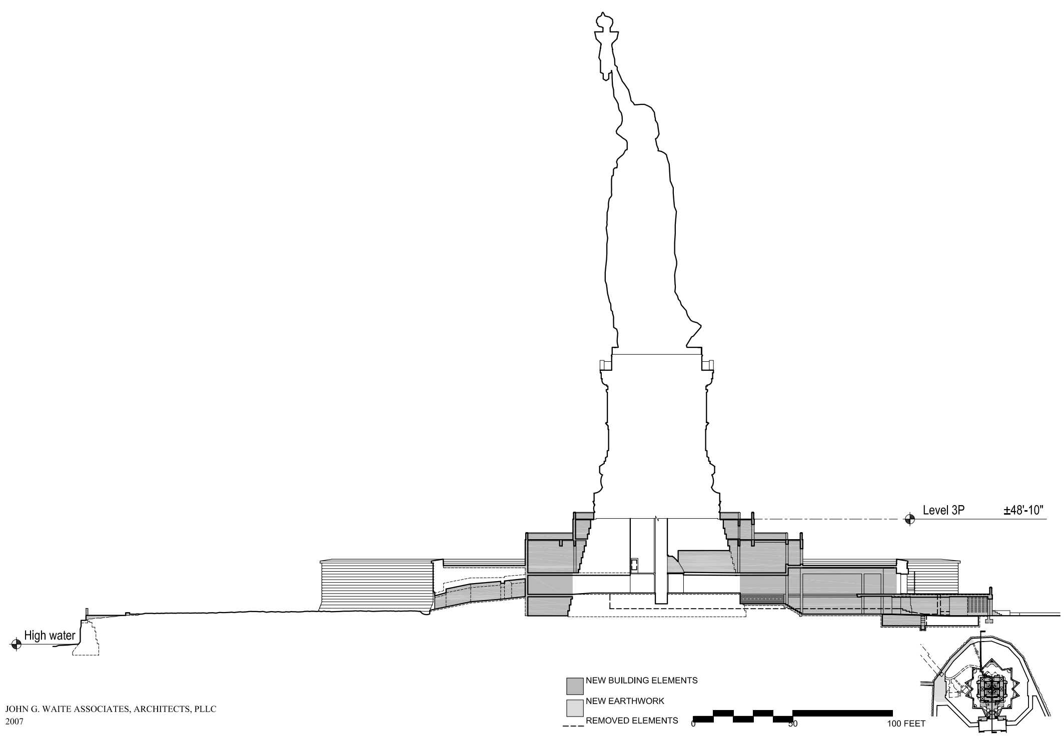


Figure 58. Schematic sections of the Statue and Fort Wood before and after the construction of the American Museum of Immigration. [JGWA, from Fort Wood Historic Structure Report]

$450,000 for the project in fiscal year 1963, and program adjustments within the National Park Service provided an additional $170,400.[307]

Between July 1962 and July 1963 only three-quarters of the second phase of the project was completed. The original completion date of April 21, 1963, was extended to October 2 of that year.[308] The concrete shell of the museum was finally finished at the end of 1963, and the third phase of building was underway within a few months. In April 1964 the National Park Service awarded a contract for $984,562 to the Teaco Construction Corporation of the Bronx for the third phase of the project — "facing the concrete shell with granite, constructing a massive stonework entryway, and repaving the promenade surrounding the base and the mall in front of it with bluestone." By mid-summer 1965 this work was finished.[309]

Though the completed base was dedicated on October 28, 1965, work on the museum's interior stood still for the next two-and-a-half years because congressional appropriations ran out and private donations ceased to come in.[310]

CONSTRUCTION OF THE INTERIOR OF THE AMERICAN MUSEUM OF IMMIGRATION, 1967–1972

Construction resumed in 1967 after congressional appropriations made the next phase of the project possible. Judson S. Ball, of the EODC and the Planning and Service Center in Philadelphia, was named coordinating architect. Drawings and specifications were prepared, and invitations for bids for this phase of the work were issued in October 1967. On December 15 the National Park Service entered into a contract for $1,097,888 with the lowest of the seven bidders, Gagliano and Gagliano, of Brooklyn, New York. The contract included the installation of anodized aluminum wall finishes, twelve exterior bronze entrances, four restrooms, air conditioning, and heating and ventilation systems. This fourth phase of construction also consisted of completing the 17,000-square-foot hall in which the AMI exhibits were to be installed.[311]

The following companies were the subcontractors for the interior work: M. Goodwin Concrete Corporation, New York, New York, for preparation of the floor surfaces ($9,559); Designed Weather, Inc., Island Park, New York, for the mechanical work ($60,344); Presentations South, Inc., Orlando, Florida, for the museum wall system and display cases ($272,296); and Mansfield Contracting Corporation, Flushing, New York, for the electrical work ($142,830).[312]

Work was scheduled to begin on February 1, 1968, and was to be completed at the end of 300 days.[313] However, because of the ongoing difficulty in raising funds and the resulting start-and-stop nature of the work, the museum was not completed until 1972, eight years behind schedule. Ultimately the entire project ended up costing $5 million, or more than double the 1959 price estimate, an increase attributed to "inflation, the piecemeal way in which the contracts were let, and controversies over the exhibits, which led to several revisions."[314]

The fifth and final phase of construction — the installation of the exhibits — was supposed to have begun in late 1969, but the rising cost of the Vietnam War siphoned funds away from domestic projects, including the AMI.[315] By September 1, 1971, the concrete floors were the only part of the fifth phase of work that had been completed; the mechanical work had begun in the middle of July, and the museum display cases were under construction in Florida. However, the electrical work had not yet begun, and the carpeting and ceiling tile were yet to be installed. Though creation and fabrication of most exhibits was not completed until March 1972, the Statue of Liberty Story Room opened to the public in February 1970. Designer Gart Urban, of Miami, Florida, prepared the story-room exhibit. Presentations South built the walls and cases for the rest of the AMI exhibits for $272,231.[316]

On September 26, 1972, a ceremony was held to celebrate the opening of the American Museum of Immigration. President Richard M. Nixon and First Lady Patricia R. Nixon attended, as did schoolchildren from throughout New York City.[317]

In the 1960s and 1970s the Statue of Liberty had become a popular site for civil-rights and anti-war demonstrations. On several occasions special-interest groups occupied the monument as a means of garnering attention for their causes, but rarely did the occupation end in violence or destruction. However, on the evening of June 3, 1980, a time-delay device, believed by the FBI to have been planted by Croatians seeking independence for Croatia from Yugoslavia, blew up in the Statue of Liberty Story Room on the second floor of the museum. There were no injuries, but the explosion destroyed many of the exhibits and a 15-by-15-foot section of the ceiling, causing $18,000 worth of damage. The Statue of Liberty and part of the AMI reopened to visitors on the following day, but two years later the damaged space still awaited repair.[318]

STONE REPOINTING AND REPAIRS AT THE PEDESTAL, 1979

The Lane Company of Pennsylvania was awarded a contract in December 1978 to repoint the pedestal and the main entrance. Work began on the pedestal in March and was finished on June 1, 1979, at a cost of $6,270; repointing of the main entrance was completed at a cost of $7,150. The project included "cleaning out loose mortar and other materials in face of joints at building walls selected for repointing; repointing all joints selected; remove material at expansion joints and reseal them as specified; reset and replace paving, reset steps and realign curbing."[319]

NOTES: NATIONAL PARK SERVICE YEARS

1. Barbara Blumberg, *Celebrating the Immigrant: An Administrative History of the Statue of Liberty National Monument 1952-1982*, Cultural Resource Management Study No. 10, Div. of Cultural Resources, North Atlantic Regional Office, National Park Service, 1985, p. 4. Benjamin Levine, "History of Bedloe's Island," May 1952, p. 86. For a short time in 1933-1934 the National Park Service was known as the Office of National Parks, Buildings, and Reservations.
2. Walter Hugins, "Statue of Liberty National Monument: Its Origin, Development and Administration," National Park Service, U.S. Dept. of the Interior, 1958, p. 42. John R. Nagle to Mr. Taylor, Feb. 16, 1934, Box 16, File 250, Statue of Liberty Collection, Part II, Bob Hope Memorial Library at Ellis Island (hereafter, SOL Part II).
3. Walter Hugins, "Statue of Liberty National Monument: Its Origin, Development and Administration," National Park Service, U.S. Dept. of the Interior, 1958, p. 42.
4. William A. Simpson to Director, National Park Service (hereafter, NPS), Sept. 8, 1933, Box 16, File 248, SOL Part II.

5. Charles A. Peters, Report of Investigation Made in New York on October 3rd and 4th, and in Washington D.C. October 5th to 20th, Inclusive on the Statue of Liberty, Oct. 25, 1933, p. 5, Box 16, File 248, SOL Part II.
6. Charles A. Peters, Report of Investigation Made in New York on October 3rd and 4th, and in Washington D.C. October 5th to 20th, Inclusive on the Statue of Liberty, Oct. 25, 1933, p. 5, Box 16, File 248, SOL Part II.
7. Memorandum for the Press, Department of the Interior, Nov. 11, 1933, p. 1, Box 16, File 248, SOL Part II.
8. Memorandum for the Press, Department of the Interior, Nov. 11, 1933, pp. 1–2, Box 16, File 248, SOL Part II.
9. H. C. Bryant, Memorandum to the Director, Nov. 20, 1933, Box 16, File 248, SOL Part II.
10. Preliminary Estimate of Amounts Needed to Complete the Reconditioning of the Statue and Develop the Island as a Park, Dec. 14, 1933, Box 16, File 249, SOL Part II.
11. Specifications for Improvement to the Statue of Liberty, Bedloe's Island, New York, Dec. 21, 1933, Box 16, File 249, SOL Part II.
12. Specifications for Improvement to the Statue of Liberty, Bedloe's Island, New York, Dec. 21, 1933, Box 16, File 249, SOL Part II.
13. Specifications for Improvement to the Statue of Liberty, Bedloe's Island, New York, Dec. 21, 1933, Box 16, File 249, SOL Part II.
14. John L. Nagle to Mr. Taylor, Feb. 16, 1934, Box 16, File 250, SOL Part II. George A. Palmer, Annual Report for 1933-34, Aug. 13, 1934, Box 16, File 250, SOL Part II.
15. George A. Palmer to Director, NPS, Oct. 2, 1934, Box 16, File 250, SOL Part II.
16. [National Park Service], Press Release, Dec. 15, 1934, Box 16, File 250, SOL Part II.
17. [National Park Service], Press Release, Dec. 15, 1934, Box 16, File 250, SOL Part II.
18. [National Park Service], Press Release, Dec. 15, 1934, Box 16, File 250, SOL Part II. Memorandum for the Press, Feb. 8, 1935, Box 17, File 255, SOL Part II.
19. [National Park Service], Press Release, Dec. 15, 1934, Box 16, File 250, SOL Part II.
20. George A. Palmer to Director, NPS, March 8, 1935, Box 17, File 255, SOL Part II.
21. John L. Nagle to Mr. Taylor, Feb. 16, 1934, Box16, File 250, SOL Part II.
22. George A. Palmer, Justification for PWA allotments, Jan. 2, 1935, Box 17, File 255, SOL Part II.
23. George A. Palmer, Justification for PWA allotments, Jan. 2, 1935, Box 17, File 255, SOL Part II.
24. Arno B. Cammerer to E. K. Burlew, July 23, 1935, Box17, File 255, SOL Part II.
25. Oswald E. Camp to Director, NPS, May 28, 1936, Box 17, File 257, SOL Part II.
26. Oswald E. Camp to Director, NPS, Mar. 25, 1936, Box 17, File 257, SOL Part II.
27. Charles A. Peters Jr to Director, NPS, May 2, 1936, Box 17, File 257, SOL Part II.
28. Oswald E. Camp to Director, NPS, May 28, 1936, Box 17, File 257, SOL Part II.
29. Oswald E. Camp to Director, NPS, May 28, 1936, Box 17, File 257, SOL Part II.
30. Charles A. Peters Jr. to the Director, NPS, June 15, 1936, Box 17, File 257, SOL Part II.
31. Charles A. Peters Jr. to the Director, NPS, June 15, 1936, Box 17, File 257, SOL Part II.
32. A. R. Demaray to Camp, Feb. 2, 1937, Box 17, File 260, SOL Part II.
33. Hilary A. Telson, Feb. 15, 1937, Box17, File 260. SOL Part II.
34. Superintendent's Report, SOL National Monument, April 30, 1937, Bob Hope Memorial Library at Ellis Island (hereafter, the location is not given, since all reports are in the library). W. A. McDonough to Oliver C. Taylor, May 3, 1937; May 27, 1937; Box16, File 261, SOL Part II.
35. Superintendent's Report, SOL National Monument, June 1, 1937.
36. Superintendent's Report, SOL National Monument, Aug. 31, 1936, p. 3.
37. Superintendent's Report, SOL National Monument, Oct. 3, 1936, p. 2.
38. Superintendent's Report, SOL National Monument, Oct. 3, 1936, p. 2.

39. Superintendent's Report, SOL National Monument, Oct. 31, 1936, pp. 2–3.
40. Superintendent's Report, SOL National Monument, Dec. 31, 1936, p. 2.
41. Superintendent's Report, SOL National Monument, Dec. 31, 1936, p. 2.
42. Superintendent's Report, SOL National Monument, June 1, 1937, p. 3.
43. *New York Times*, May 25, 1937, trans.; *Baltimore Morning Sun*, May 25, 1937, trans.; "Statue of Liberty to Get New Coat of Paint Inside," *New York Herald Tribune*, May 25, 1937; Box 19, File 271, SOL Part II.
44. Superintendent's Report, SOL National Monument, July 6, 1937, p. 3.
45. Superintendent's Report, SOL National Monument, July 31, 1937, p. 3.
46. Superintendent's Report, SOL National Monument, Sept. 2, 1937, pp. 2–3.
47. Superintendent's Report, Oct. 2, 1937; Nov. 1, 1937; Dec. 3, 1937.
48. Superintendent's Report, Dec 3, 1937.
49. Superintendent's Report, Jan. 6, 1938; Feb. 7, 1938. Finishing this work apparently was wrapped into the next WPA contract, number 365-97-2-8.
50. Superintendent's Report, Dec. 12, 1938.
51. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
52. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
53. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
54. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
55. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
56. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
57. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
58. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
59. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
60. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
61. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
62. Master Plan: Statue of Liberty National Monument, 1937, Box 13, File 272, SOL Part II.
63. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 1, Box 19, File 273, SOL Part II. The superintendent's monthly reports and the reports of the Branch of Engineering of Region One (Box 18, File 264) provide monthly updates on the work underway.
64. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 1.
65. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, pp. 1–2.
66. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 2.
67. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 2.
68. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 2.
69. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 3.
70. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 3.
71. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 3.
72. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 3.

73. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 3.
74. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, pp. 4–5.
75. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 7.
76. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 7.
77. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, pp. 7–8.
78. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 8.
79. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 8.
80. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 8.
81. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 9.
82. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 9.
83. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 10.
84. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 10.
85. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, pp. 10–11.
86. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 11.
87. Report, Oct. 1938, Engineering Division, Region One, Richmond, Va., Box 18, File 266.
88. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 11.
89. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 11.
90. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 12. The report lists the supplies of electrical materials and fixtures.
91. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 13.
92. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 13.
93. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 14.
94. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 14.
95. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, pp. 14–15.
96. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 15.
97. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 15.

98. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, pp. 15–16.
99. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 17.
100. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 18.
101. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 18.
102. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 19.
103. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 24.
104. W. Mickell, "Completion Report: Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939, p. 24.
105. Superintendent's Report, SOL National Monument, Dec. 1938.
106. John R. White to Director, Jan. 12, 1942, Box 20, File 282, SOL Part II.
107. Newton B. Drury to Secretary, Mar. 11, 1942, Box 20, File 282, SOL Part II.
108. Superintendent's Report, SOL National Monument, Mar. 4, 1943.
109. Superintendent's Report, SOL National Monument, April 14, 1943, p. 2.
110. Superintendent's Report, SOL National Monument, May 11, 1943, p. 2.
111. Superintendent's Report, SOL National Monument, Aug. 5, 1943.
112. Palmer to Regional Director, Region One, Feb. 21, 1944, Box 20, File 284, SOL Part II.
113. Superintendent's Report, SOL National Monument, Sept. 3, 1943.
114. Superintendent's Report, SOL National Monument, Dec. 14, 1943.
115. Superintendent's Report, SOL National Monument, Sept. 8, 1948.
116. Roy E. Appleman to Regional Director, NPS, July 15, 1949, Box 22, File 299, SOL Part II.
117. Superintendent's Report, SOL National Monument, Aug. 8, 1949.
118. Superintendent's Report, SOL National Monument, Aug. 10, 1950, SOL Part II.
119. Superintendent's Report, SOL National Monument, Sept. 11, 1950, SOL Part II.
120. David S. Youngholm to Palmer, Oct. 21, 1941, Box 20, File 280, Box 112, SOL Part II. Palmer to the Director of NPS, Oct. 21, 1941, Box 20, File 280, SOL Part II.
121. [NPS], Press Release, "Torch of Statue of Liberty Gets Flaming New Color Effect," Oct. 28, 1941, Box 20, File 280, SOL Part II.
122. Press Release, Dec. 14, 1941, Box 20, File 280, SOL Part II.
123. Palmer to Regional Director, Box 20, File 284, Box 11, SOL Part II.
124. Press Release, Feb. 26, 1942, Box 20, File 282, Box 112, SOL Part II.
125. Palmer to Director, July 7, 1944, Box 20, File 284, SOL Part II.
126. Superintendent's Report, SOL National Monument, Oct. 11, 1944, p. 1.
127. Palmer to Regional Director, Dec. 23, 1944, Box 20, File 284, SOL Part II. Paul H. Younger, "The Lights at the Statue of Liberty," Feb. 10, 1945, Box 20, File 285, SOL Part II.
128. Palmer to L. D. Macy, Feb. 14, 1945, Box 20, File 285, SOL Part II.
129. Press release, 'Electric Fire' to Simulate Actual Flame in Liberty's Torch, April 9, 1945, p. 1, Box 21, File 286, SOL Part II.
130. Press release, 'Electric Fire' to Simulate Actual Flame in Liberty's Torch, April 9, 1945, p. 1, Box 21, File 286, SOL Part II.
131. Press release, 'Electric Fire' to Simulate Actual Flame in Liberty's Torch, April 9, 1945, p. 1, Box 21, File 286, SOL Part II.

132. Press release, 'Electric Fire' to Simulate Actual Flame in Liberty's Torch, April 9, 1945, p. 2, Box 21, File 286, SOL Part II.
133. Press release, 'Electric Fire' to Simulate Actual Flame in Liberty's Torch, April 9, 1945, p. 2, Box 21, File 286, SOL Part II.
134. Press release, 'Electric Fire' to Simulate Actual Flame in Liberty's Torch, April 9, 1945, p. 3, Box 21, File 286, SOL Part II.
135. Press release, 'Electric Fire' to Simulate Actual Flame in Liberty's Torch, April 9, 1945, p. 2, Box 21, File 286, SOL Part II.
136. S. G. Hibben to Palmer, April 18, 1945, p. 1, Box 21, File 286, SOL Part II.
137. Superintendent's Report, SOL National Monument, July 17, 1945.
138. Palmer to Regional Director, Region One, July 14, 1944, Box 20, File 284, SOL Part II.
139. Superintendent's Report, SOL National Monument, April 7, 1942, p. 2.
140. Thomas J. Allen to Director, Sept. 22, 1944, Box 20, File 284, SOL Part II.
141. Superintendent's Report, SOL National Monument, Oct. 11, 1944, p. 1.
142. Palmer to Regional Director, Region One, Sept. 1, 1944, Box 20, File 284, SOL Part II.
143. Thomas J. Allen to Director, Sept. 22, 1944, Box 20, File 284, SOL Part II.
144. Superintendent's Report, SOL National Monument, Nov. 10, 1944, p. 1.
145. Specifications of Paint to be Used on Interior of Statue of Liberty and Pedestal, Jan. 22, 1945, p. 1, Box 20, SOL Part II.
146. Specifications of Paint to be Used on Interior of Statue of Liberty and Pedestal, Jan. 22, 1945, p. 1, Box 20, File 285, SOL Part II.
147. Specifications of Paint to be Used on Interior of Statue of Liberty and Pedestal, Jan. 22, 1945, p. 1, Box 20, File 285, SOL Part II.
148. Specifications of Paint to be Used on Interior of Statue of Liberty and Pedestal, Jan. 22, 1945, p. 1–2 , Box 20, File 285, SOL Part II.
149. Superintendent's Report Feb. 14, 1945, p. 1.
150. Palmer to Regional Director, Region One, Feb. 15, 1945, Box 20, File 285, SOL Part II.
151. Palmer to Regional Director, Region One, Feb. 15, 1945, Box 20, File 285, SOL Part II.
152. Palmer to Regional Director, Region One, Feb. 15, 1945, Box 20, File 285, SOL Part II.
153. Contract with Empire Contracting Company, Mar. 9, 1945, Box 20, File 285, SOL Part II.
154. Palmer to Regional Director, Region One, Feb. 15, 1945, Box 20, File 285, SOL Part II. Marshall to Regional Director, Region One, Aug. 14, 1946, Box 21, File 289, SOL Part II.
155. Marshall to Regional Director, Region One, Aug. 14, 1946, Box 21, File 289, SOL Part II.
156. Marshall to Regional Director, Region One, Aug. 14, 1946, Box 21, File 289, SOL Part II.
157. Superintendent's Report, SOL National Monument, Nov. 8, 1946.
158. Superintendent's Report, SOL National Monument, Dec. 9, 1946.
159. Specifications for Repainting Interior of the Statue of Liberty, Contract No. I-56np-3, Dec. 5, 1946, p. 19, Box 21, File 289, SOL Part II.
160. Specifications for Repainting Interior of the Statue of Liberty, Contract No. I-56np-3, Dec. 5, 1946, p. 19, Box 21, File 289, SOL Part II.
161. Specifications for Repainting Interior of the Statue of Liberty, Contract No. I-56np-3, Dec. 5, 1946, p. 20–21, Box 21, File 289, SOL Part II.
162. Specifications for Repainting Interior of the Statue of Liberty, Contract No. I-56np-3, Dec. 5, 1946, p. 21, Box 21, File 289, SOL Part II.
163. Specifications for Repainting Interior of the Statue of Liberty, Contract No. I-56np-3, Dec. 5, 1946, p. 21, Box 21, File 289, SOL Part II.
164. Specifications for Repainting Interior of the Statue of Liberty, Contract No. I-56np-3, Dec. 5, 1946, p. 22, Box 21, File 289, SOL Part II.

165. Superintendent's Report, SOL National Monument, Jan. 10, 1947.
166. Marshall to Regional Director, Region One, Jan. 2, 1947, Box 21, File 290, SOL Part II.
167. Marshall to Regional Director, Region One, Dec. 18, 1946, Box 21, File 289, SOL Part II.
168. Contract No. I-56-np-4 with the Inertol Co., Feb. 13, 1947, Box 21, File 289, SOL Part II.
169. Contract No. I-56-np-4 with the Inertol Co., Feb. 13, 1947, p. 19, Box 21, File 289, SOL Part II.
170. Contract No. I-56-np-4 with the Inertol Co., Feb. 13, 1947, p. 24, Box 21, File 289, SOL Part II.
171. Contract No. I-56-np-4 with the Inertol Co., Feb. 13, 1947, p. 24, Box 21, File 289, SOL Part II.
172. Superintendent's Report, SOL National Monument, Mar. 11, 1947.
173. Contract with General Wire Mesh Company, July 12, 1946, Box 21, File 289, SOL Part II. Superintendent's Report, Mar. 6, 1946, p. 1. Superintendent's Report July 11, 1946.
174. Superintendent's Report, SOL National Monument, Mar. 11, 1947.
175. Minne C. Stein to Regional Director, Region One, Mar. 6, 1947, Box 21, File 290, SOL Part II.
176. Change Order Number One, Contract I-41p-183, Mar. 13, 1947, Box 21, File 290, SOL Part II.
177. "Statue of Liberty Open, Is Lipstick-Proof Now," Unidentified Newspaper, [April 4, 1947], Box 22, File 300, SOL Part II.
178. Superintendent's Report, SOL National Monument, May 6, 1947.
179. Minnie C. Stein to Regional Director, Region One, July 22, 1947, Box 21, File 291, SOL Part II.
180. *New York Times*, [April 4, 1947], Box 22, File 300, SOL Part II.
181. Jesse H. Denniston, Inspection Trip, Statue of Liberty National Monument, p. 1, Box 20, File 282, SOL Part II.
182. Proposed Physical Improvement Program for the Statue of Liberty, June 9, 1947, p. 4, Box 21, File 290, SOL Part II.
183. Superintendent's Report, SOL National Monument, Mar. 6, 1946, p. 1.
184. Bernice Marshall to Harry S Truman, Jan. 27, 1948, Box 21, File 293, SOL Part II.
185. *New York Times*, May 27, 1948. Hillary A. Tolson (Acting Director) to Assistant Secretary Warne, July 12, 1948, Box 22, File 295, SOL Part II.
186. Work Program, July 2, 1948, Box 22, File 295, SOL Part II.
187. Abbot, O'Neil, and Peterson to Regional Director, Aug. 10, 1948, Box 22, File 295, SOL Part II.
188. H. D. Balsinger to O'Neil, Aug. 24, 1948, Box 22, File 295, SOL Part II.
189. Specifications for Statue Pedestal Heating Statue of Liberty National Monument, Feb. 23, 1949, Box 22, File 297.
190. Contract with Johnson Heating Company, Mar. 10, 1949, Box 22, File 298, SOL Part II.
191. Superintendent's Report, SOL National Monument, July 15, 1949.
192. Roy E. Appleman to Regional Director, July 15, 1949, Box 22, File 299, SOL Part II.
193. Superintendent's Report, SOL National Monument, Aug. 8, 1949. Superintendent's Report, SOL National Monument, Sept. 9, 1949.
194. Project Completion Report, Statue Pedestal Heating, Aug. 30, 1949, Box 22, File 299, SOL Part II.
195. Project Completion Report, Statue Pedestal Heating, Aug. 30, 1949, Box 22, File 299, SOL Part II.
196. Project Completion Report, Statue Pedestal Heating, Aug. 30, 1949, Box 22, File 299, SOL Part II.
197. Superintendent's Report, SOL National Monument, Jan. 9, 1949.
198. Superintendent's Report, SOL National Monument, Mar. 12, 1949.
199. Superintendent's Report, SOL National Monument, Oct. 7, 1949.
200. Foster to Regional Director, Nov. 29, 1948, Box 22, File 296, SOL Part II. Thomas J. Allen to Foster, Dec. 16, 1948, Box 22, File 296, SOL Part II.
201. Specifications for Replacement of Windows in the Crown of the Statue of Liberty, April 1, 1949, p. 1-2, Box 22, File 297.

202. Superintendent's Report, SOL National Monument, Oct. 7, 1949. Superintendent's Report, SOL National Monument, Nov. 4, 1949.

203. Superintendent's Report, SOL National Monument, May 10, 1948.

204. Superintendent's Report, SOL National Monument, Sept. 11, 1950.

205. Palmer to Irving V. A. Huie, May 13, 1941, Box 20, File 279, SOL Part II.

206. Superintendent's Report, SOL National Monument, Dec. 15, 1941, p. 1.

207. Superintendent's Report, SOL National Monument, Feb. 10, 1942, p. 2.

208. Superintendent's Report, SOL National Monument, Mar. 9, 1942, p. 1. Superintendent's Report, SOL National Monument, April 7, 1942, p. 2.

209. Superintendent's Report, SOL National Monument, April 7, 1942, p. 2.

210. Superintendent's Report, SOL National Monument, May 6, 1942, p. 2.

211. Superintendent's Report, SOL National Monument, June 8, 1942, p. 2.

212. Superintendent's Report, SOL National Monument, July 9, 1942, p. 1.

213. Superintendent's Report, SOL National Monument, July 9, 1942, p. 1.

214. Jesse H. Denniston, Inspection Trip, Statue of Liberty National Monument, Oct. 22-26, 1942, p. 1, Box 20, File 282, SOL Part II.

215. Bernice Marshall to Harry S. Truman, Jan. 27, 1948, Box 21, File 293, SOL Part II. Work Program, July 2, 1948, Box 22, File 295, SOL Part II. Superintendent's Report, SOL National Monument, Aug. 10, 1950. Specifications for Railing Rear Sally Port Statue of Liberty National Monument, 1950, Box 23, File 303, SOL Part II.

216. Specifications for Railing Rear Sally Port Statue of Liberty National Monument, 1950, Box 23, File 303, SOL Part II.

217. Specifications for Railing Rear Sally Port Statue of Liberty National Monument, 1950, Box 23, File 303, SOL Part II.

218. Specifications for Railing Rear Sally Port Statue of Liberty National Monument, 1950, Box 23, File 303, SOL Part II.

219. Specifications for Railing Rear Sally Port Statue of Liberty National Monument, 1950, Box 23, File 303, SOL Part II.

220. Completion Report, Jan. 25, 1952, Box 23, File 306, SOL Part II.

221. Superintendent to Regional Director, Mar. 5, 1951, Box 23, File 304, SOL Part II.

222. Foster to Regional Director, May 1, 1948, Box 21, File 294, SOL Part II.

223. Superintendent's Report, SOL National Monument, Aug. 14, 1948. Superintendent's Report, SOL National Monument, Sept. 8, 1948.

224. Superintendent's Report, SOL National Monument, July 15, 1949.

225. Superintendent's Report, SOL National Monument, Sept. 9, 1949.

226. Superintendent's Report, SOL National Monument, Oct. 7, 1949.

227. Superintendent's Report, SOL National Monument, Mar. 11, 1950.

228. Superintendent's Report, SOL National Monument, Mar. 11, 1950.

229. Superintendent's Report, SOL National Monument, May 8, 1950. Superintendent's Report, SOL National Monument, June 17, 1950.

230. Superintendent's Report, SOL National Monument, July 10, 1950.

231. Superintendent's Report, SOL National Monument, Sept. 11, 1950.

232. Superintendent's Report, SOL National Monument, Oct. 14, 1950.

233. Superintendent's Report, SOL National Monument, Nov. 7, 1950.

234. Superintendent's Report, SOL National Monument, Dec. 13, 1950.

235. Superintendent to Regional Director, Mar. 5, 1951, Box 23, File 304, SOL Part II.

236. Inspection of Statue of Liberty National Monument, Mar. 1, 1951, Box 23, File 304, SOL Part II.

237. Superintendent to Regional Director, Mar. 5, 1951, Box 23, File 304, SOL Part II.
238. Foster, Project Completion Report, May 22, 1951, Box 23, File 304, SOL Part II.
239. Completion Report, May 22, 1951, Box 23, File 304, SOL Part II.
240. Specifications for Steel Plates at Base of Statue of Liberty, Jan. 19, 1951, Box 23, File 304, SOL Part II.
241. Specifications for Steel Plates at Base of Statue of Liberty, Jan. 19, 1951, Box 23, File 304, SOL Part II.
242. Foster to Reals Roofing Co., Mar. 30, 1951, Box 23, File 304, SOL Part II.
243. Completion Report for replacing steel plates, April 9, 1951, Box 23, File 304, SOL Part II.
244. Completion Report for replacing steel plates, April 9, 1951, Box 23, File 304, SOL Part II.
245. Completion Report for replacing steel plates, April 9, 1951, Box 23, File 304, SOL Part II.
246. Foster to Regional Director, Region One, Feb. 21, 1950, Box 22, File 301, SOL Part II.
247. Superintendent to Regional Director, Mar. 20, 1950, Box 22, File 301, SOL Part II.
248. Superintendent's Report, SOL National Monument, Jan.. 13, 1951, SOL Part II.
249. Superintendent to Regional Director, Mar. 10, 1951, Box 23, File 304, SOL Part II.
250. Completion Report, Mar. 25, 1952, Box 23, File 309 (1958)
251. Superintendent to Director, Dec. 2, 1950, Box 23, File 303, SOL Part II.
252. Completion Report, Mar. 25, 1952, Box 23, File 306, SOL Part II.
253. The material for the section on the AMI era is abridged from the Architectural History by Mount Ida Press in John G. Waite Associates, Architects, *Fort Wood, Statue of Liberty National Monument, Historic Structure Report*.
254. *New York Times*, June 13, 1949.
255. *New York Times*, July 6, 1949.
256. Hugins, 71.
257. Barbara Blumberg, *Celebrating the Immigrant: An Administrative History of the Statue of Liberty National Monument 1952–1982*, Cultural Resources Management Study No. 10. Division of Cultural Resources North Atlantic Regional Office (NPS, U.S. Dept. of the Interior, 1985), 58. This resource is also available on line at http://www.cr.nps.gov/history/online_books/stli/adhi3.htm.
258. Blumberg, 28.
259. Blumberg, 28.
260. Blumberg, 29.
261. Blumberg, 29.
262. *New York Times*, Aug. 11, 1954.
263. Blumberg, 30.
264. Blumberg, 28–30.
265. Blumberg, 31.
266. Blumberg, 51–52. Robert G. Hall, Chief EODC, to [Jackson Price?], Assistant Director, Design and Construction, May 25, 1962, American Museum of Immigration, Administrative Files, Statue of Liberty National Monument (hereafter, AMI), Box 152, File 2982.1. In this letter Hall reported the following: "Experience has proved that work on Liberty Island is approximately 100% higher in cost than that completed on the mainland."
267. *New York Times*, July 24, 1956; Aug. 4, 1956.
268. Blumberg, 34, 36.
269. Blumberg, 36.
270. Pre-advertisement for Invitation of Bids, Mar. 26, 1962, AMI Box 151, File 2972.
271. Blumberg, 52.
272. Fund-raising Campaign Statement, as of Sept. 17, 1962, AMI Box 151, File 2973.
273. Blumberg, 53.

274. Kroll, 34.
275. Jackson Price, Assistant Director, NPS, to Malcolm Ericson, Mar. 28, 1962, AMI Box 147, File 2921.
276. National Park Service, Department of the Interior, Specifications for the American Museum of Immigration Excavation, Statue of Liberty National Monument, Liberty Island, New York, October 1961, AMI Box 151, File 2970.
277. Pre-advertisement for Invitation of Bids, Mar. 26, 1962, AMI Box 151, File 2972. [Same doc also located in AMI Box 152, File 2982.1]. Kroll, 34.
278. Ronald F. Lee, Regional Director, to Robert G. Hall, Chief, EODC, Mar. 27, 1962, AMI Box 147, File 2921. Eastern Office Division of Design and Construction, Specifications and Drawings for the American Museum of Immigration Structure, Addendum No. 1, May 17, 1962, AMI Box 152, File 2982.1. David O. Smith, Project Supervisor, to Robert G. Hall, Chief, EODC, Dec. 14, 1962, AMI Box 152, File 2982.5. David O. Smith, Project Supervisor, EODC Weekly Field Report, Feb. 1, 1963, AMI Box 152, File 2982.2.
279. Kroll, 34.
280. Pre-advertisement for Invitation of Bids, Mar. 26, 1962, AMI Box 151, File 2972. Statement and Certificate of Award and Construction Contract number 14-10-0529-1124, June 8, 1962, AMI Box 152, File 2982.1. NPS, Statement of Contractors' Claims, no date, AMI Box 151, File 2975. Robert G. Hall, Chief EODC, to Regional Director, Region Five, June 8, 1962, AMI Box 179, File 3283. Progress Report on AMI, No. 1, David O. Smith, Project Supervisor, to Robert G. Hall, Chief, EODC, Aug. 2, 1962, AMI Box 152, File 2982.1. "Immigrant Museum to Be Erected Soon at Statue of Liberty," *New York Times*, June 20, 1962.
281. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Aug. 2, 1962, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.1. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Aug. 17, 1962, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.1.
282. Harold H. Hagen, Assistant Project Supervisor, to Robert G. Hall, Chief of EODC, July 30, 1962, Weekly Progress Report, Week of July 23, 1962, AMI Box 152, File 2982.1. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Aug. 2, 1962, Progress Report on AMI, No. 1, AMI Box 152, File 2982.1. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Aug. 17, 1962, Progress Report on AMI, No. 1, AMI Box 152, File 2982.1. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Aug. 24, 1962, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.1. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Sept. 17, 1962, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.1.
283. David O. Smith, Project Supervisor, EODC Weekly Field Reports, June 7, 1963; July 5, 1963, AMI Box 152, File 2982.2.
284. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Dec. 3, 1962, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.2.
285. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Oct. 12, 1962; Dec. 3, 1962; Jan. 7, 1963, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.2.
286. Robert G. Hall, Chief of EODC, to [Ronald F. Lee], NPS Regional Director, Northeast Region, Oct. 30, 1962, AMI Box 152, File 2982.2.
287. David O. Smith to Robert G. Hall, September 17, 1962; Robert E. Smith, Chief Architect of EODC, to Newell Foster, Oct. 26, 1962; AMI Box 152, File 2982.2.
288. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Oct. 22, 1962, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.2. Newell H. Foster to Peter Reiss Construction Co., Inc., and Lew Morris Demolition Co., Inc., October 23, 1962, AMI Box 152, File 2982.2.
289. "Cornerstone Laid for Museum of Immigration," American Museum of Immigration Press Release, Oct. 29, 1962, AMI Box 152, file 2982.2. *New York Times*, Oct. 29, 1962.
290. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Oct. 29, 1962, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.2.
291. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Oct. 29, 1962; Nov. 9, 1962 Progress Report Statue of Liberty NM, AMI Box 152, File 2982.2.
292. Kroll, 34.

293. David O. Smith, Project Supervisor, to Robert G. Hall, Chief of EODC, Jan. 7, 1963, Progress Report Statue of Liberty NM, AMI Box 152, File 2982.2.
294. David O. Smith, Project Supervisor, to Newell Foster, Superintendent of the Statue of Liberty, Dec. 31, 1962, AMI Box 152, File 2982.2.
295. David O. Smith, Project Supervisor, to Newell Foster, Superintendent of the Statue of Liberty, Jan. 11, 1963, AMI Box 152, File 2982.2.
296. David O. Smith, Project Supervisor, EODC Weekly Field Reports, Jan. 21, 1963; Jan. 25, 1963; Feb. 1; 1963; Feb. 8, 1963, AMI Box 152, File 2982.2.
297. Robert G. Hall, Chief of EODC, to Ronald F. Lee, NPS Regional Director, Northeast Region, Nov. 20, 1962, AMI Box 152, File 2982.2. Robert G. Hall, Chief of EODC, to [Jackson Price?], Assistant Director, Design and Construction, May 25, 1962, AMI Box 152, File 2982.1. An "ample shielded storage area of over 2827 cubic feet" within the Statue's pedestal, the sally port, and the storage rooms of the museum was designed and outfitted to serve as a fallout shelter.
298. Robert E. Smith, Chief Architect of EODC, to NPS Regional Director, Northeast Region, Feb. 27, 1963, AMI Box 152, File 2982.2.
299. David O. Smith, Project Supervisor, EODC Weekly Field Report, March 1, 1963, AMI Box 152, File 2982.2.
300. David O. Smith, Project Supervisor, EODC Weekly Field Report, March 15, 1963; Mar. 22, 1963, AMI Box 152, File 2982.2.
301. David O. Smith, Project Supervisor, EODC Weekly Field Report, Feb. 15, 1963, AMI Box 152, File 2982.2.
302. Ronald F. Lee, Regional Director, NPS, to Robert G. Hall, Chief of EODC, March 13, 1963, AMI Box 153, File 2989.
303. David O. Smith, Project Supervisor, EODC Weekly Field Report, Mar. 29, 1963, AMI Box 152, File 2982.2.
304. David O. Smith, Project Supervisor, EODC Weekly Field Report, Mar. 29, 1963, AMI Box 152, File 2982.2.
305. David O. Smith, Project Supervisor, EODC Weekly Field Report, June 7, 1963, AMI Box 152, File 2982.2.
306. David O. Smith, Project Supervisor, EODC Weekly Field Report, June 7, 1963, June 14, 1963, June 21, 1963, June 28, 1963, July 5, 1963, AMI Box 152, File 2982.2.
307. Blumberg, 41.
308. David O. Smith, Project Supervisor, EODC Weekly Field Reports, June 7, 1963; July 5, 1963, AMI Box 152, File 2982.2.
309. Blumberg, 54.
310. Blumberg, 55.
311. Blumberg, 55. U.S. Dept. of the Interior Press Release, Jan. 13, 1968, AMI Box 151, File 2974.
312. Jerry D. Wagers, American Museum of Immigration Progress Report No. 2, Sept. 1, 1971, AMI Box 151, File 2977.
313. Jerry D. Wagers, American Museum of Immigration Progress Report No. 2, Sept. 1, 1971, AMI Box 151, File 2977.
314. Blumberg, 44.
315. Blumberg, 55.
316. Blumberg, 55. Jerry D. Wagers, American Museum of Immigration Progress Report No. 2, Sept. 1, 1971, AMI Box 151, File 2977.
317. *New York Times*, Sept. 27, 1972.
318. Blumberg, 16. *New York Times*, June 5, 1980.
319. Unit price contract with Lane Company, Stone Repointing and Repairs, June 22, 1979, NPS T-2. F: Stone Repointing and Repairs, Bob Hope Memorial Library at Ellis Island.

Figure 59. The Statue of Liberty during the 1984 restoration. Photograph by Jet Lowe. [HAER NY, 31-NEYO, 89-22, Library of Congress]

RESTORATION OF THE STATUE OF LIBERTY, 1982-1986

THE RESTORATION PROJECT

The restoration work of the 1980s was timed to coincide with the centennial of the erection of the Statue on its pedestal on Bedloe's Island in 1886. In May 1982 President Ronald Reagan had launched the restoration project with the establishment of the Statue of Liberty-Ellis Island Centennial Commission. The commission was charged with activities to be undertaken by the private sector for not only the Statue but also the rapidly deteriorating immigration facilities on Ellis Island. The commission was also to advise the National Park Service on preservation issues and the celebrations that would mark the centennial. The commission was chaired by Lee A. Iacocca, then the chairman of the Chrysler Corporation.[1] The commission also worked with the Statue of Liberty-Ellis Island Foundation, which had been established to raise money for the work. Iacocca also became chairman of the foundation, lending his "prestige and popularity" to the work and raising over $350 million in contributions.[2]

Meanwhile, the French-American Committee for the Restoration of the Statue of Liberty had been organized in January 1981 and presented a report to the National Park Service that incorporated both research and diagnostic work on the conditions and problems of repair at the Statue of Liberty. The committee consisted of Philippe Grandjean, a French architect and engineer; Pierre Tissier, a French structural engineer; Jean Levron, a French mechanical engineer; and Jacques Moutard, a French master artisan specializing in ornamental metals, including repoussé work. Their work was credited with giving the "project much of its initial momentum."[3] The National Park Service, having studied the group's report, asked that "a detailed diagnostic report be prepared to explore in depth the condition of the statue"; the report would be prepared by the French-American Committee, which would also raise money for the restoration work.[4] The National Park Service wanted to make the Statue "safer, more secure, and environmentally comfortable" for visitors.[5]

Initially, the National Park Service and the committee had agreed that the French-American Committee would "do the studies for the restoration of the Statue" and "develop drawings and contract documents for the work," all at no cost to the U.S. government.[6] However, as the scope of the work grew broader, the committee asked the National Park Service to prepare a diagnostic report and also asked Swanke Hayden Connell Architects of New York to participate; unlike the French consultants, the American architects would bring to the project necessary experience with American design and construction standards, procedures, and business practices. After multiple cultural and practical difficulties arose, the American design team began taking a stronger role in the design and eventually severed its contract with the French-American Committee.[7]

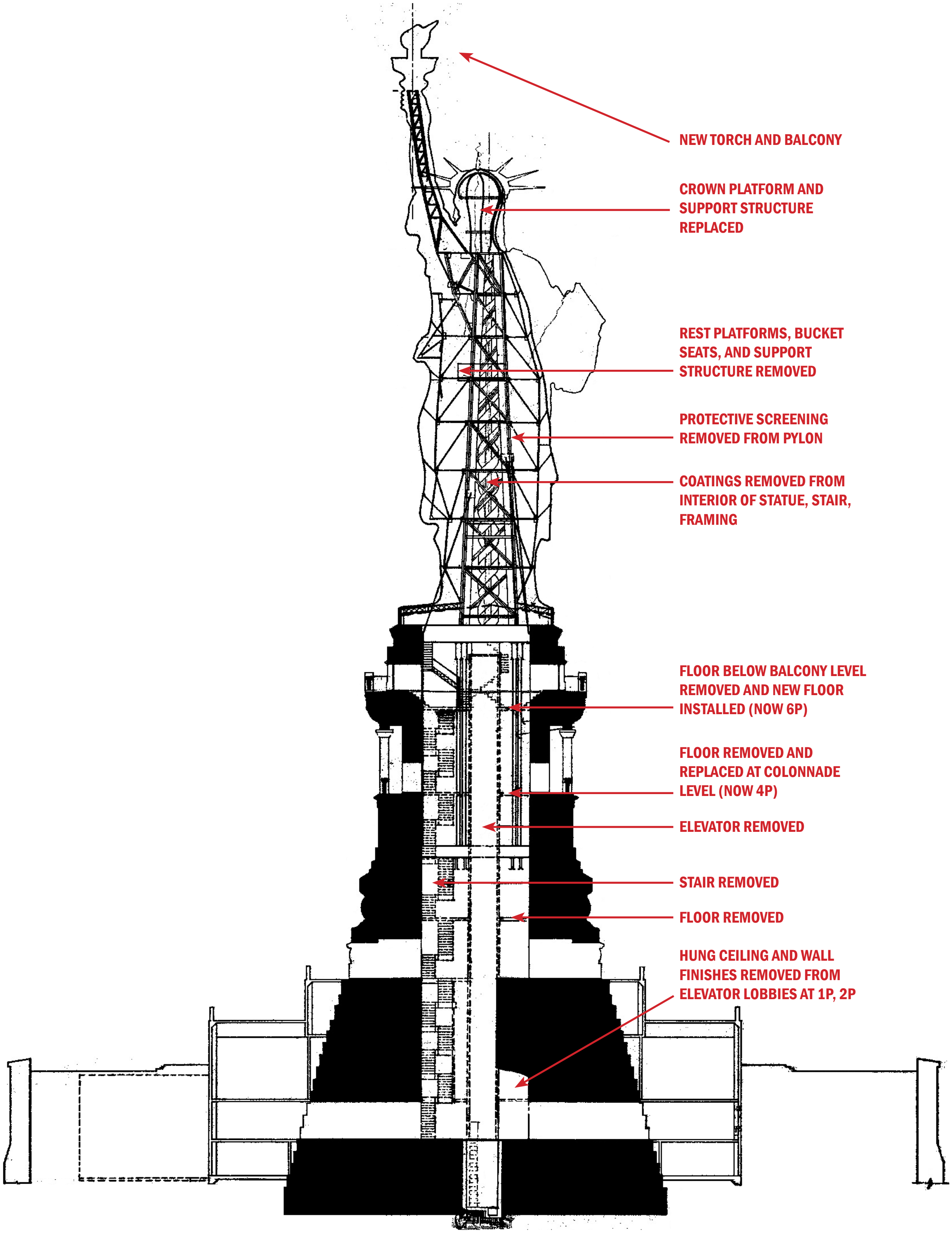


Figure 60. Removals done as part of the 1980s restoration. Adapted from drawing A-03 of "Restoration of the Statue of Liberty" by French-American Consulting Team (Swanke-Hayden-Connell Architects), April 1984. [NPS, STLI, Ref.Lib., 25902/309838]

The remaining design work and the actual restoration work was carried out under the auspices of the Statue of Liberty-Ellis Island Foundation and on behalf of the United States government, which was represented by the National Park Service.[8] The firm of Swanke Hayden Connell became the architect for the restoration of the Statue; the Office of Thierry W. Despont was the associate architect. Ammann and Whitney, experts on bridge engineering, were the structural engineers.[9] Construction management and "coordination of the trade contractors" were handled by Lehrer/McGovern, Inc. All three firms were based in New York. Blaine Cliver, chief of the Historical Preservation Center of the National Park Service in Boston, and historical architect John Robbins, who was located in New York, represented the National Park Service.[10]

The bid documents were issued in the spring of 1984 and construction was well underway in the fall. At the same time the National Park Service decided to include the renovation of the pedestal in the project, along with adding new museum exhibits about the Statue.[11]

There were four major areas where important decisions had to be made regarding the future preservation of the Statue—the overall structural system, the armature of the wrought-iron bars that connected the copper skin to the structural system, the copper skin itself, and the flame and torch. In addition, the floodlighting system was redesigned; visitor circulation systems were improved in both the Statue and the pedestal; and exhibits about the Statue were installed in American Museum of Immigration in the pedestal.[12] To carry out the work, a specially engineered scaffold was built around the Statue; it was constructed of extruded aluminum because scaffolding made of steel would rust and damage the Statue's patina. A ramp, 400 feet long, was built up over the wall of Fort Wood to facilitate the transport of materials from the dock to the Statue itself.[13]

THE STRUCTURAL SYSTEM

When the Statue was examined in the early 1980s, the central pylon was found to be in good condition. The secondary frame of light angle-iron members, which connected the pylon to the wrought-iron armature, was also in good condition. The angle-iron members were retained; the iron was blast cleaned and then coated with a zinc primer and aqueous epoxy. However, the flat iron bars that made up the armature that originally connected the angle-iron frame with the copper skin of the Statue were replaced with replicas made of "high-alloy duplex stainless steel."[14]

There was another important aspect of the structural system that needed attention—the right arm, which was essentially cantilevered from the central pylon and originally had been engineered so that the structural system of the arm was continuous with the secondary framing and central pylon. However, when the Statue was assembled in Paris, a change was made to the position of the arm, for unknown reasons; the change involved moving the arm's box truss about 18 inches outward and adding more secondary iron framing. As a result, the original structural continuity of the arm was compromised, and "unanticipated stresses and bending" were induced into the secondary framing, which had been "designed to take only tensile or compressive stress." The connection to the pylon was described by experts as being "eccentric, too flexible, and overstressed"; in addition, the “joints lacked continuity,” thereby allowing “twisting and excessive movement.” Some additional reinforcements had been added to the arm during the 1930s, when the Statue was under the jurisdiction of the U.S. War Department.[15]

An engineering evaluation of the arm carried out during the restoration determined that more improvements to the structure were needed. Two approaches were identified. The first would have involved removing the elements installed during the Paris-made alteration and inserting new structural elements to achieve Eiffel’s original structural continuity. The second approach called for preserving and repairing the early repairs and adding some new structural members that would make the arm as safe as it would have been if structural continuity had been achieved. The National Park Service preferred the second approach because it would retain the physical evidence of the early alteration; this approach was adopted, and the work carried out.[16]

A few other repairs related to the structure of the Statue were also made. Several of the five head-support arches that had been “not directly attached to the central pylon” were reinforced and connected properly.[17] In addition, “damaged portions of the lattice girders which receive and frame the bottom folds of the draping copper robe, to form an outline for the pedestal cap, were replaced.”[18] Some sections of the girders were badly corroded; the upper flange of some girders “had been cut to allow the installation of guy rods, causing the girders to sag.” The guy rods, which had never functioned properly to help keep the Statue from overturning, were relocated.[19] In addition the lead-based paint that had been applied to the frame over the years was removed in order to identify possible corrosion; the paint was grit blasted using aluminum oxide.[20]

The anchorage system also underwent a repair: “30-ton hydraulic jacks were used to tighten” the 6-inch diameter nuts at the bottom of each tension bar.[21]

REPLACING THE ARMATURE

The impact of the galvanic corrosion of the iron armature bars was most severe where the bars had caused bulges and indentations in the copper skin; in addition, corrosion had affected areas of the armature that were located some distance from the copper saddles. According to one report,

> In some cases, half the thickness had corroded away, and at lap joints, iron bolts had corroded and failed. Extensive galvanic corrosion of iron occurred in the torch, torch arm and shoulder, and head. These areas were most susceptible to moisture seepage; for example, the iron crown ring and torch base ring were severely deteriorated.[22]

The severity of the iron corrosion meant that the iron armature needed to be replaced. Replacement with the same material was ruled out because the replacement iron would still be susceptible to galvanic corrosion. The mechanical and physical characteristics of the replacement material had to be similar to those of iron so that the armature would support the copper skin and absorb stresses as the original had done; the new material also could not result in renewed galvanic corrosion.[23]

Various tests were carried out to determine what materials would be most likely to be “galvanically compatible with copper in the interior Statue environment.” Higher-alloy

Figure 61. Detail of the armature of the Statue in February, 1984. Note that the armature and skin are coated in paint. Photograph by Jet Lowe. [HAER NY,31-NEYO,89-94, Library of Congress]

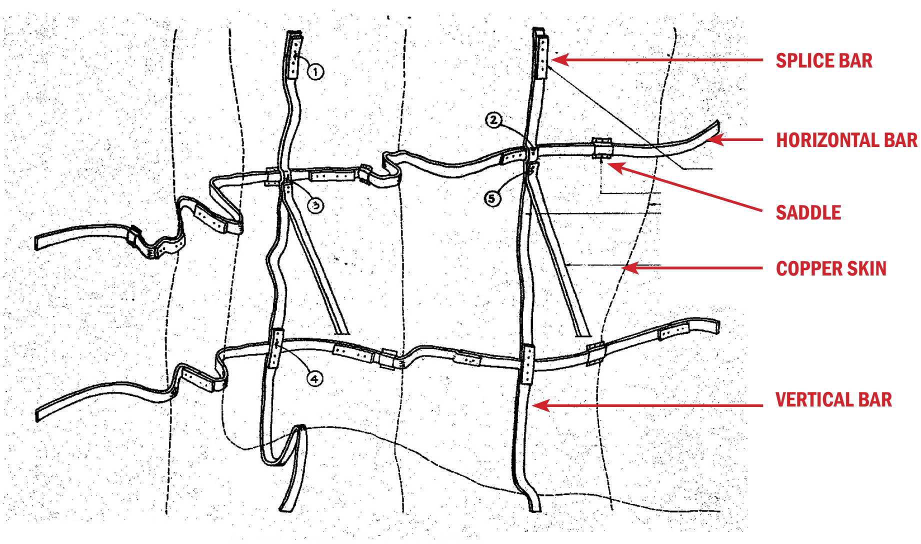


Figure 62. Diagram of typical existing armature, showing armature bars and saddles. Adapted from drawing A-103 of "Restoration of the Statue of Liberty" by French-American Consulting Team (Swanke-Hayden-Connell Architects), April 1984. [NPS, STLI, Ref.Lib., 25902/309838]

Figure 63. The workshop for replicating the armature, March 27, 1985. In the upper photograph, the worker is wearing a protective suit for installation and sandblasting; in the lower photograph, a craftsman is welding a splice on a new section of armature. Photographs by Jet Lowe. [HAER NY,31-NEYO,89-120 and 89-123, Library of Congress]

Figure 64. Armature and skin in February 1984 at the interior surface of the Statue's face (nose and mouth), before restoration. Note the coating on the interior metal work. Photograph by Jet Lowe. [HAER NY,31-NEYO,89-113, Library of Congress]

stainless steel proved to be the most compatible. Its mechanical properties also made it a good choice for the new armature for several reasons: the new stainless-steel elements could be fabricated at the same size as the original and thus be installed using the original rivet holes in the copper; furthermore, the stainless steel elements "would behave similarly under the action of wind, stress, and vibration." Based on tests, experts' experience, and mechanical and physical properties, type 316L stainless steel (UNS S31603) was selected as the material to replace the wrought-iron armature elements. Asbestos that had originally been installed between the armature bars and the copper saddles as insulation to help prevent galvanic corrosion was removed on site.[24]

Each new stainless-steel bar was fabricated to match the size and shape of the iron bar that it replaced and then "installed with new copper saddles and rivets before the next iron bar was removed" *[See Figure 63]*. Some 1,800 bars were installed in this way, using some 20,000 conical rivets that had been prepatinized. This work was done as a joint venture between P. A. Fiebiger, a metal-crafts workshop, and Nab Construction, a large-scale steel fabricator. As an extra precaution against corrosion, "Teflon tape with pressure-sensitive silicone backing" was inserted between the stainless-steel elements and the copper skin. All of the original iron armature bars were removed "except for a few bars in the raised sole of the right foot"; they were found to be in satisfactory condition and were also retained to document the original construction. Bracing was used to prevent the skin and armature elements that were still in place from moving during the replacement of the armature bars.[25]

THE EXTERIOR OF THE COPPER SKIN

Once the scaffolding was in place, the copper skin of the Statue could be examined section by section and rivet by rivet. Although the copper was reported to be in overall excellent condition considering its age and exposure to the elements, there were numerous problems in specific locations. The patina was also studied.[26]

For instance, many riveted seams had been sealed by the coal-tar waterproofing that had been applied to the interior of the Statue by the War Department in 1911. However, the coal tar had dripped and run through holes in the copper, disfiguring the Statue but not actually damaging the patina. Similarly, paint drips were found on the exterior of the Statue. The paint and coal-tar drips were left in place because removing them would have damaged the patina.[27]

The copper skin had been stained by rust from the deteriorating iron armature where moisture, laden with rust, had flowed through holes in the copper skin from the interior of the Statue to the exterior. Areas of rust staining included the neck, the crown, and the torch. The rust stains that appeared on the neck were removed with sodium bicarbonate.[28]

More damaging to the copper skin were holes and distortions caused by the corrosion of the iron armature bars. The bars were attached to the copper skin with copper saddles; the saddles, in turn, were held in place by copper rivets. As the iron bars corroded and expanded, some of the rivets were pulled through the copper, leaving distorted holes. Although most of the rivets had not been pulled through the copper sheets, the pressure from the corrosion had nevertheless caused disfiguring indentations in the copper near

Figure 65. Damaged ringlet of hair in March, 1985 (above), and the repaired ringlet on November 18, 1985 (left). Photographs by Jet Lowe. [HAER NY,31-NEYO,89-174 and 89-175, Library of Congress]

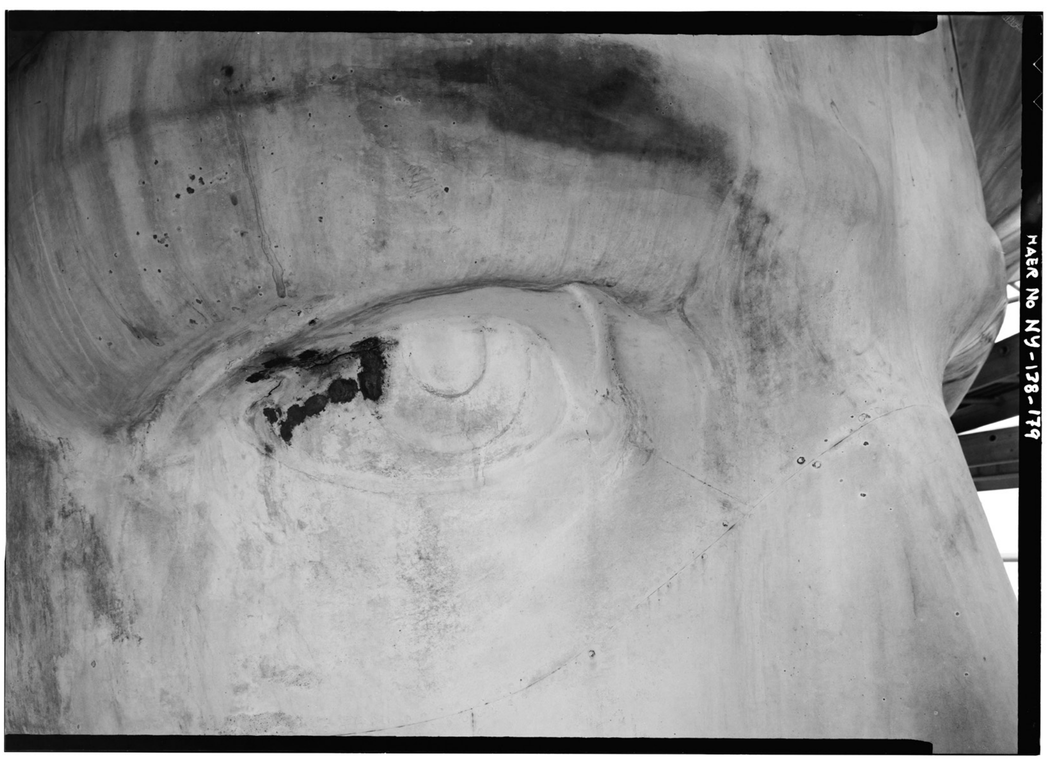


Figure 66. Details of the face during repairs, November 18, 1985. Photographs by Jet Lowe. [HAER NY,31-NEYO,89-178 and 89-179, Library of Congress].

Figure 67. The spike rubbing against the right arm (left) in March, 1985; and the spikes removed for repair in October/November 1985. Photographs by Jet Lowe. [HAER NY,31-NEYO, 89-170 and 89-172, Library of Congress]

the heads of the rivets, as well as outward bulges between the rivets. This damage was determined to be primarily cosmetic, and the copper was not reshaped because it would have damaged the patina in the process and because the copper itself "had been stretched beyond reforming."[29]

Another perforation of the copper the result of one of the spikes in the crown rubbing against the arm of the Statue *[See Figure 67]*. Apparently the abrasion was caused by the misalignment of the arm that resulted from the early alterations. During the restoration work the original position of the spike was adjusted slightly so that it would clear the arm.[30]

The spikes in the crown were found to have been made from brass and bronze, perhaps to increase their rigidity.[31] The armatures of the rays were replaced with stainless steel, and the exterior surfaces of the rays were cleaned.[32]

Samples of the copper skin underwent laboratory analysis, and the chemical composition of the patina was studied in detail. Studies were also undertaken to investigate the causes of variegation in the patina. A sample of copper that had been taken from the Statue in 1905 and deposited in the National Archives was used as a benchmark in evaluating the current patina. This early sample had a dark green patina. Other examples of this patina were still exposed in some locations during the 1980s; generally, however, it had been displaced by a lighter green surface. A mapping program was established to follow any erosion of the lighter patina, perhaps caused by environmental changes, such as acid rain.[33]

During the 1980s restoration experts measured the thickness of the copper using an ultrasonic caliper; the results indicated "no differential, either vertically or circumferentially, in average skin thickness."[34] In addition, the thickness of the copper was measured in areas where streaks of coal tar had dripped through holes to the exterior of the Statute in 1911; these streaks had protected the copper since then. The thickness of the copper in those areas was compared to that of the immediately adjacent copper. The differential was approximately that of the average loss of other exposed copper since the 1880s in New York, thus suggesting that "nothing unusual" had been "occurring to exacerbate the weathering of the skin" of the Statue.[35]

Some areas of the copper, however, had suffered unusually severe corrosion where water had been trapped on the interior. The copper was patched in these areas following the original repoussé fabrication method of making a mold and then hammering the copper against that shape.[36] Weep holes were added, especially in areas where there were "deep horizontal folds," so that condensation could escape from the interior of the Statue.[37]

In other locations, including the chin, lips, nose, and right eye, the copper had suffered major cracks. These areas were patched by inserting a new piece of copper shaped by the repoussé method or by using a "wolf-mouth" assembly, in which the edges of the two pieces of copper "are cut in a sawtooth pattern, leveled to a featheredge, interlocked like the fingers of two hands, and hammered into a single surface" *[see Figure 66]*. Small tears in the copper were "simply hammered back together and sealed from the inside." Graffiti and names carved into the copper, some dating to 1886, were not removed.[38]

After testing a variety of stain-removal methods, it was decided "to pressure-wash the entire statue and carefully scrape away only those stains and bird droppings visually and chemically detrimental to the statue."[39] Removing the patina down to the "bright copper" layer would have accelerated the loss of copper. No other treatment or coating of the patina was undertaken, mainly because of the huge size of the Statue and because of the fact that the cleaning products being considered had short life spans. Because the exterior copper surfaces would be inaccessible once the scaffolding was removed, it was planned to periodically measure the thickness of the copper from inside the Statue.[40]

THE INTERIOR OF THE STATUE

Over the years the interior of the Statue had been coated with paint and coal tar; it was estimated that at least ten layers of coatings had been applied to the inside of the copper skin. Coal tar had been used in 1911 with the intent of waterproofing the joints and seams; later coatings included "lead, aluminum, alkyd, and vinyl paints." The copper skin needed to be cleaned of these coatings before the new stainless-steel armature could be installed. In addition, there was concern that the coatings "concealed serious corrosion and structural problems."[41]

After various methods were tested, workers removed layers of paints using liquid nitrogen, which caused the paint to freeze, contract, and then fall off in sheets. The coal tar affixed to the copper skin beneath the paint was removed by "blasting with sodium bicarbonate beads."[42] Paint on the central pylon and the secondary structural system was removed by blasting, so that the iron could be checked for hidden corrosion.[43]

NEW STAIRWAYS, ELEVATORS, AND VISITOR CIRCULATION

Another goal of the restoration program was to improve visitor access to the interior of the Statue and the pedestal, where changes, including the installation of stairways and an elevator, had been made at various times over the years. During the restoration the interior spaces were returned to their "original, unobstructed state, and the visitors' route was reorganized."[44] Stainless-steel treads and railings were installed on the circular stairs in the Statue, and a new stairway, also made of stainless steel, was installed inside the pedestal. A new double-cab hydraulic elevator with glass walls was put in the pedestal, and two new emergency elevators placed inside the pedestal and the Statue.[45]

A set of centennial doors replaced the public-access doorway to the Statue that had been installed in the 1960s. The entranceway was enlarged, and two monumental bronze doors installed; the doors had ten bas-relief panels that illustrate the tools used by artisans who built the Statue. The doors were part of a revised circulation plan for visitors, which included a new grand stairway and the removal of concrete floor slabs from the pedestal. Once the slabs were removed, visitors had the opportunity to see the newly exposed, stepped walls of the foundation of the Statue.[46]

The lobby adjacent to the base of the pedestal was refurbished, and new museum exhibits created on the second level of the American Museum of Immigration. In addition, a new mechanical system with humidity controls was added to "reduce the humidity and provide a better environment for corrosion control."[47]

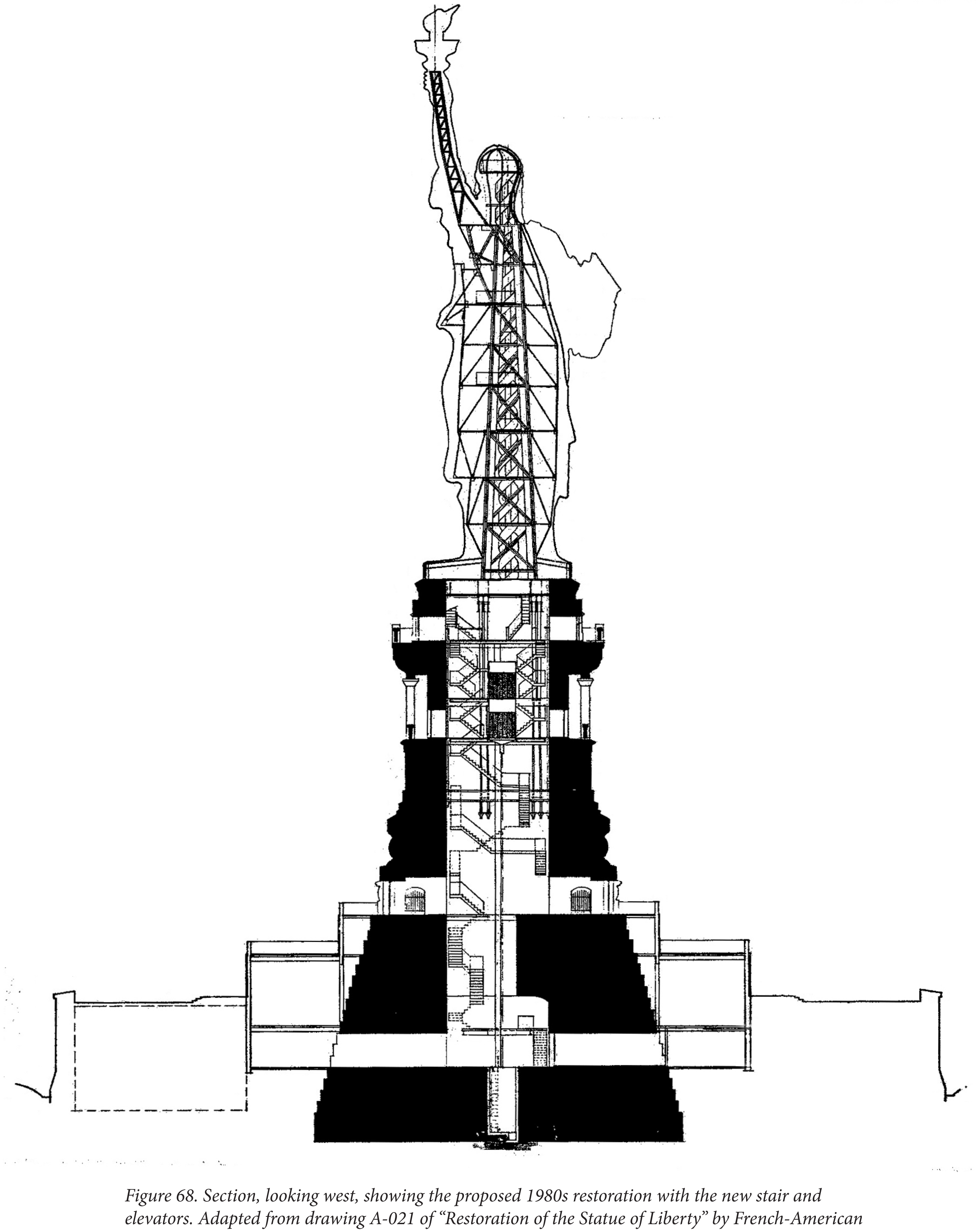


Figure 68. Section, looking west, showing the proposed 1980s restoration with the new stair and elevators. Adapted from drawing A-021 of "Restoration of the Statue of Liberty" by French-American Consulting Team (Swanke-Hayden-Connell Architects), April 1984. [STLI, 25902/309838]

RECREATING THE FLAME AND THE TORCH

The flame and the torch, atop the Statue's right arm, were in poor condition. The glass openings in the flame were not watertight, with the result that precipitation seeped down into the torch and then into the arm. In addition, the copper of the torch and the interior iron armature had suffered severe corrosion. It was therefore decided that the original torch (except for a portion of the pendant), as well as the flame, would be replaced. The torch and flame were removed from the Statue and lowered down from the arm of the Statue on July 4, 1984.[48]

Since the sheet-metal construction of the flame had been altered over time, it was decided to replace it with a flame based on the original design. Original drawings showing the flame had not been found, so National Park Service staff studied early sketches and photographs, and that research was then used by French workers as the basis for the new flame.[49]

The new flame and torch were fabricated by artisans from Les Metalliers Champenois, of Reims, France, in a workshop that they set up at the base of the Statue beginning in November 1984. After creating a model based on the contours of the original flame *[see Figure 69]*, the workers fabricated the molds needed for the repoussé process of shaping the copper. The seams of the formed sheets were then riveted together, the rivets ground down so they were flush with the surface of the copper, and the joints secured with solder to create a watertight seal. The armature of the flame and the torch was made of type 316L stainless steel, the same as that used in the new armature for the rest of the Statue. To gild the flame, the copper was etched and three coats of varnish applied before gold leaf was applied.[50]

New molds for the torch were made for the repoussé work, and the four upper sections of the copper torch (the soffit, platform, balcony, and drum) were then attached to the stainless-steel armature; Teflon tape was used between the copper sheet metal and the stainless-steel armature to prevent galvanic corrosion. The torch was prepatinated to match the patina on other parts of the Statue. The new torch and flame were hoisted into place on November 25, 1985 *[see Figure 71]*. The originals were placed in the museum at the base of the Statue.[51]

NEW LIGHTING

A new nighttime floodlighting system for the exterior of the Statue was designed by H. M. Brandston and Partners of New York with technological assistance from General Electric. After extensive research and testing, a system of low-wattage lamps and high-intensity fixtures was developed; it provides increasing amounts of illumination from the fort to the pedestal and the Statue and then culminates in the brightest light on the torch and the flame. Some of the lamps are housed in ground-level pits around the edge of the island; others surround the flame above the torch.[52]

The new lighting system inside the Statue followed a pattern similar to the exterior lighting, with the interior of the pedestal being dimly lighted, more artificial light within

Figure 69. Plaster model for the torch standing in front of the new torch, October 14, 1985. Photograph by Jet Lowe. [HAER NY,31-NEYO,89-126, Library of Congress]

Figure 70. One of the French craftsmen fabricating part of the torch balustrade, October 14, 1985. Photograph by Jet Lowe. [HAER NY,31-NEYO,89-140, Library of Congress]

Figure 71. The new flame and torch being lowered into place, November 25, 1985. Photograph by Frank DePalo. [HAER NY,31-NEYO,89-199, Library of Congress]

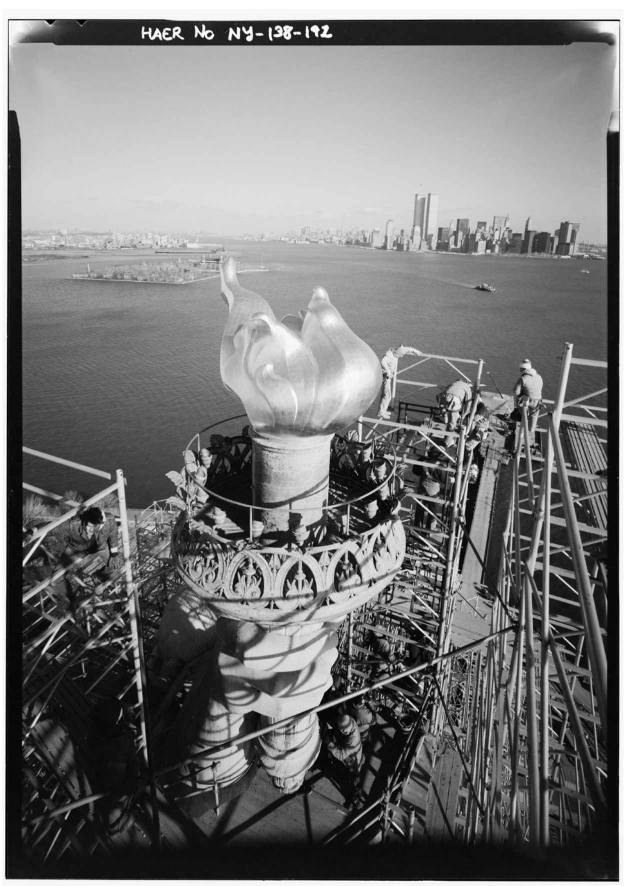


Figure 72. The new flame and torch in place, December 17, 1985. Photograph by Jet Lowe. [HAER NY,31-NEYO,89-192, Library of Congress]

the Statue, and daylight streaming through the windows in the crown. The lighting was designed to highlight the structural features of the interior of the Statue.[53]

NOTES

1. Barry Moreno, *The Statue of Liberty Encyclopedia* (New York: Simon and Schuster, 2000), 204. F. Ross Holland Jr., "The Government, the Commission, and the Foundation: Public/Private Cooperation in the Restoration of the Statue of Liberty and Ellis Island," in Robert Baboian, E. Blaine Cliver, and Lawrence Bellante, eds., *The Statue of Liberty Restoration*, *Proceedings of the Statue of Liberty—Today for Tomorrow Conference*, Oct. 20-22, 1986 (Houston: National Association of Corrosion Engineers, 1990), 10.
2. Moreno, 218. Holland, 10.
3. Richard Seth Hayden and Thierry W. Despont, *Restoring the Statue of Liberty* (New York: McGraw-Hill Book Company, 1986), 3-4, 98.
4. Hayden and Despont, *Restoring the Statue of Liberty, 4.*
5. Hayden and Despont, *Restoring the Statue of Liberty*, 73.
6. Moreno, 94-95. Holland, 10-11.
7. Hayden and Despont, *Restoring the Statue of Liberty*, 3-19.
8. Moreno, 94-95. Holland, 10-11. Hayden and Despont, *Restoring the Statue of Liberty*, 19.
9. Hayden and Despont, *Restoring the Statue of Liberty, 8.*
10. Holland, 12. Hayden and Despont, *Restoring the Statue, 101.*
11. Hayden and Despont, *Restoring the Statue of Liberty*, 18-19.
12. E. Blaine Cliver, "Restoring Miss Liberty: The Decision-Making Process," in Baboian et al, 45. Much of the information in this article was published earlier in E. Blaine Cliver, "The Statue of Liberty," *APT Bulletin: The Journal of Preservation Technology* 18 (No. 3, 1986), 12-23. For a list of articles on the technical aspects of the restoration work, see [Judith M. Jacob with Katharine A. Morrison], "Technical Articles Written on the Copper Skin, Armature, Frame, and Torch, 1984-1997, Selected Bibliography"; copy provided by Diana Pardue.
13. Hayden and Despont, *Restoring the Statue of Liberty,* 47.
14. Baboian and Cliver, 82. See also Gregory P. Smyth, "Coatings and Sealants on the Statue's Interior," in Baboian et al, 123-128.
15. Cliver, "Restoring Miss Liberty," 45-46. Richard Seth Hayden and Thierry W. Despont, "Restoration of the Statue of Liberty, 1984-86," in *Liberty, The French-American Statue in Art and History* (Cambridge: Harper and Row, 1986), 222.
16. Cliver, "Restoring Miss Liberty," 46 .
17. Hayden and Despont, *Restoring the Statue of Liberty*, 80-81.
18. Hayden and Despont, "Restoration of the Statue of Liberty," 222.
19. Hayden and Despont, *Restoring the Statue of Liberty*, 81.
20. Hayden and Despont, *Restoring the Statue of Liberty*, 81.
21. Hayden and Despont, "Restoration of the Statue of Liberty," 222. Hayden and Despont, *Restoring the Statue of Liberty,* 80.
22. Robert Baboian and Blaine Cliver, "Corrosion on the Statue of Liberty: An Overview," in Baboian et al, 77.
23. Baboian and Cliver, 81.
24. Baboian and Cliver, 77, 81-82. Milton Einbinder, "Armature Replacement on the Statue," in Baboian et al., *The Statue of Liberty Restoration*, 129-130.

25. Baboian and Cliver, 82. Hayden and Despont, "Restoration of the Statue of Liberty," 222. Einbinder, 130. Hayden and Despont, *Restoring the Statue of Liberty*, 76.
26. Cliver, "The Statue of Liberty," 18. See also Thomas E. Graedel and John P. Franey, "Formation and Characteristics of the Statue of Liberty Patina," in Baboian et al, 101-108.
27. Cliver, "The Statue of Liberty," 18.
28. Baboian and Cliver, 77, 83.
29. Cliver, "The Statue of Liberty," 18.
30. Baboian and Cliver, 76. Hayden and Despont, *Restoring the Statue of Liberty*, 57.
31. Hayden and Despont, *Restoring the Statue of Liberty*, 55, 57.
32. Hayden and Despont, "Restoration of the Statue of Liberty," 220. Jean Wiart, "A New Torch for the Statue," in Babioan et al, 136. Babioan and Cliver, 76.
33. Hayden and Despont, *Restoring the Statue of Liberty*, 54-55. Cliver, "The Statue of Liberty," 18.
34. Cliver, "The Statue of Liberty," 18.
35. Cliver, "The Statue of Liberty," 18. Baboian and Cliver, 47.
36. Baboian and Cliver, 76, 79.
37. Hayden and Despont, *Restoring the Statue of Liberty, 55.*
38. Hayden and Despont, *Restoring the Statue of Liberty*, 55, 57.
39. Hayden and Despont, *Restoring the Statue of Liberty,* 54-55.
40. Cliver, "The Statue of Liberty,"19-20.
41. Babioan and Cliver, 80. Frances Gale and John Robbins, "Removal of Coatings from the Interior Copper at the Statue of Liberty," in Baboian et al, 117.
42. Hayden and Despont, "Restoration of the Statue of Liberty," 222. Babioan and Cliver, 81. Gale and Robbins, 117-119.
43. Hayden and Despont, "Restoration of the Statue of Liberty," 222.
44. Hayden and Despont, "Restoration of the Statue of Liberty," 223. Cliver, "Restoring Miss Liberty," 48-49.
45. Babioan and Cliver, 82. Cliver, "Restoring Miss Liberty," 48-49. Hayden and Despont, *Restoring the Statue of Liberty*, 87. Philippe Grandjean, "Designs to Move People through the Statue," in Babioan et al, 51-55.
46. Hayden and Despont, *Restoring the Statue of Liberty*, 71, 83-84.
47. Babioan and Cliver, 82. Hayden and Despont, *Restoring the Statue of Liberty*, 88-89.
48. Wiart, 131. Babioan and Cliver, 76.
49. Babioan and Cliver, 76.
50. Babioan and Cliver, 76. Wiart, 131.
51. Wiart, 136-137. Babioan and Cliver, 76.
52. Howard Brandston, "Seeing Liberty in a New Light," in Baboian et al, 59-61. Hayden and Despont, *Restoring the Statue of Liberty*, 67-69.
53. Brandston, 59.

CHANGES TO THE STATUE OF LIBERTY AND THE PEDESTAL, 1986-2009

PROBLEMS WITH THE PEDESTAL STONEWORK

While the focus of the restoration work in the 1980s was the Statue itself, work was also done on the pedestal, and some of that work continued beyond the restoration. The walls of the pedestal, along with those of Fort Wood, were pressured cleaned with water by Jet Stream Services, and the work was underway by May 1986. The granite facing of the pedestal was cleaned successfully, except for areas that had been stained during the restoration work itself. In June and later in the summer of 1986 Jet Stream tested various cleaning materials intended to remove the oil stains on the pedestal.[1]

THE REOPENING OF THE STATUE AND ITS AFTERMATH, 1986-1987

On the evening of July 3, 1986, before 4,000 guests on Governors Island and millions of television viewers, President Ronald Reagan pressed a button relighting the Statue of Liberty. The monument itself was reopened to the public with First Lady Nancy Reagan officiating at the ribbon-cutting during the morning of July 5; she then climbed up to the crown. Lee Iacocca, chair of the Statue of Liberty-Ellis Island Commission, turned the project back over to the National Park Service. A hundred French and American children who had won essay contests were on hand. More than a thousand people already on the island for the ceremony were joined by another 11,000 who arrived on Circle Line ferries leaving Manhattan beginning at noon to celebrate Liberty Weekend. At the end of the day hundreds of visitors were turned away when it was too late for them to climb to the top of the Statue; when 16 people refused to leave, they "were placated with a ride in the elevator in order to avoid marring opening day with arrests."[2]

According to the National Park Service's own reports, Liberty Island was not in the "super condition" that Iacocca had touted, and he had only ceremonially, not actually, turned the project back over to the National Park Service. Much work remained unfinished: the elevator, restrooms in the pedestal, and the public-address system were inoperative. The interpretive signs on the island proved "woefully inadequate" to serve the crowds of visitors." Ten days after the opening ceremony, with the incinerator still not working, a tower of trash 12 feet high filled the maintenance yard. The quality of the construction work at the Statue came under scrutiny when a visitor had to dodge a tumbling brass door closer and holes appeared in walls. An average of 12,500 people a day came to the island during the weeks immediately after the opening, and by the end of September visitation stood at 1.25 million, routinely overwhelming the facilities on the island.[3]

During the summer of 1986 Park Service staff raised questions about the need for more bracing to provide additional rigidity to the glass installations on the stairways and for additional glass in the pylon and pedestal to prevent visitors from touching the elevator components. Some additional railings were installed. Difficulties with the elevator and the incinerator were still posing "constant crowd control, safety and health problems" in late summer.[4]

CLOSURE OF THE AMERICAN MUSEUM OF IMMIGRATION AND REPAIRS TO FORT WOOD, 1990s

The opening of the Ellis Island Immigration Museum in September 1990 drew attention and resources away from the American Museum of Immigration on Liberty Island. In January 1991 the National Park service officially closed the AMI, but the Bartholdi Gallery, a gallery located at Level 2P**,** was created and remained open for another decade to exhibit some of the Statue of Liberty art that was part of the museum collection. Over time some of the AMI collections not related to the Statue or to Ellis Island were dispersed to other properties operated by the National Park Service, or to the owners that had loaned them, but once the Bartholdi Gallery closed, exhibits and partitions were also removed, leaving the foundation of the pedestal exposed.[5]

The Statue of Liberty-Ellis Island Foundation, which had funded the restoration of the Statue during the 1980s, continued to support a multitude of projects on Liberty Island during the 1990s; other construction projects were funded by the National Park Service. In 1995 foundation funding was authorized for upgrading the security and emergency-lighting systems and installing stainless-steel mesh in the elevator room in the pedestal. Also in 1995 the foundation funded design work for additional glass partitions to prevent public access to the air handlers at the base of the Statue.[6]

In 1997 the walls, stairwells, and tunnel areas inside the Statue were to be painted to match existing colors; this work was done by Coating Technology. More repointing of the promenade was done by Argus Landscaping. A new boiler plant was constructed by All City Plumbing and Heating Corporation in 1998. The endowment's authorized projects for 1999 included the installation of emergency battery-pack lighting within the Statue and the evaluation and repair of emergency lighting within the museum by Morgan Electric. Painting continued within the museum, and the elevator was rehabilitated. Plans for 2001 called for emergency battery-pack lighting to be installed in the pedestal.[7] With life safety issues in mind, the National Park Service began evaluating the possibility of no longer allowing visitors to climb to the crown of the Statue in 2000.[8]

CLOSURE AND REOPENING OF THE STATUE OF LIBERTY, 2001-2009

The events of September 11, 2001, had a major impact on visitors' access to the Statue of Liberty and resulted in many alterations designed to improve life safety for visitors and anti-terrorism security for the monument. Beginning on September 11 Liberty Island

and the Statue of Liberty were closed to visitors. On December 20, 2001, Liberty Island was reopened, but the Statue itself remained closed while improvements were made. In February 2002 the National Park Service consulted with John G. Waite Associates, Architects, who determined that the level of visitor safety had steadily decreased since the Statue first opened to visitors. The firm's design team undertook both a performance-based engineering assessment, as well as prescriptive code review of the entire island, focusing on the fort, Statue, and museum complex and making recommendations to allow a partial re-opening of portions of the monument. The following year EBL Fire Engineering and Highland Associates, Architects and Engineers, completed construction documents for this work.[9]

Better emergency egress for visitors was a primary concern. Openings were cut through the north and south sides of the American Museum of Immigration at Level 2P to allow visitors to exit from the promenade of Fort Wood by returning to the inside of the vacant museum and then proceeding to the sally port. At the same time, two sets of temporary stairs, constructed of heavy timbers, were erected alongside the exterior walls of the fort, so that in the event of an emergency visitors located at the promenade level could cross over the parapet and then descend to ground level. A new handicap ramp was installed between Level 2P and the exterior, and security gates were installed. At levels 0P and 2P the existing bronze doors dating from 1986 were replaced with similar new ones. The top of the pedestal was encapsulated with steel plates and glazing to protect the Statue from security threats from below. To improve fire safety a fire suppression-system was installed, along with a new fire pump, and more emergency lighting was introduced. During May and June 2004 the National Park Service undertook archeological work, including field monitoring, in areas affected by the installation of the temporary stairs and the metal fencing.[10]

The drawings for construction and the specifications, prepared by Highland Associates in New York, were issued on April 1, 2004, and the work was completed in time for the reopening in August 2004.[11]

In addition, the staff of the island's maintenance division constructed fire compartments and partitions throughout the monument. A new fire detection system was completed in 2007, and a building management system using direct digital controls is now used to regulate the mechanical equipment and the fire systems.[12]

The pedestal of the Statue (up to the promenade level at 6P) reopened to visitors on August 3, 2004, with a ceremony hosted by Secretary of the Interior Gale A. Norton, the National Park Service, and the Statue of Liberty-Ellis Island Foundation. The interior of the Statue itself remained closed to the public because it was determined that the two double helix stairways inside the Statue did not meet the minimum safety requirements of local, state, or national model building codes. However, visitors continued to have access to the interior of the pedestal and to the observation deck at the promenade level (6P) of the pedestal and its views of New York harbor, and they were able to peer into the interior of the Statue through the previously installed glass ceiling above the promenade at level 6P of the pedestal.[13]

From late 2008 to early 2009, the National Park Service conducted an engineering/safety study to determine what would be required to do to reopen the Statue Crown Observation Platform to safely allow public access.

In the spring of 2009, the National Park Service made safety improvements to the two double helix staircases in the Statue, as well as other miscellaneous improvements to enable the public to again safely visit the crown. From 6P to 7P in the pedestal, handrails were replaced. At level 7P in the pedestal, guardrails and handrails were replaced. From level 7P in the pedestal to level 4S in the Statue, handrails were replaced with handrails and guardrails on both the up stair and the down stair. From level 4S in the Statue to the crown observation platform, handrails were replaced on both the up stair and the down stair. A supplemental handrail was added to the up stair to provide additional safety in the event the up stair would have to be used as a down stair. At the crown observation platform, guardrails and handrails were replaced. Protective glass was installed at many locations from 7P in the pedestal up towards the crown in the Statue where handrails and guardrails were not feasible. In addition, the National Park Service added management actions to complement the safety improvements to ensure efficient egress from the Statue.

On July 4, 2009, the National Park Service reopened the crown of the Statue of Liberty to the public. [14]

NOTES: CHANGES TO THE STATUE OF LIBERTY AND THE PEDESTAL, 1986-2009

1. Some portions of the text in this section are based on John G. Waite Associates, Architects, *Fort Wood, Statue of Liberty National Monument, Historic Structure Report* (2009), 37-42. Ginsberg to Bellante, Nov. 13, 1985; Bellante to Ginsberg, Nov. 19, 1985; SLR, Box. 58, File 375. Robbins to Bellante, May 28, 1986, SLR, Box 58, File 376. Landsman to Robbins, May 30, 1986; Robbins to Lansman, June 4, 1986; SLR, Box 58, File 376. Totillo to Bellante, Aug. 11, 1986; copy supplied by Naomi Kroll. George Evans to Bellante, June 17, 1986, SLR, Box 58, File 376. Totillo to Bellante, Aug. 11, 1986, cited in Naomi Kroll, *Condition Survey, Construction History and Preservation Plan, Fort Wood, Statue of Liberty National Monument*, issued by the Architectural Preservation Division, Northeast Region, National Park Service, March 2006, 40.
2. Report, Staff Meeting, SOL NM, July 7, 1986, NPS Box T-6, File Correspondence July 1986. Calendar of events, *Newsday*, June 29, 1986. *New York Times*, July 4, 1986; July 6, 1986.
3. Report, Staff Meeting, SOL NM, July 7, July 15, July 22, Aug. 25, 1986, NPS T-6, File Correspondence Aug. 1986. SOL NM, Fiscal Year 1986 Annual Report, NPS T-6, Folder Correspondence Oct. 1986. Report, Staff Meeting, SOL NM, Sept. 22, 1986, NPS T-6, File Correspondence Sept. 1986.
4. Cliver to Associate Regional Director, Planning and Resource Preservation, July 29, 1986, SLR Box 58, File 376. Report, Staff Meeting, Aug. 26, 1986, NPS T-6, File Correspondence, Aug. 1986.
5. Barry Moreno, *The Statue of Liberty Encyclopedia* (New York: Simon and Schuster, 2000), 19. Email, Moreno, Judy Giuriceo to STLI staff, Feb. 2, 2001, copy provided by Diana Pardue. Conversation with Diana Pardue, April 25, 2007.
6. Statue of Liberty-Ellis Island Foundation, annual lists of approved projects, 1993-1996. Conversations with Diane Toland, April and May 2007. Email, Diane Toland to Diana Waite, May 22, 2007. Kroll, 40. Chandler McCoy, Task Directive, Investigate and Correct Leaking of Fort Wood Terrace and Statue Base, Div. of Cultural Resources Management, March 19, 1993; copy provided by Kroll. Memorandum, Chandler McCoy to Tom Bradley, Jan. 31, 1994; copy provided by Kroll. Cultural Resources Center, Building Conservation Branch, Specifications, Rehabilitation of Terraces at the Statue of Liberty, Jan. 1995; copy provided by Kroll. Memorandum, Architect to Larry Steeler, May 8, 1996; copy provided by Kroll.
7. Conversation with Peter O'Dougherty, May 2, 2007. Statue of Liberty-Ellis Island Foundation, annual lists of approved projects, 1998-2001. Conversations with Diane Toland, April and May 2007. Email, Diane Toland to Diana Waite, May 22, 2007.

8. Fran P. Mainella to Anthony Weiner, Aug. 4, 2006, files at Statue of Liberty National Monument and Ellis Island Maintenance Division.
9. Conversation with Diana Pardue, April 25, 2007.
10. Conversation with Peter O'Dougherty, May 2, 2007. Statue of Liberty National Monument and Ellis Island Maintenance Division, Annual Report FY 2001. Richard D. Holmes, *Archeological Investigations for the Temporary Stairs and Security Fencing at the Statue of Libery, Statue of Liberty National Monument, New York, New York* (New York: National Park Service, 2004), management summary.
11. Highland Associates, Drawings and Specifications for Life Safety Upgrade, Statue of Liberty National Monument, April 1, 2004, files at Statue of Liberty National Monument and Ellis Island Maintenance Division.According to the file of as-built submittals, c. 2004, files at Statue of Liberty National Monument and Ellis Island Maintenance Division, the following contractors undertook this work: General contractor: Joseph A. Natoli Construction Corp.; bronze entrance doors: Ellison Bronze Inc.; bronze and glass entrance vestibule: OldCastle Glass; coiling security doors: Cookson Rolling Doors; concrete: Tri-State Quikrete; doors and hardware: Galaxy Steel Door and Frame; electrical work: Starko Electrical Services; Fire protection: Landmark Fire Protection; Fire suppression system: C & S. Building Services; Fire pump: Joseph A. Natoli Construction Corp.; fire stairs: Safway Services, Inc.; dencing and gate: Ameristar (to design of Denver Service Center); granite: Philipsburg Marble Co.; HVAC: Design Aire Inc.; metal framing (ADA ramp): Lockwood Greene, Engineering and Construction; plumbing: F & G Mechanical; steel stairs: Fredon Welding and Iron Works; structural steel: Fredon Welding and Iron Works, Weir Welding Co.; timber stairs: Safway Services, Inc.; wheelchair elevator: Mobility Elevator and Lift Co.
12. Interview of Peter O'Dougherty, May 2, 2007. Email, Peter O'Dougherty to Diana Waite, May 24, 2007.
13. Fran P. Mainella to Anthony Weiner, Aug. 4, 2006, files at Statue of Liberty National Monument and Ellis Island Maintenance Division.
14. This text was kindly provided by Hugh Duffy, Project Manager - Design & Construction East, National Park Service, May 16, 2011.

EVOLUTION OF THE VISITOR'S ROUTE THROUGH THE PEDESTAL AND STATUE OF LIBERTY

Though some physical conditions have changed, and security is now a primary concern, the visitor's trek to reach the crown has remained remarkably consistent since the iron stair was installed in 1888. To trace the development of the visitor's route, the team looked at early guide books of New York City; searched online for journals describing visits; and read the National Park Service guides.

Early descriptions detailing the experience of touring the Statue are surprisingly rare. Nineteenth-century and early twentieth-century guidebooks to New York City usually focus on the experience of reaching the island, and then skip directly to the view from the balcony or the crown. Visitors' accounts list statistics, or, again, speak of the view from the crown. The passages in this section of the report are selected from the most helpful of the early sources.

FROM THE BOAT TO THE STATUE

From the first visit to the Statue until the changes made in 1907, the visitor's route to reach the base of the Statue, and ultimately the crown, remained unchanged. Stepping off of the boat onto the wharf, the visitor proceeded over the island to the west side of Fort Wood. Crossing a drawbridge over the moat that surrounded the fort, the visitor entered the sallyport gate and passed through the corridor that penetrated the thickness of the fort itself. At the far end of the passage was the parade ground that surrounded the exposed concrete foundation and pedestal of the Statue. Proceeding around the foundation to the east face of the monument, one encountered a series of wood steps and platforms that provided access to the base of the granite-clad pedestal and the east access doorway. This door provided the only entrance into the pedestal where the large, twenty-seven-foot shaft housing the internal cast-iron stair was situated.

The narrow stair extended upward in multiple runs to the top of the granite-clad pedestal, where an exterior terrace was situated. From this level, a pair of stairs ascended to the next level where the visitor gained access to the double helix stair that extended upward through the structural pylon to the platform in the crown.

It is the ascent in the Statue and the experience in the crown that the visitor's accounts seem to emphasize, rather than the experience of Fort Wood and the base of the Statue.

1887 - JOHN HALLAM

In his 1895 memoir, John Hallam, a Tennessee lawyer, claimed to have climbed up to the torch soon after the Statue was dedicated. This description seems to indicate that a food or

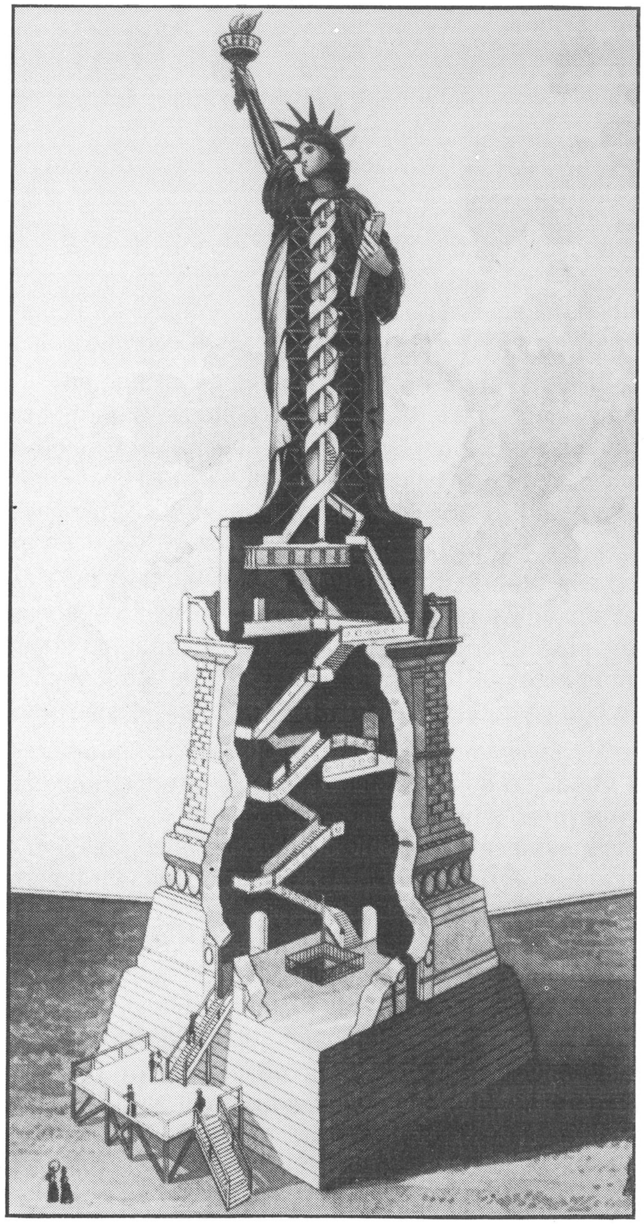


Figure 73. This diagram of the path through the Statue appeared in Rand McNally's Photographic Views of the Statue of Liberty and New York Harbor "From Recent Photographs," *1898. [Photocopy from Carole Perrault files, NPS, STLI, Ref.Lib.]*

drink concession was located somewhere in or near the base of the Statue, and that access was not tightly controlled.

> [In 1887] I stopped in New York several days on my return to Albany, where I had been many times before, but had not been up in that glorious inspiration of Bartholdi, the Statute [sic] of Liberty, on Bedloe's Island.
>
> I went early on the crowded steamer to the Island, and hurried up the supporting masonry to the base of the statue, where I found a soldier, with bayonet fixed, marching the circuit of the basement to prevent ascension. I gave him a silver dollar, provided he would descend to the basement and eat large Baltimore oysters with a bottle of wine. He laughed, and accepted the proposition, and long before he returned to duty I was standing in the hand of the statue, enjoying one of the most splendid prospects land or ocean affords, with libraries revolving in my mind. None other of the many hundreds who went for the same purpose made the ascension.[1]

1891- GUSTAV KOBBÉ'S GUIDE BOOK

The art and music critic Gustav Kobbé included a detailed guide to visiting the Statue in his guidebook, *New York and Its Environs*.

> The statue may be described as a draped female figure, crowned with a diadem, a flaring torch in the uplifted right hand, and a tablet held close to the body by the left. Its artistic value has been seriously questioned, but the fact remains that it is, next to the East River Bridge, the most imposing feature in the view of New York harbor from the south, and unqualifiedly the most imposing in any view of which the bridge is not a part. On fair days the steamer plying between the Battery and Bedloe's Island is crowded every trip. Admission to the pedestal and statue is free, a special permit being, however, required for admission to the right arm and torch. These permits are issued by the Major General commanding the Department of the Atlantic on Governor's Island, and by the Engineer and Inspector of the Third Lighthouse District, Tompkinsville, Staten Island. One hundred and seventy-three steps lead to the balcony on the pedestal; one hundred and sixty-four from the balcony to the head, which will comfortably hold forty people; and fifty-six from the head up the arm to the balcony around the torch, which will hold twelve people. *[Note that a ladder, rather than steps, beginning in the shoulder – not the head – ascends to the torch.]* In all, therefore, the steps number three hundred and ninety-three. Before beginning the ascent visitors are obliged to cheek overcoats, wraps, canes, umbrellas, etc., with the guard, who also lets out lanterns for a small fee. As the passage up and down the spiral stairways within the statue itself is in places very dark, the use of lanterns is advisable. The ascent to the balcony is easy, and one which all visitors should make, as from this point a superb view of New York and of the East River Bridge is had. Governor's Island, with its green mounds and its fortifications mellowed by age; the superb sweep of the waters of the harbor around the Battery into the North and East rivers, the cluster of towers and spires and the noble span of the bridge, a model of strength and grace—these are the chief elements in a view in which the grand and the picturesque are wonderfully harmonized. The ascent through the statue itself is arduous, and should not be attempted

> by any one who is nervous or not in prime physical condition. There are windows in the diadem from which a magnificent view is to be had, and that from the torch balcony is still grander.[2]

1902 "SEEN AND HEARD"

In his periodical "Seen and Heard," the Philadelphian publisher Louis N. Megargee provided one of the most detailed (and entertaining) early accounts of visiting the Statue. The article, which appeared in the February 26, 1902 issue, began with a few pointed comments concerning New Yorkers:

> …It never has become a fashionable fad for New York people to visit the Statue of Liberty. In fact, the only time the vast majority of them ever appear to think of it is, when crossing the North River or the bay, they carelessly, with a gesture of the thumb, say to an acquaintance who is a stranger in the city: "There is the Liberty Statue." Few of them ever think of inspecting it or admiring the grandeur of its colossal curves. I doubt if there is a society woman on Manhattan Island who has ever been within the statue, and I am very certain that there is not a New York dude in existence who has the courage or endurance enough to climb into the corona which surrounds the brow of the goddess. Those who visit Liberty Island, especially during the autumn, winter, and spring, are almost exclusively visitors to New York City. The daily average the year around is about 200. A considerable proportion, and these are the most enthusiastic and critical in their praise of the statue, are foreigners.[3]

After describing the island and charitable organizations, Megargee went on to describe the tour.

> Every American who can should feel it a duty to pay one visit at least to this shrine of Liberty which a Sister Republic has erected at the gateway to the continent. The trip is both interesting and charming. A small steamboat carries visitors from the Battery, making hourly trips at this season of the year and double that number when warmer and more inviting weather approaches.[4]

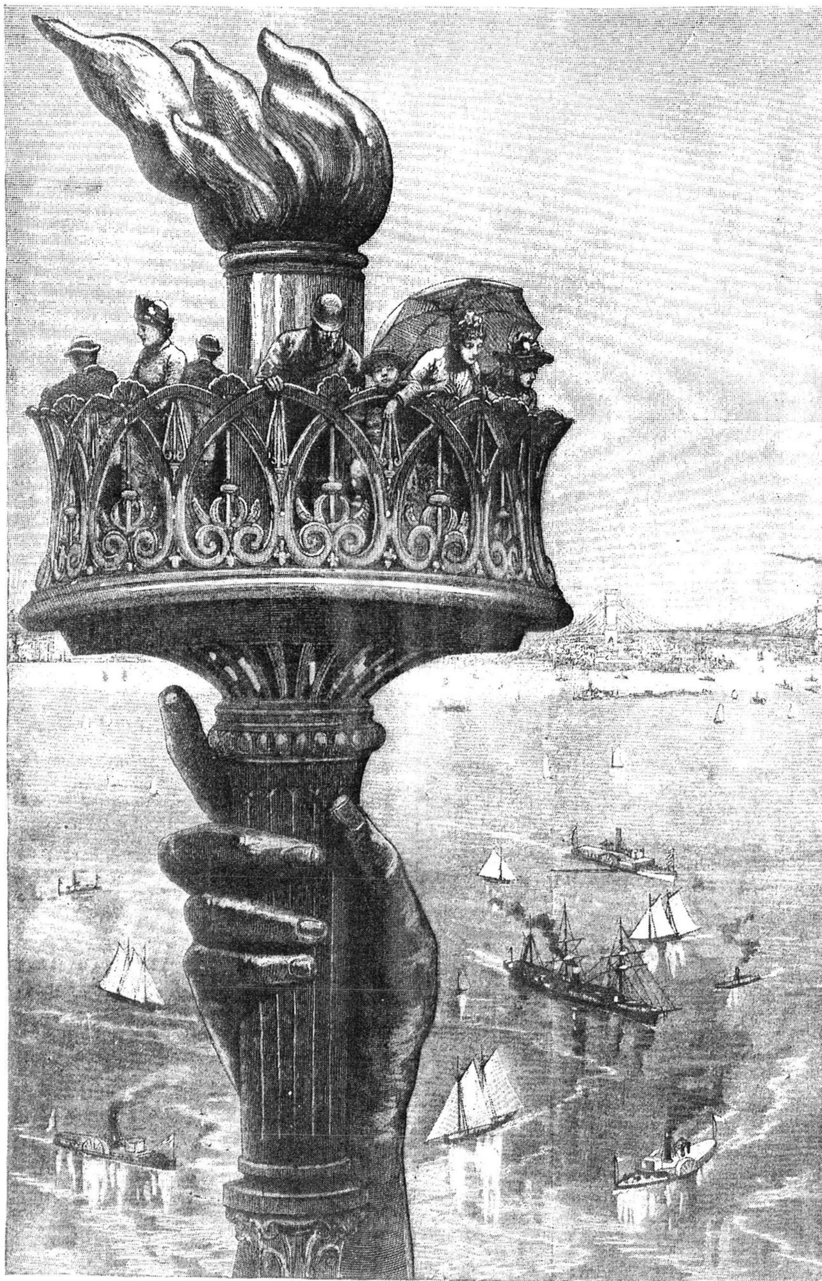
Upon reaching the island

> The entrance to the island is across a long wharf, and then the fort is entered, the moat crossed, and the access gained to the pedestal. Its stairways of stone are broad and well lighted [*in fact, the stairs within the pedestal were made of cast iron and were very narrow, only about two feet wide*], and when the greater part of its 154 feet have been mounted, access is had to a balcony which surrounds it on all sides, and from which a glorious view can be had of New Jersey, the lowlands of Staten Island, the highlands beyond Sandy Hook and marking one side of the Narrows; the richly peninsulared sands and marshes of Long Island, and Brooklyn and New York bound together by what from that distance appears like the fragile threads of the great bridge. Just before this point is reached, the visitor who intends to climb into Liberty's crown has been prepared for the journey.[5]

Once in the pedestal, the path outlined by Megargee matches that of Kobbe's, but includes a few more colorful details.

> Thus far there has been neither let nor hindrance to those ascending. There is no doorkeeper at the base of the pedestal, no catch-penny device encountered; everything is as free as the air, as free as liberty itself. Nor is there any change in this programme even when, near the top of the pedestal, a blue-capped watchman is met. He presides over a register in which he insists the name of every visitor shall be entered. Yet there is no charge connected with his services. But the welcome in his unctuous Irish brogue is so great and his further attentions so courteous that it is scarcely likely any one who has ever met him fails to increase the expense of the trip to Liberty Island. "Sure you can't go up with that high hat on, sir. You will knock the top of it clane off in climbing. Lave it with me sir, and take this soft one of mine. It is old, but it is clane. An' is your overcoat (feeling it) heavy enough? I can lave you have a good thick one, but I guess yours will do.
>
> These are the first suggestions that there is anything out of the ordinary connected with the ascent, which has thus far been quite commonplace. The wonder, if no alarm, which these preparations create is not lessened when the watchman turns to a row of six lighted swinging lamps, such as railroad brakemen carry, and hanging one forth says: "Kape it close to your feet and you will get along safely. The managers don't provide these; this is my belongin's, but you are welcome to it." The top of the pedestal is reached and light is left behind when the balcony to which I have referred before is underneath. Then the reason for the lighted lantern is discovered. Above is almost impenetrable darkness, with nothing but shadow suggestions of an intricate mass of enormous metal braces shown but slightly and for a few feet ahead by the faint rays from large lamps, whose gleams cannot reach far, owing to the mass of metal work which surrounds them. There is a way to go up and a way to come down, and plainly printed signs at the beginning of the climb indicate which is to be taken by the one ascending. But the signs say more, and when timid persons read to the end they incontinently turn tail, and their ascent ends then and there. The announcement which causes this retreat reads as follows:---
>
> VISITORS ENTER THE STATUE
>
> AT THEIR OWN RISK
>
> *****
>
> This is certainly not reassuring. There is no suggestion as to what the "risk" may be; simply a vague warning creating a vaguer terror. But up we start, even if hearts are in throats and knees a trifle shaky, and in a moment there is the darkness of the tomb. The steps are wide enough for exactly one person, and that person of narrow width. The dim light from the lantern, which is held in one hand while the other clutchingly feels the way, reveals the fact that the steps are of bronze, and the metal sends forth a ghostly clang as anxious toes knock against each coming step in order that there may be a certainty as to the firmness of the position on the one at foot.
>
> Every few feet --- certainly not more than ten feet--- there are skeleton-like metal embrasures in the hand rail in which the weary traveler can rest, if he has no objection to the knowledge that he is practically sitting in space, and space which is inky black and

144 THE STATUE OF "LIBERTY."



THE STATUE OF "LIBERTY."—VIEWING THE HARBOR FROM THE TORCH IN THE HAND OF THE STATUE.—SEE PAGE 129.

Figure 74. An artist's rather optimistic conception of visitors at the torch, from Frank Leslie's Illustrated Newspaper*, June 20, 1885. According to Louis N. Megargee, visitors could not take umbrellas up into the arm of the Statue. [Library of Congress]*

> impenetrable. The wise traveler, however, will use them at frequent intervals, as otherwise, when the more trying descent is made, the tired knees, uncontrollable by newly-used muscles, will be found to be decidedly shaky. The visitor who makes the journey, as I did, from bottom to top--- beginning in a hurry to get through the "risk"--- with only one rest, reaches the top bathed in perspiration and panting for breath. The stopping place is within the statue on a metal platform, which will hold not more than four persons. It is in that portion of the corona, directly above the hair of the goddess and some distance higher up than her twenty-eight inch eyes and her nose of three fee and nine inches of aquilineness. The torch is still thirty-five feet higher in the air, but access is had to it by another direction and through the right arm. That journey is only made by the men who every morning change the carbons in the electric light which sends its rays out to sea further than any light in the world.[6]

Megargee's description of the platform in the crown is one of the few to acknowledge that only a few people could fit in the space, for instance, Kobbé's guidebook claims that forty people could fit comfortably. Megargee also noted that the window openings in the crown could be temporarily covered:

> From the platform within Liberty's crown, through openings in stormy weather which can be covered with heavy glass, stretches forth the beauty of which demonstrates more than anything else, excepting only the statue itself, the genius of Bartholdi…[7]

This tribute to the wonders of the Statue was followed by a diatribe against the government for its neglect of the site.

1904 - NEW YORK TIMES

An article on the adventures of two young women at the Statue in April, 1904, gives a different perspective on the visitors' experience and a glimpse of the security in place at that time. On April 5, 1904, seventeen-year-old Grace Tojetti and her friend Johanna Luehrs (a stenographer at Ellis Island) met for a day of sightseeing.

> After they had seen all there was to be seen on Ellis Island, Grace and Johanna set sail for the Battery. By the time they had arrived there the breezes of Spring on the North River had aroused the "go-fever" in their veins. The extended arm of Dame Liberty beckoned, and the girls accepted the invitation.
>
> They reached Liberty Island, climbed the winding stairs to the top of the statue, and there tarried awhile.
>
> "Isn't it magnificent?" said Grace Felicia, drinking in the beauty of the sunlit panorama.
>
> …"Just lovely," said Johanna. "I could stay here forever."
>
> Time slipped by unnoticed, until the sun cast Liberty's shadow half way to Brooklyn. Then it occurred to the girls that Mrs. Tojetti might be anxious if they didn't get home before dark. They hurried down the winding stairs and found—woe unspeakable—that the door had been closed and locked for the night! *[This door was probably the single access door at level 3 in the base of the pedestal.]*

At first the girls thought it was "rather good fun" and went back to the top of the statue. But presently the sense of imprisonment cast a different light upon the situation. The sun had gone to bed; there was gloom upon the land, and the tooting of whistles was like mockery. So Grace and Johanna went down again and knocked at the door and cried for release, but in vain. They kept this up for nearly an hour or more; then gave up and sat down to have a good cry. Johanna took it all back about "staying there forever."[8]

As their families became increasingly frantic,

… the girls in the Bartholdi statue had found a window on the second floor, and there they sat down and wept, for they were cold and hungry. Now and [smeared – then?] they shouted, but no one appeared until late, when a man approached with measured stride and a mysterious, shining something on his shoulder. *[The window was probably one of the openings to the balconies now designated level 4P or level 6P.]*

"Gracious!" whispered Johanna, "he's got a gun!"

The sentry – for the man was a soldier – evidently had heard their cries.

"Who goes there?" shouted the sentry, bringing his rifle to port.

"It's just us," replied Grace Felicia timidly, "and we can't go anywhere until you let us out."[9]

The girls were put into the care of the surgeon's wife, fed, and entertained by the post band. The next morning, when the early boat failed to arrive, "Honest Bill" Quigley, a Battery boatman, returned them to Manhattan.

1940-1979 NATIONAL PARK SERVICE BROCHURES

The first official guide to the Statue appears to have been produced by the National Park Service in 1940, after the completion of the interior renovations. The description of the tour changed little over the next twenty years.

> Visitors to the Statue of Liberty National Monument now arrive at Bedloe's Island by boat from South Ferry Landing in Battery Park, the southernmost extremity of Manhattan. The entrance to the monument is through the high scarped walls of old Fort Wood. The portal, originally one of two sally ports, is flanked by heavy doors 6 inches in thickness.
>
> The walls of the fort, more than 20 feet thick at the base, are pierced by a corridor of brick vaultwork which opens into the passageway leading to the stairway and to the elevator within the pedestal foundation.
>
> There is a 5-cent fee for use of the elevator which takes the visitor to the balcony level, near the top of the stonework…
>
> …During pleasant weather, many visitors take the stairway from the sally port corridor to the promenade which, more than 50 years ago, was the terreplain or gun platform of the old fort…
>
> Now paved, the space between the wall and the terraced lawn surrounding the pedestal provides a pleasant walk and affords an opportunity to study the details of the statue's construction. In the 11 salient points of the old wall are the 96 lamps that provide the nightly illumination of the statue.

From the promenade there are stairs that lead to the second level *[now level 3P]* within the pedestal. Here are the dedication tablets presented by the Franco-American Union, donor of the statue, and the American committee which erected the pedestal. The bronze tablet bearing the Emma Lazarus sonnet, "The New Colossus," is also on this floor.

Six stories above is the fourth level [now level 6P], at the foot of the statue, from which one may ascend the spiral stairway system to the crown, 12 additional stories above. There are two stairways, each of 168 steps, winding around the same central column within the towerlike supporting structure of the statue. One is for the ascending traffic and the other for returning visitors.

There are two rest platforms, situated at one-third and two-thirds of the distance to the top, which enable visitors to pause without delaying those behind them. Those who do find the climb too arduous may cross over to the descending stair.

The right arm which holds aloft the torch has been closed to the public for many years. The ladder in this arm is now used by the maintenance staff in replacing the lighting system for the torch.

At the top of the stairway, the observation platform within the head is 260 feet above sea level, and is large enough to accommodate 30 people. Visitors may look out through a series of 25 windows that are the jewels of the crown below the 7 rays of the diadem.

…Visitors can see more of the statue by walking down the stairs in the pedestal to the promenade. However ,those who wish to pay a 5-cent fee can ride down on the elevator.

Exhibits offering a full understanding of the beginning and construction of the pedestal are available at the various levels within the pedestal. Other exhibits and displays for the public waiting room and museum are being prepared.[10]

That guidebook also promised changes for the future:

In order that the statue may be presented in its full significance, the National Park Service is preparing extensive plans for the development of Bedloe's Island. The present approach by boat which brings the visitor under the very feet of the Goddess of Liberty will be changed to permit circling the island in order to give a better view from the harbor. As seen from the boat, the statue will appear as if rising from a wooded island, since all the buildings are to be placed in the far background. After arriving at the new pier on the island, the visitor will approach the statue over wide, tree-lined walks, passing the new administration and concession buildings on the way to the old fort sally port.[11]

The guidebooks from 1943, 1948, 1950, and 1966 list similar routes.[12]

The next significant change in the interpretive route occurred after the construction of the American Museum of Immigration. The 1979 guidebook includes the new spaces (and increased fee for the elevator).

Once you get to Liberty Island, follow the broad mall to the statue. Inside the lobby, on the left, is an information desk…

…From the lobby, proceed up the steps to the balcony level. To the left and one flight up is the American Museum of Immigration. To the right is the Statue of Liberty Story Room which leads to the entrance to the statue. This area tells how the statue was constructed.

…You can reach the top of the pedestal by either elevator or stairs. The elevator, for which a 10-cent fee for all persons 16 and over is charged, goes only to the top of the

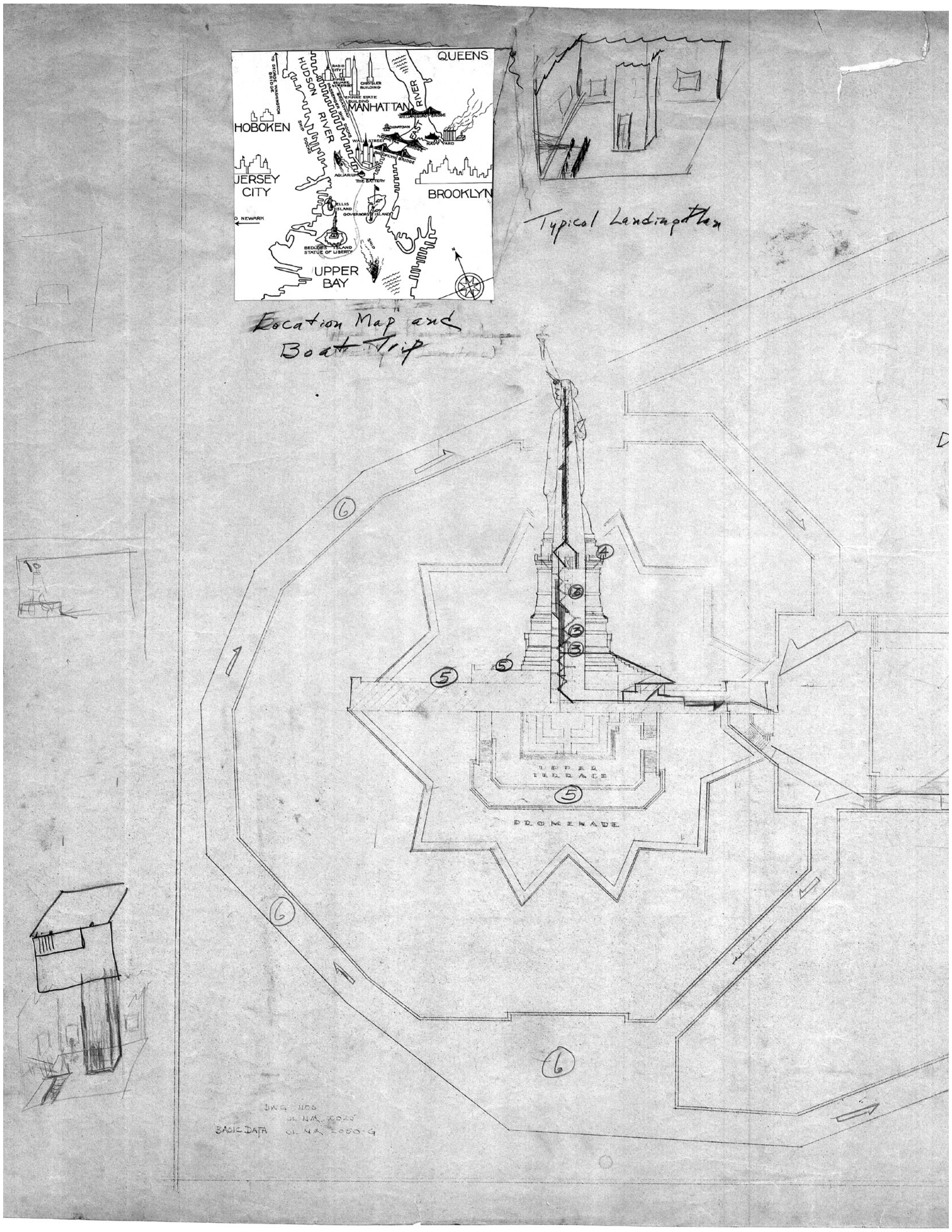


Figure 75. Detail from a National Park Service April 16, 1940 drawing done for an interpretative tour plan. At this time, a new terrace had been proposed at the base of the pedestal. Image enhanced to increase contrast. [NPS, STLI, Ref.Lib., LCS 22568 BPC STLI 04, FOLDER 1, STLI 36761]

> pedestal. From this level, ascent to the statue's crown is by spiral stairway only. The climb is equivalent to 12 stories.
>
> …Access is to the crown only. The torch is structurally secure, but it has been closed to visitors since 1916 because of the congestion that would result along the narrow, 13-meter (2 foot) ladder. At the museum level at the foot of the pedestal is a promenade which is accessible from the lobby below. The promenade, situated above the original Fort Wood, surrounds the statue and has wayside exhibits…[13]

1990-2009

With the 1980s restoration of the Statue, and the 1990 opening of the Ellis Island Immigration Museum, the route to the Statue changed yet again, and the path has remained relatively consistent since (although additional security measures were added after September 11th, 2011). Visitors now enter through the large bronze doors on the west side of Fort Wood, and then enter a large, two-story lobby. Stairs lead to an exhibit on the design and construction of the Statue that extends along the north and east sides of the pedestal, and visitors then arrive at another lobby that allows them to continue up into the pedestal or exit out onto the Grand Promenade. Those who have tickets to the crown can continue up from 6P to 7P and up the double-helix stair to the crown.

Immediately after the events of September 11, 2001, Liberty Island and the Statue of Liberty were closed to visitors. Liberty Island reopened on December 20 of that year, but the pedestal and Statue remained closed until August of 2004, when visitors could again enter the pedestal after modifications to improve emergency egress. Those who climbed to 6P could see glimpses up into the Statue through glass panels installed between the large structural beams. In 2009, visitors were again allowed access up to the crown.

NOTES: EVOLUTION OF THE VISITOR'S ROUTE

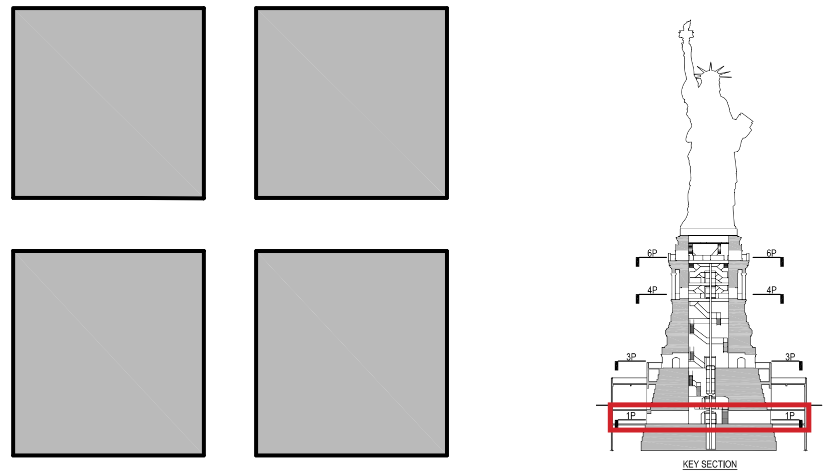
1. John Hallam, *The Diary of An Old Lawyer: Scenes Behind the Curtain* (Nashville, Tenn.: Southwestern Publishing House, 1895) 431.
2. Gustav Kobbé, *New York and Its Environs* (New York: Harper & Brothers, 1891) 71-72.
3. *Seen and Heard*, Vol. II (Feb. 26, 1902), 264-265.
4. Ibid., 266.
5. Ibid., 267.
6. Ibid., 268-273.
7. Ibid., 273.
8.. *New York Times*, April 6, 1904.
9. Ibid.
10. United States Department of the Interior, *Statue of Liberty National Monument: Bedloes Island* (New York: U.S. Government Printing Office, 1940) 9-13, in Statue of Liberty Guides and Brochures, Box 1, STLI.
11. Ibid., p. 9
12. Statue of Liberty Guides and Brochures, Box 1, STLI.

13. United States Department of the Interior, *Statue of Liberty National Monument, New York* (Washington, DC: General Printing Office, 1979).

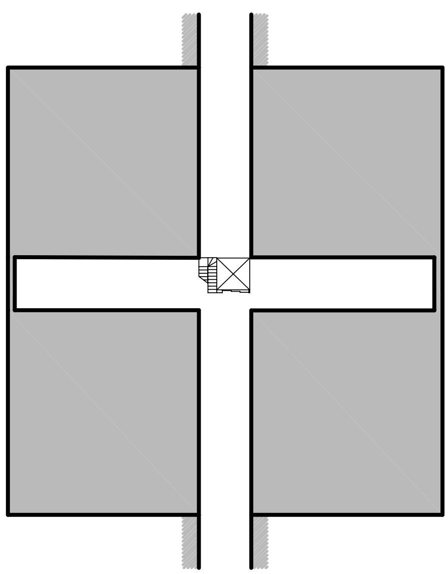
EVOLUTION SKETCHES AND DRAWINGS

The following plans illustrate the evolution of the four primary levels in the foundation and pedestal from 1888, the year that the original cast-iron stair was installed, until 1986 when the most recent renovation and restoration was completed. Significant changes made in the intervening years include the installation of the first elevator in 1907; the installation of the new stair system and elevator completed in 1937; and the construction of the American Museum of Immigration (AMI) completed in 1967.

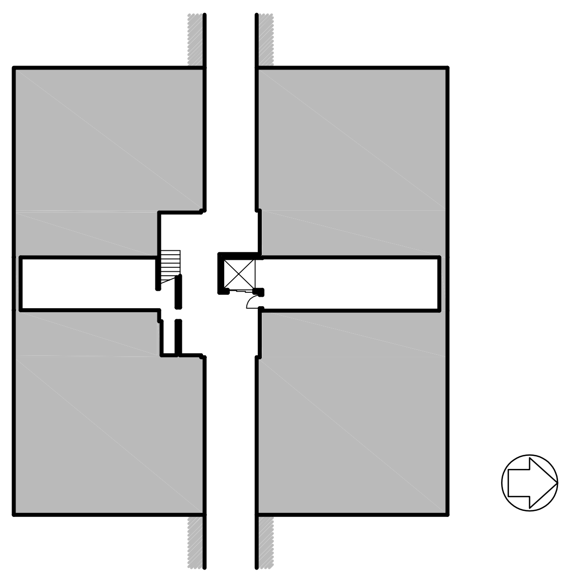
After the plans, a series of sketches show the changes in the entrance to the pedestal and foundations.



Level 1P - 1888

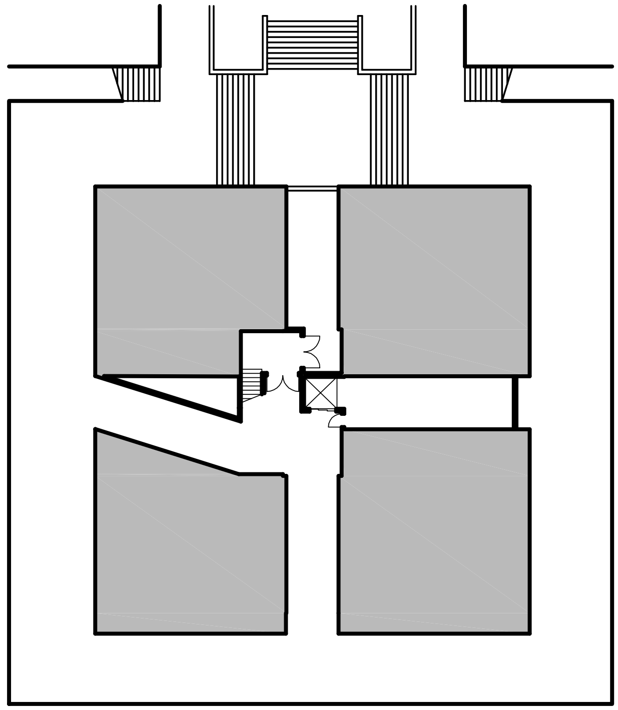


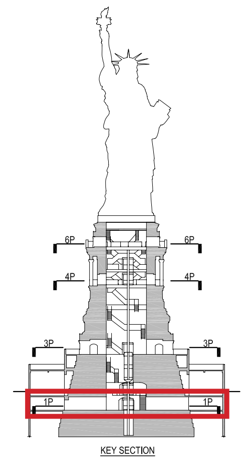
Level 1P - 1907
(first elevator installed)



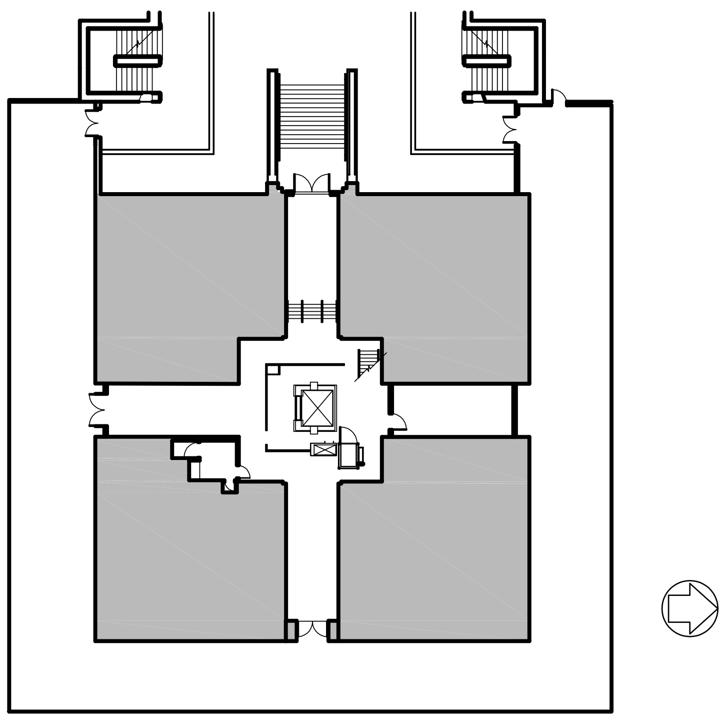
Level 1P - 1937
(new stair and elevator installed)

Figure 76. Evolution plans for level 1P: 1888, 1907, 1937



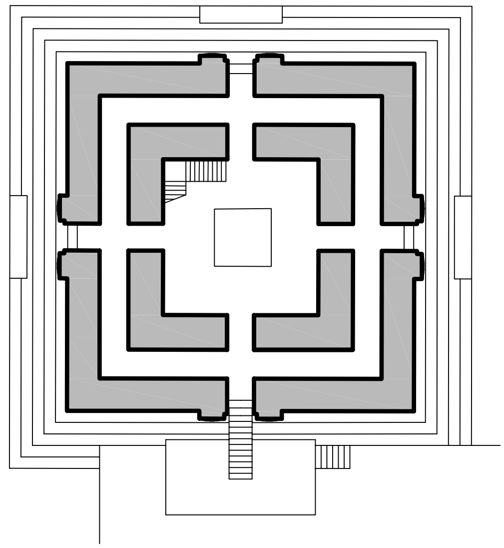


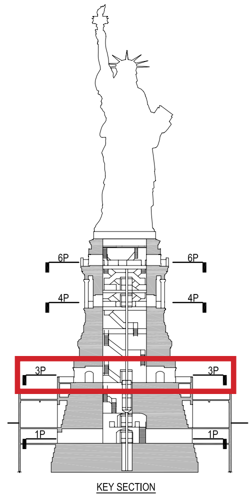
Level 1P - 1967
(construction of AMI)



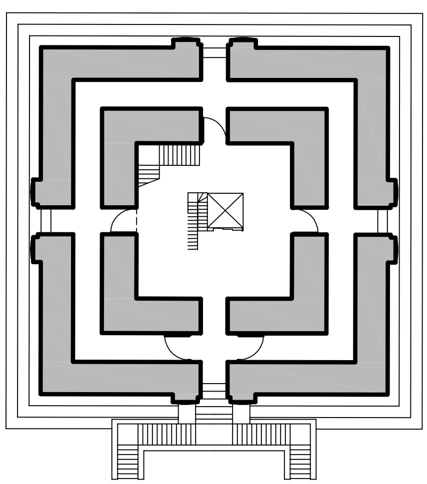
Level 1P - 1986
(restoration and renovation; new stairs and elevators)

Figure 77. Evolution plans for level 1P: 1967, 1986

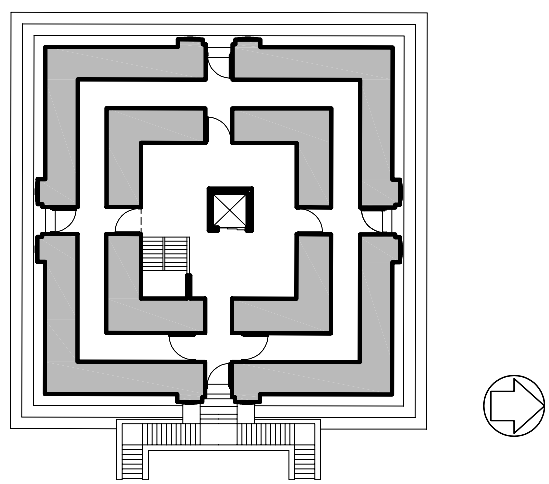




Level 3P - 1888
(original cast-iron stair installed)

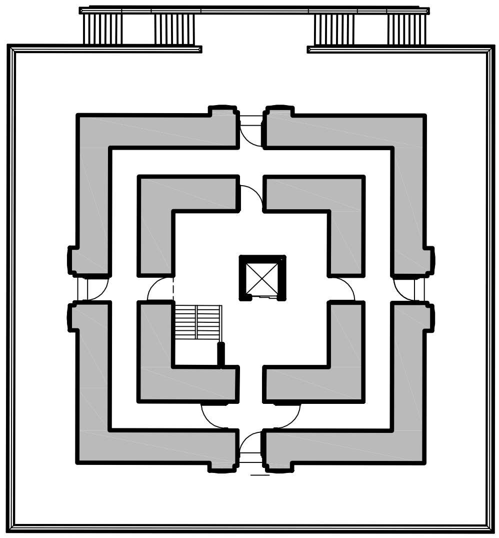


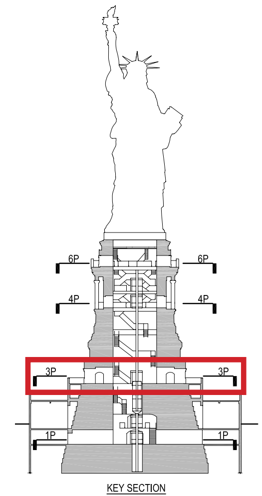
Level 3P - 1907
(first elevator installed)



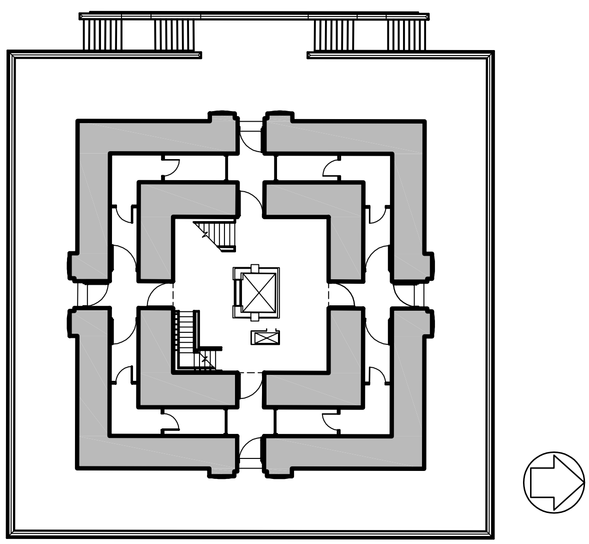
Level 3P - 1937
(new stair and elevator installed)

Figure 78. Evolution plans for level 3P: 1888, 1907, 1937



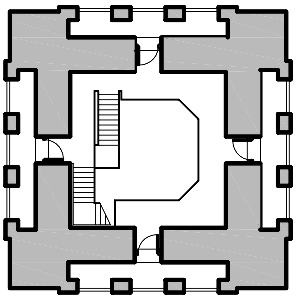


Level 3P - 1967
(construction of AMI)

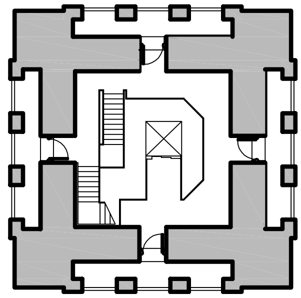


Level 3P - 1986
(restoration and renovation; new stairs and elevators)

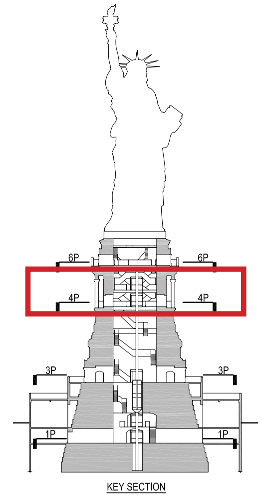
Figure 79. Evolution plans for level 3P: 1967, 1986

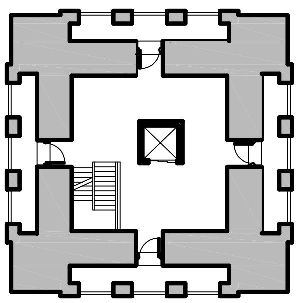


Level 4P - 1888
(original cast-iron stair installed)

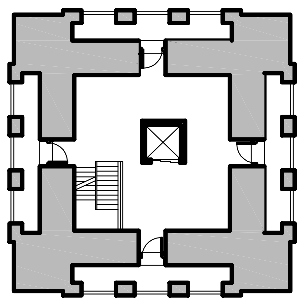


Level 4P - 1907
(first elevator installed)

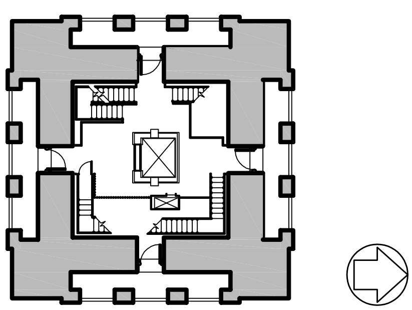




Level 4P - 1937
(new stair and elevator installed)

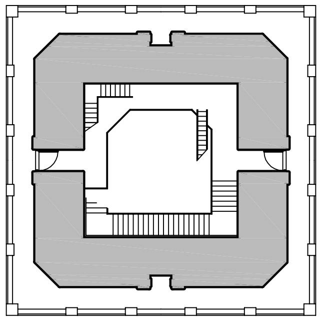


Level 4P - 1967
(construction of AMI)

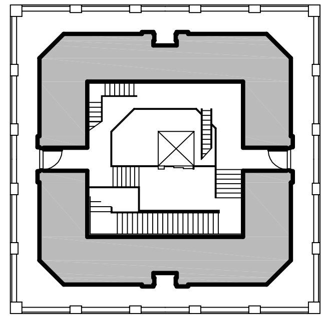


Level 4P - 1986
(restoration and renovation; new stairs and elevators)

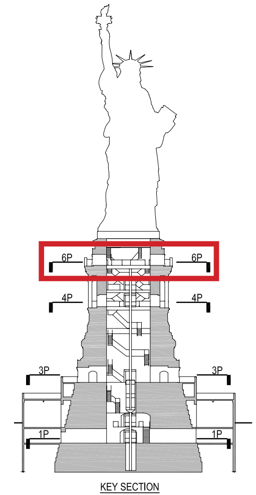
Figure 80. Evolution plans for level 4P: 1888, 1907, 1937

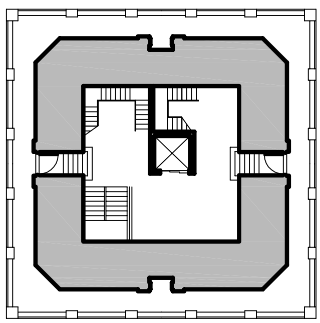


Level 6P - 1888
(original cast-iron stair installed)

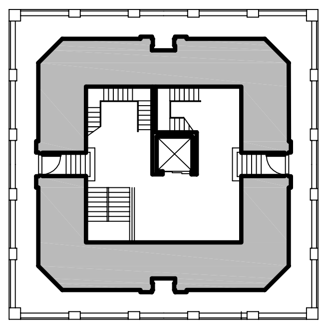


Level 6P - 1907
(first elevator installed)

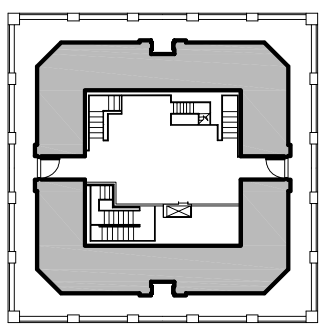


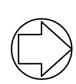


Level 6P - 1937
(new stair and elevator installed)



Level 6P - 1967
(construction of AMI)





Level 6P - 1986
(restoration and renovation; new stairs and elevators)

Figure 81. Evolution plans for level 6P: 1967, 1986

The following sketches illustrate the evolution of the entrance into the foundation and/or pedestal.

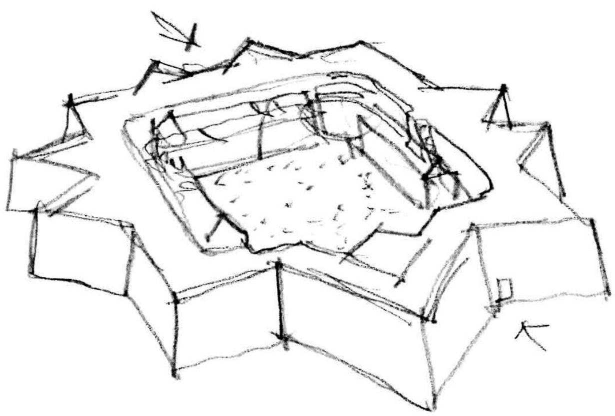


Figure 82. Fort Wood in 1846. [JGWA, 2010]

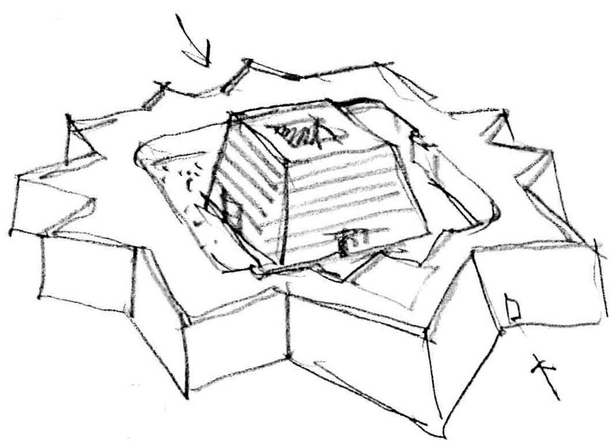


Figure 83. The foundation under construction in 1884. [JGWA, 2010]

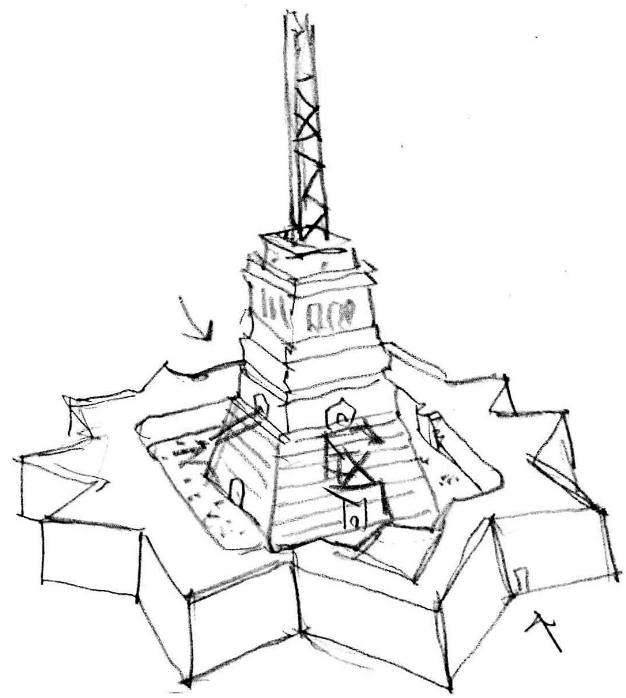


Figure 84. The pedestal construction in 1885. [JGWA, 2010]

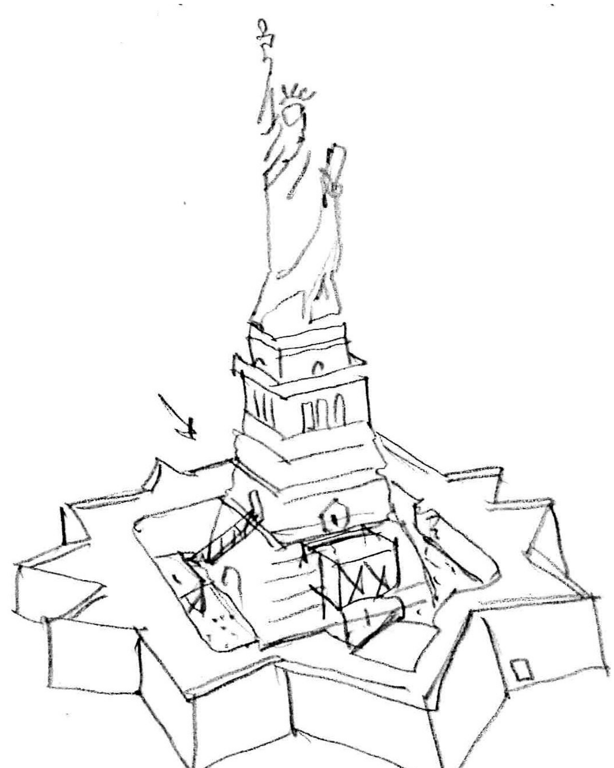


Figure 85. The Statue in 1886. The main entrance is through the rear sallyport, then up a wood staircase to level 3P. [JGWA, 2010]

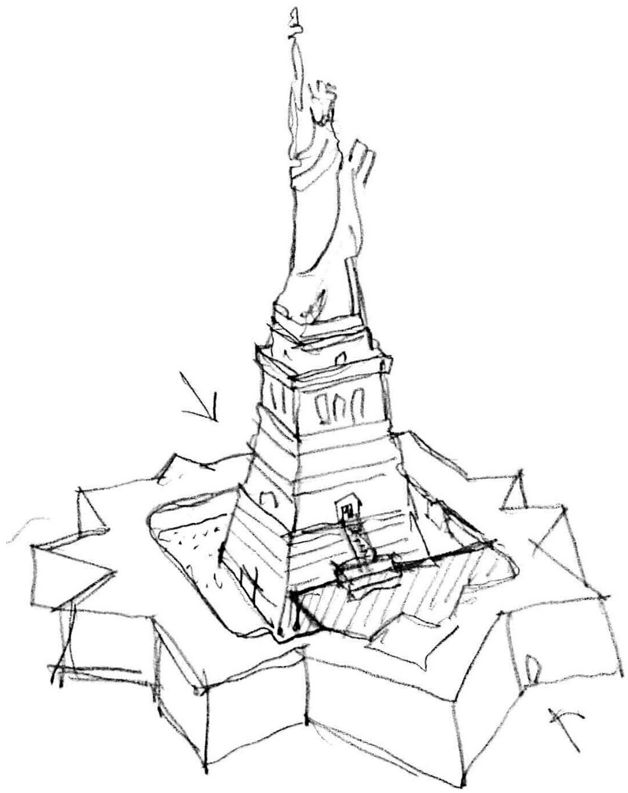


Figure 86. The Statue in 1890 (based on a photograph published in St. Nicholas *magazine; see Figure 32). [JGWA, 2010]*

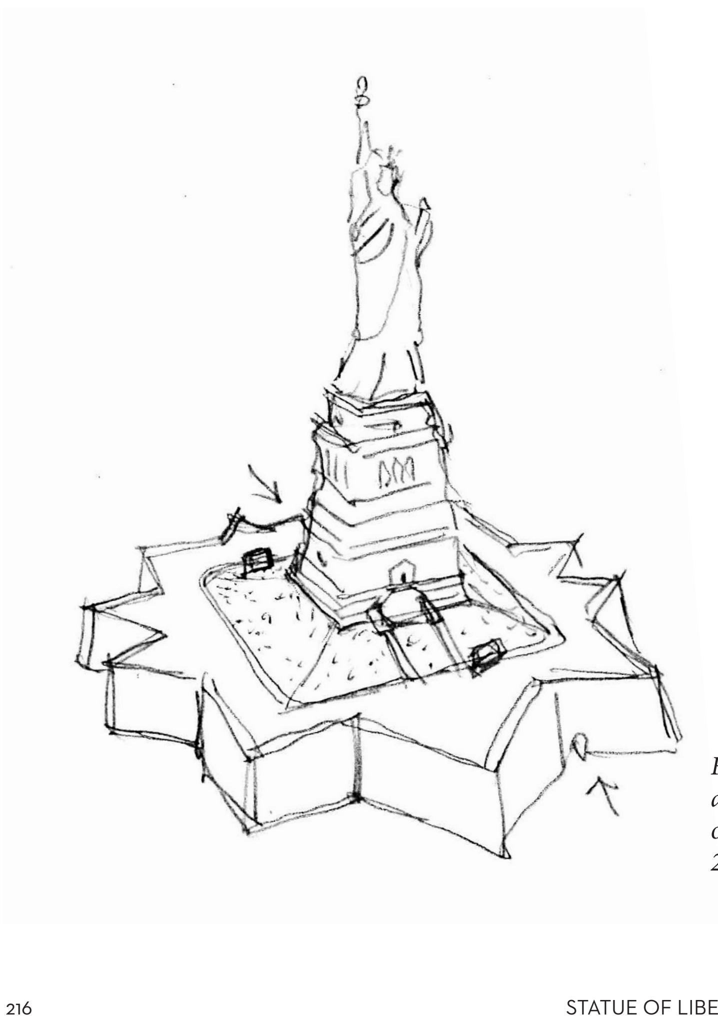


Figure 87. The Statue in 1908, after the entrance on the east side of the pedestal was built. [JGWA, 2010]

Figure 88. The Statue in 1972, after the construction of the American Museum of Immigration. [JGWA, 2010]

Figure 89. The Statue of Liberty from the torch in October 2010. [JGWA, 2010]

PHYSICAL DESCRIPTION

The following description of existing conditions is based on field visits made in 2010 by John G. Waite Associates staff. The assessment begins with the exterior walls of the pedestal, and then proceeds with the interior, using the National Park Service designations for the levels in the pedestal and Statue. For clarity in referring to individual rooms, JGWA assigned each space in the pedestal a room number. Spaces in the pedestal at levels 0P-2P were included in the Fort Wood Historic Structure Report; the descriptions of those spaces have been expanded and updated for this report.

Because the Statue and pedestal do not face true north, it can be confusing to identify spaces using compass points. After discussion with the park staff it was determined, for this conditions assessment, to establish a plan north, with the main entrance as the west compass point and the Statue facing east.

The Statue of Liberty is generally in good condition. It receives regular and dedicated maintenance; however, it suffers from the constant demands of visitation and from high operational costs that limit extensive curatorial care. While the 1984-1986 restoration was well planned and executed, this work was completed approximately twenty-five years ago, and no program for monitoring soil deposition or degradation of the metal and stone has been instituted. Neither has a program been implemented for systematic exterior cleaning or repair.

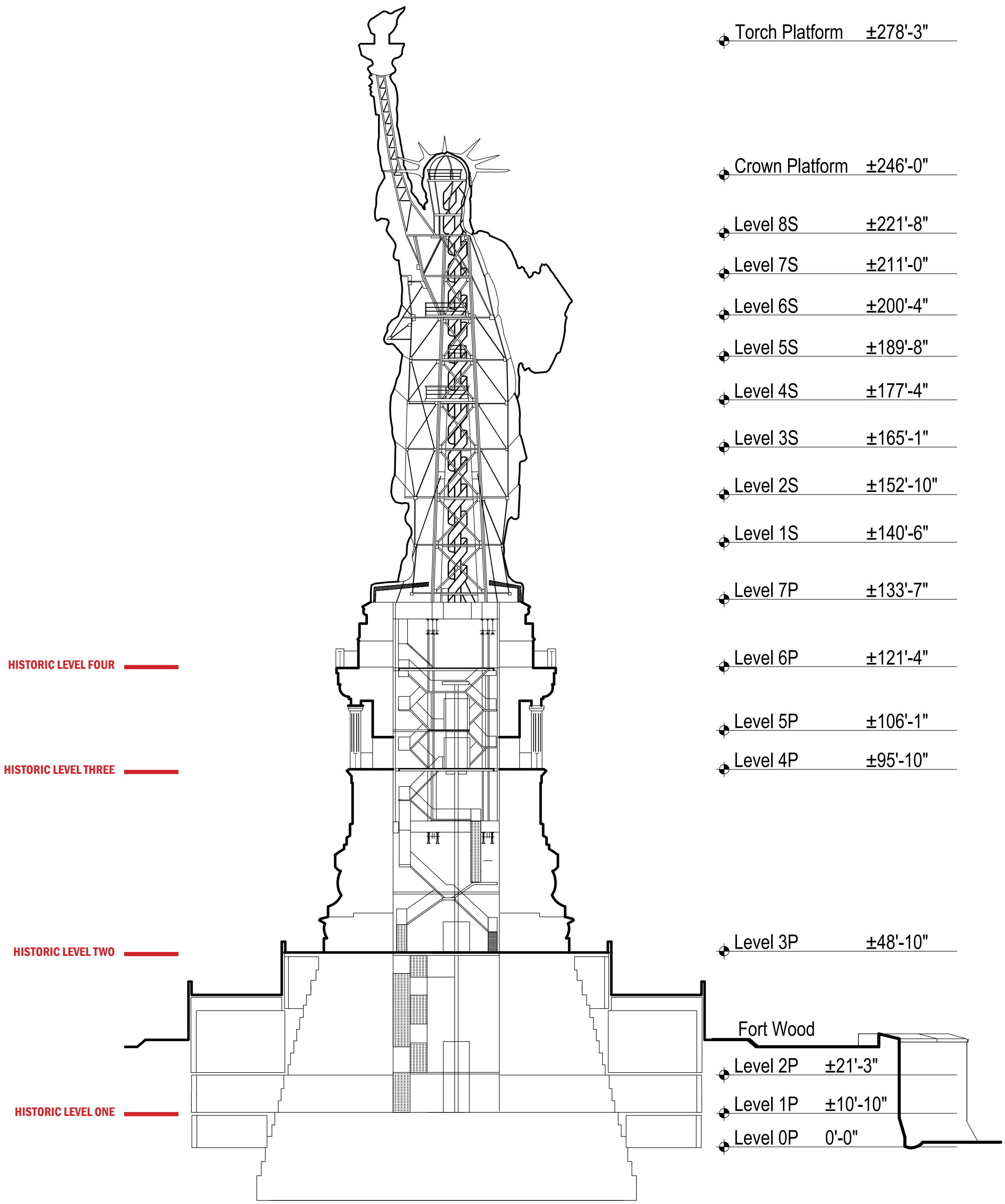


Figure 90. Key section. Historic level designations are shown in red.

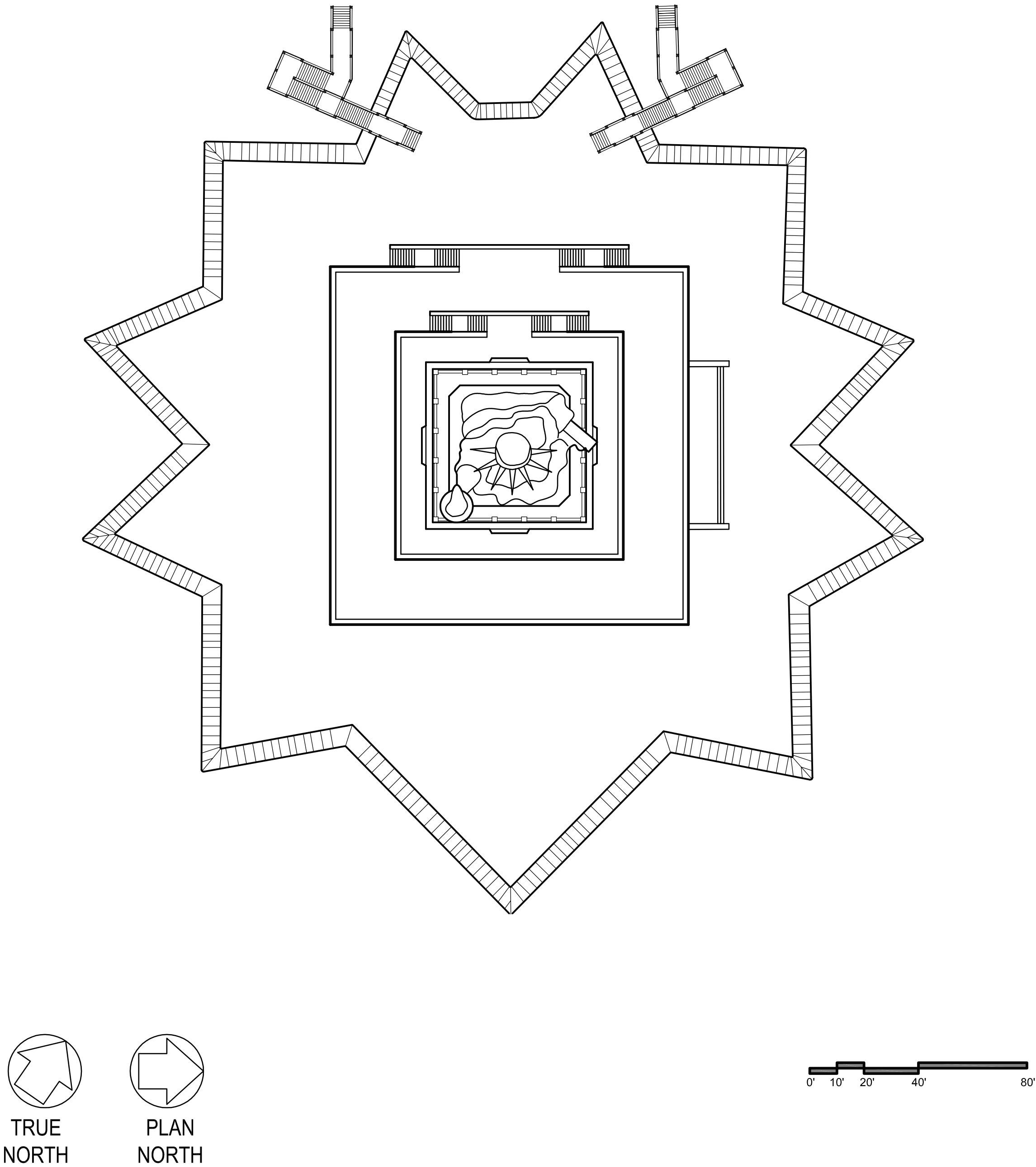


Figure 91. Key plan of Statue of Liberty and Fort Wood. [JGWA, based on ongoing HABS/HAER drawings]

PHYSICAL DESCRIPTION

EXTERIOR

As it now exists, the original exposed portions of the Statue of Liberty National Monument consist of Richard Morris Hunt's granite pedestal and Frederic-Auguste Bartholdi's copper Statue. Both now appear to rest on the stepped platform of the 1960s American Museum of Immigration.

As originally completed, and until the extensive work carried out in 1907-08, the monument's appearance was very different. The massive, 65'-10" high stepped concrete foundation was fully exposed as it rose above the Fort Wood parade ground to support the pedestal and Statue. Until 1907-08, the pedestal was approached from the west and east sallyports of Fort Wood. Passing along the parade ground to the east face of the foundation, the visitor climbed a series of wood stairs to the entrance in the east face of the pedestal (now called level 3P, but originally referred to as level two).

PEDESTAL AND FOUNDATION

It is hard to imagine the Statue of Liberty without Richard Morris Hunt's pedestal. As described by Lewis I. Sharp:

> The final design for the executed pedestal was one of Hunt's finest collaborations in the sphere of public sculpture. The height and mass of the pedestal— the major architectural considerations—are perfect. The monument commands a dominant position in New York's busy harbor, yet the pedestal does not overwhelm or in any way lessen the significance of Bartholdi's statue. ...The openings into the pedestal and the panels, the pilasters, the shields, and all the other architectural decorations are all effectively articulated to enliven visually the mass of the pedestal—but it is the solidity and vertical thrust of the pedestal that makes Hunt's contribution such an important part of the success of the Statue of Liberty.[1]

FOUNDATION

The pedestal rests on a massive stepped concrete foundation that is now concealed by the 1960s American Museum of Immigration and earth fill. The foundation was constructed tier-by-tier of concrete poured into an elaborate wood formwork that expanded upward in a series of steps.

Hunt envisioned that the foundation would be covered, but his design called for a unique solution composed of

> ...arches [that] will span the space between the foundation and the old walls of the fort. On each face of the pedestal these arches will support a flight of steps ten feet wide, with the grassy mound between them and the terrace. They will be built of concrete and made three feet thick at the foundation mass, and five feet at the springing, the chord of the arc

Figure 92. Statue and pedestal from the east. [JGWA, 2010]

Figure 93. Statue and pedestal from the north. [JGWA, 2010]

Figure 94. Statue and pedestal from the west. [JGWA, 2010]

Figure 95. Statue and pedestal from the south. [JGWA, 2010]

> being forty-nine feet. The terrace will be 15-1/2" wide in the clear, and will be surrounded by a parapet...[2]

Illustrations of the concrete foundation during the 1884 construction *[see Figures 16 and 17]* reveal a massive, stepped, pyramid-like structure composed of twelve tiers terminating at a 65'-0" square platform. At the center of the platform, a 10'-0" square well extended down to the level of the parade ground. The foundation extended some additional 15'-0" below grade.

At grade level, centered on each of the four sides of the foundation, there were arched openings to 10'-0" wide tunnels that extended through the foundation to meet at the central shaft. The east and west openings were to remain open. After 1907, they became important entrances into the monument. The north and south openings were closed with concrete sometime after the completion of the Statue.

Because of the lack of funds, the foundation remained exposed until 1907-08, when the parade ground of Fort Wood was filled with soil and a stair built against the upper east face of the foundation. At that time, massive granite facing stones were added to the upper four tiers of the foundation *[see Figures 35-37]*; they were later removed during the construction of AMI. Evidence for these features can still be seen on the foundation exposed in the old museum space (2P) and in the mechanical space at 2.5P *[see Figure 121]*.

The large, rock-faced, rectangular granite blocks were set on the steps of the concrete foundation. The space between the back of the blocks and the face of the steps was then filled with mortar. Some of this mortar fill remains *in situ*, and the irregular surface of the mortar reflects the irregular surface of the back face of the 1907 granite blocks *[see Figure 124]*. Some of the 1-1/4" wide x 1/8" thick iron ties, used to secure the blocks against the foundation, remain in place at level 2.5P.

The construction of the American Museum of Immigration added a two-tiered platform around the base of the pedestal and re-filled the Fort Wood parade ground with soil, concealing the foundation. Only the foundation sections in 0P, 2P and 2.5P can now be seen. The foundation at level 1P is largely concealed by the exhibits that tell the story of the Statue of Liberty.

The Sanitary Engineer described the materials and construction of the foundation in detail:

> The foundation of the pedestal is ninety-one feet square at the bottom, sixty-five feet square at top, fifty-two feet ten inches high, and rests on a compact bed of gravel and boulder clay at eight feet above high tide. The faces are not battered, but drawn in by horizontal offsets, the vertical distances between being four times the offset...
>
> For fifteen feet eight inches of the height the concrete composing the foundation was made from Rosendale cement mixed in the proportion of two parts of cement, two of sand, and seven of broken trap-rock. The next twelve feet were mixed one part Rosendale cement, one of Portland cement, two of sand, and seven of broken trap-rock. The upper twenty-five feet were of two parts Portland, two sand, and seven broken trap, except that the extreme upper part was one of Portland cement to four of trap-rock screenings.
>
> This concrete was mixed by hand, but that in the interior of the pedestal was thoroughly incorporated in a mixer run by steam-power consisting of a cubical box rotating on tubular axes fixed at diagonally opposite corners.

The water for wetting the mass was carefully measured and introduced through the axes. When the concrete was put in place it was rammed until water flushed to the surface.[3]

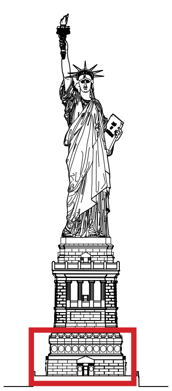
The exposed foundation was described in a June 1901 report by Major A. C. Taylor as "..a rough cement foundation..."that was "cracked, shaling, and discolored by the drip from the copper above during rains."[4] At an undetermined date, a skim coat of cement plaster was applied to the foundation steps, but by 1905, this finish had deteriorated.

PEDESTAL

The pedestal is faced in Leet's Island granite, and the stone laid

> in Portland-cement mortar, mixed of one part of cement to one of fine trap-rock screenings, and all joints, both horizontal and vertical, are 3/8-inch thick, except that vertical joints for a part of the distance at the rear of the stones are wider. The courses have risers of one foot six inches to two feet six inches, and are carefully bonded, at least a foot break of joint being required in all directions. The granite courses form a facing to an interior of Portland-cement (mixed one of Portland cement to four of trap-rock screenings), which was built up in even courses with the granite and thoroughly bonded with it.[5]

Generally, the stone is smooth faced, except in the areas flanking the loggias, where it is rock-faced. Inspection of the smooth-faced blocks revealed that each is dressed with 1" wide chiseled margins. The margin detail is subtle, and only appears in certain light conditions.



PEDESTAL PLINTH AND BASE

The pedestal itself begins a simple, battered plinth (now at level 3P). At the bottom of the plinth is a two-course-high base that extends 3'-3" above the Promenade level of AMI. The upper course is carved with a quirked scotia. Above this base are four battered courses that rise up approximately 8'-1". The plinth then steps back 3-1/4" and is capped with a 2'-4" high course.

Door openings centered in the four sides of the plinth are set between massive, truncated, 3'-11" wide pilasters that support stylized, pediment-like lintels. Each pilaster features a simple 4'-4" wide base, the same height as the plinth base; a two-course-high shaft embellished with a plain 3'-4" diameter granite boss; and a one-course-high capitol made up of a frieze, a reeded frieze, and a large cavetto cap. Early drawings by Hunt showed the bosses with "the monograms of the Republics of France and the United States."

The 4'-4" wide openings are currently fitted with 1984-86 bronze frames and glazed bronze doors (described in more detail in the 3P description). At the south opening, there are ferrous fasteners centered and imbedded in the bases and bosses of the pilasters at 2'-2" and 5'-4" above the level of the terrace, where a pair of scroll-work metal (iron or bronze) fences were installed. The fences prevented access to the ledge that extended around the base of the pedestal. They were

Figure 96. The base of the pedestal plinth (level 3P). [JGWA, 2010]

Figure 97. South elevation at the southwest corner of the pedestal (Level 3P). The granite cornerstone is cracked. Blue-green copper staining is visible at the horizontal mortar joint and lime run deposits above the cove water table molding. [JGWA, 2010]

Figure 98. The south loggia, looking west. [JGWA, 2010]

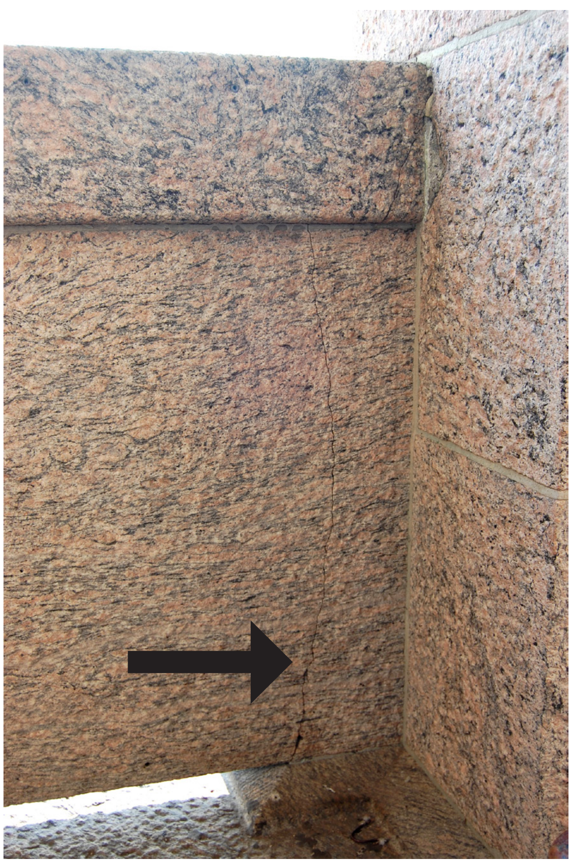


Figure 99. Vertical and diagonal cracks extend through the body of the granite spandrel panels at all four of the loggias. [JGWA, 2010]

installed sometime after the 1907-08 construction of the monumental east access stair.

Above the battered plinth is a frieze of plain circular granite bosses (ten on each side), set between a simple curved base and capitol (approximately 9'-5" high). The early Hunt drawings showed "the coats-of-arms of the several States in bronze placed upon" the bosses *[see Figures 18 and 19]*.

To transition between the frieze and the shaft of the pedestal, there is a plain course and then a cap course with small gabled projections (eight per side), creating a crenellated effect. The Sanitary Engineer article claimed that these projections were more than ornamental:

> The projections on the sloping offset above the former serve not only for ornamentation, but also as "cover-joint stones" to the joints in the course below, recesses two inches deep being cut into the vertical face of the adjoining course so as to give a bond in all directions.[6]

Four plain courses then step back to the pedestal shaft.

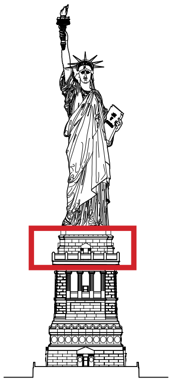
PEDESTAL SHAFT

The shaft of the pedestal is dominated by the recessed, immense, three-bay-wide loggias (at level 4P) on each side. The walls flanking the loggias are faced with rock-faced granite, projecting as much as 10" to form deep shadowed joints. The contrast between the smooth-faced granite of the loggias and the rock-faced granite emphasizes the verticality of the shaft. That upward thrust is only interrupted by a two-course-high water table of smooth-faced granite above the fourth course of the shaft. Below the water table, the plane of the loggia continues with a frieze embellished with a recessed panel; above the water table, the columns of the loggia extend up nine courses to the frieze and echinus of the shaft's crown molding.

Four fluted rectangular granite columns, each 3'-3" wide and 2'-6" deep, divide each of the loggias into three 6'-0" wide bays. The columns have small, 4" high bases; each capitals is composed of a curved bed molding, an echinus that culminates at a quirk and fascia cap. The 4'-2 1/2" high plain granite balustrades that span between the columns include a 10" deep x 9-1/2" high rectangular "railing." The top surface slopes down towards the outer edge.

Each loggia is 4'-6" deep (measuring from the balustrade). The granite floor slopes towards a 3" gap between the balustrade and floor. A simple, 4'-4" wide rectangular doorway in each interior wall is set 5-3/4" above the loggia floor. The north, south, and west loggias are accessible from 4P; a stairway on the east wall of 4P makes the east loggia currently inaccessible. Originally, and until 1937-38, each of these doorways was accessible from the interior balcony or gallery at level 4P.

Bird netting has been applied to the loggia ceilings. There are floodlights above the interior of the column capitals.



PEDESTAL BALCONY

The pedestal culminates in a continuous 4'-1" deep balcony (at 6P). Stele-shaped granite posts, 4'-10" high x 2'-0" wide x 1'-6" deep, divide each side of the balustrade into five bays, and plain, 3'-10 1/2" high granite slabs with 9" high x 10" deep rectangular "rails" span between the posts.

Beyond the balustrade, the upper section of the pedestal begins with a one-course-high beveled base, then continues with three courses to a low, curved base molding. The pedestal ends in a two-course-high frieze capped with an echinus crown molding and a fascia.

The copper "roof" surface surrounding the base of the Statue forms a drip edge at the top of the granite fascia.

The north and south elevations of the balcony are punctuated with central rectangular 3'-8" wide x 7'-4" tall door openings. Each opening is flanked by 2'-0" wide plain pilasters with one-course high bases (that match the base of the pedestal wall); two-course high shafts; and projecting capitals composed of two fasciae and a cavetto cap. The pilasters extend up to stylized, pediment-like lintels. Each opening has a 5-1/2" high granite threshold, and is fitted with a 1984-86 bronze door frame and glazed bronze door (described more fully in 6P).

There are similar, door-like compositions with granite thresholds in the east and west walls. The position of the interior stairs in 6P would not have allowed these openings to be used as doors and from the interior it appears that the original concrete walls are continuous across these locations. The concrete backs of the blind openings appear to match the interior concrete. At an undetermined date, two courses of rock-faced granite, slightly different in appearance from the pedestal granite, were set above each threshold to prevent public access. Later, to prevent the placement of material in the now raised recesses, a different, much lighter colored concrete, angling upward from the granite back to the concrete back walls, was installed. Each recess is 2'-0" deep and the rear concrete wall surface is 4'-0" wide.

There are ferrous expansion anchors in the four corners of the inside face of the balustrade, and along the top of the base of the pedestal wall.

The floor of the balcony is formed of large granite slabs. Centered in each slab is an irregular hole, now plugged with a cement-like material. A larger circular plug is centered in the slab in front of the west wall recess.

At the southwest corner of the balcony, a 2-1/2" diameter bronze disk is set into the granite floor. The disk is inscribed "United States Harbor Line Reference Mark."

At the north and south doorways, cables extend through the openings and up to security cameras and speakers mounted to the tops of the lintels.

Figure 100. The balcony at 6P: the upper photograph shows the west side, looking north; and the lower photograph is of the north side, looking west. The blue-green staining is concentrated at mortar joints, and at areas where moisture is percolating through the pores of the stone. Holes in the granite floor of the balcony have been patched with cementitious material.

Figure 101. Two views of the Statue from the torch balcony. Soiling has accumulated in the creases and folds, where the sheet copper is not regularly washed with rainwater. Note the differential patination on the copper. [JGWA, 2010]

STATUE

Bartholdi's creation —a woman clad in a Roman tunic and stola, holding a lit torch towards the New York Harbor— has become so iconic that a written, academic exterior description fails to convey the drama of the monumental lady surveying the harbor from her position high atop Hunt's granite pedestal. One must look back to the wonders of the ancient world for a work of man that combines art and nature in such a commanding manner.

The following statistics provided to visitors by the National Park Service illustrate the monumental size of the Statue:

Top of base to torch.	151'-1" (46.05m)
Ground to tip of torch.	305'-1" (92.99m)
Heel to top of head.	111'-1" (33.86m)
Length of hand.	16'-5" (5.00m)
Index finger .	8'-0" (2.44m)
Head - Chin to cranium.	17'-3" (5.26m)
Width of head .	10'-0" (3.05m)
Width of eye .	2'-6" (.76m)
Length of nose .	4'-6" (1.37m)
Length of right arm.	42'-0" (12.80m)
Width of right arm .	12'-0" (3.66m)
Width of waist .	35'-0" (0.67m)
Width of mouth .	3'-0" (.91m)
Length of tablet.	23'-7" (7.19m)
Width of tablet.	13'-7" (4.14m)
Thickness of tablet.	2'-0" (.61m)

The interior framework (described in more detail in the interior description of the Statue in this section of the report) is clad in sheets of copper, riveted together along thin seams. Most of the copper is 3/32" thick, popularly compared to the thickness of two pennies, but there is some variation in thickness due to the repoussé technique of hammering the copper to forms. The copper may have come from the mine of Vigsnes in Norway.[7]

Standing on a plain square plinth with chamfered corners, the Statue appears to step forward; the sandaled left foot pushes out from below the tunic, trampling a broken chain and shackles. The left arm bends at the elbow to support a keystone-shaped tablet that bears the inscription *4 July MDCCLXXVI [4 July 1776]*. The right arm is thrust up to hold a lit torch, symbolizing enlightenment.

CROWN

The diadem crowning the head is adorned with twenty-five "jewels" – or twenty-five window openings for the viewing platform inside the crown. The openings are fitted with 1984-86 bronze window sash, glazed with tempered clear laminate glass.

Seven pointed rays extend out from the crown. The rays were removed from the crown for the 1984-86 restoration:

> The internal armature on each ray was removed and recreated in stainless steel. Since the sides of the rays were made of cast bronze, [Les Metalliers Champenois – the French metal workers who restored the torch] screwed the armature directly onto the bronze sides using flat stainless steel screws and bolts (M16).
>
> The original brass sheets covering the top and bottom of each ray were preserved. However, all of the brass screws that held the sheet to the bronze spikes were remade using screws (M6) with small flattened oval heads.[8]

The ray closest to the right arm was found to be rubbing against the arm, forming a perforation in the copper skin.[9] During the 1984-86 reinstallation, that ray was moved slightly to avoid future damage.

TORCH

The torch is finely detailed, and more decorative than other design elements of the Statue. In his essay on the development of the Statue's design, Pierre Provoyeur points out that this was a deliberate design choice by Bartholdi: "The sculptor… put more emphasis on the torch, which he ornamented so that its line, continuing smoothly from the raised arm, provided balance for the weight of the draping."[10]

The torch, its balcony, and its flame are described in detail in the final section of the interior description that follows.

PHYSICAL DESCRIPTION

INTERIOR

LEVEL 0P

ENTRANCE LOBBY (0P01)

This lobby was first created as part of the 1960s museum and was heavily modified in 1984-86. The floor was excavated so that the space could house the torch, and the three sets of stairs and landing at the east end of the space were removed.

The east wall of the lobby is the concrete foundation of the Statue pedestal, which steps up in five tiers: the bottom tier is exposed 1'-1" above the museum lobby floor; the second tier is 6'-0" high; the next three tiers average 4'-1" high; and the top tier is exposed 8-3/4" below the museum ceiling. The original concrete of the steps is covered with a smooth cement parging; the coating on the bottom three tiers is more recent.

On the fourth tier from the bottom, white paint has been used to mark the foundation (beginning from the south end) D8, F8, J8, and L8.

ELEVATOR PIT

Concrete was removed near the center of the foundation for the elevator pit. A steel ladder descends against the south wall down to two chambers: the west space holds the equipment for the 1984-86 hydraulic (oil) elevator; and the east space serves the "Alimak" lift.

At the base of the ladder, grate flooring sits on steel angles that span between the east and west spaces. The concrete walls are unfinished.

Systems in the west space include a utility fixture, a switch, a duplex receptacle, and electrical panels/boxes on the west wall. There is a switch on the west wall of the entrance shaft (for the light fixture) and a push-button switch on the north wall.

LEVEL 1P

WEST CORRIDOR (1P12)

This is one of the four original passages included in the 1884 concrete foundation. The 10'-0" wide arched passages extended through the foundation mass to meet at the center at a 10-foot square shaft that rose upward to the room at the second level. Originally the wall, floor and ceiling surfaces were of exposed concrete. In 1934, the surfaces were covered in various finishes including terra cotta tiled walls, sandstone floors and arched enameled-copper ceilings. In 1937-38, the central area and this corridor were modified when an enormous mass of the original concrete at the center of the foundation was removed to provide additional space for the stair and elevator. This resulted in a decrease

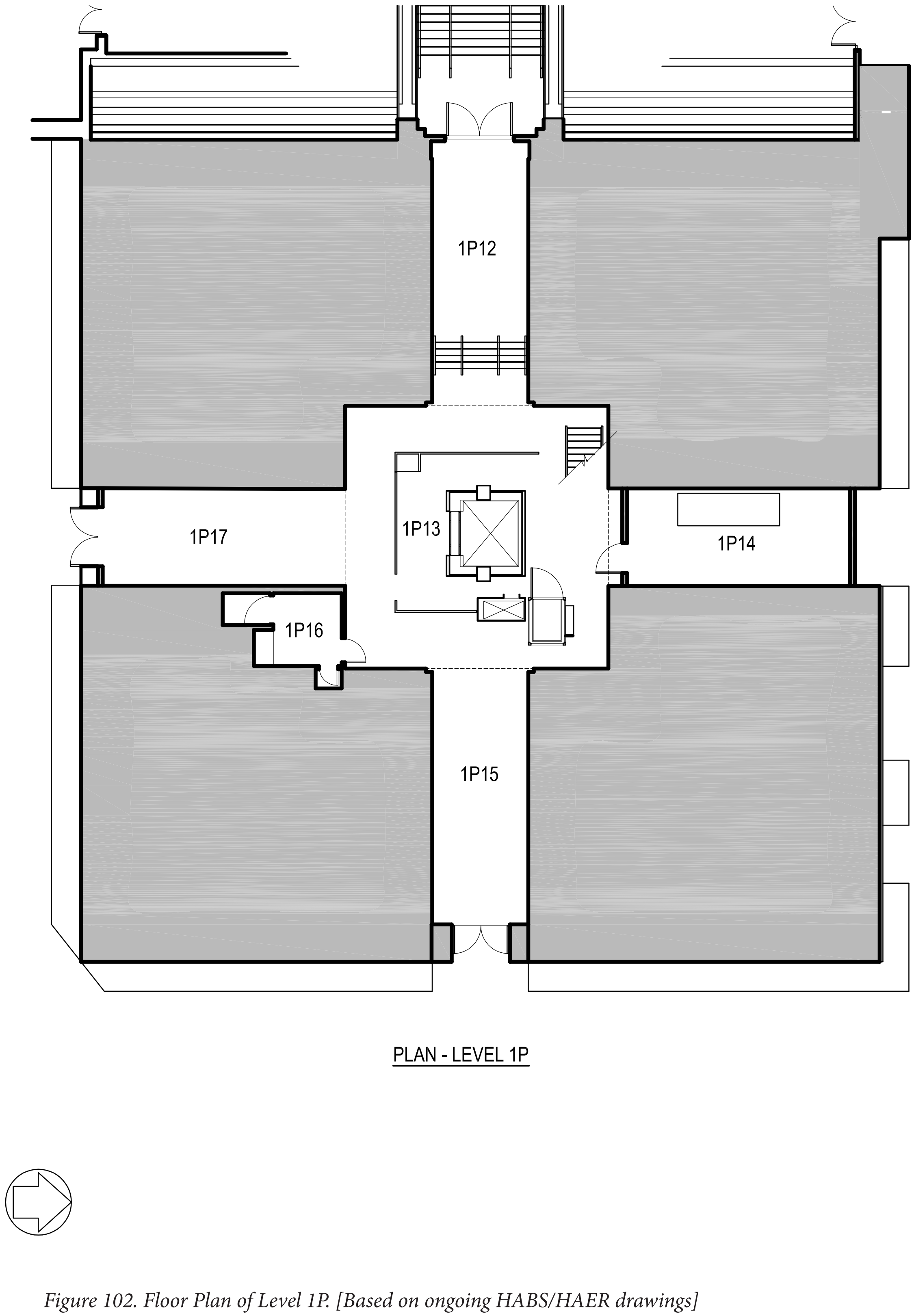
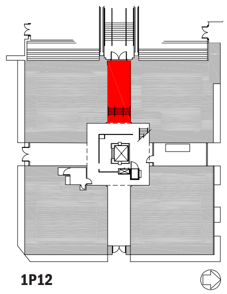


Figure 102. Floor Plan of Level 1P. [Based on ongoing HABS/HAER drawings]

Figure 103. The shaft to the elevator pit below 1P13. [JGWA, 2010]

Figure 104. The elevator pit, looking up into the shaft (top photograph) and looking west (bottom photograph). [JGWA, 2010]



1P12

in the length of this corridor. In 1984-86, the floor was lowered at the west end of the corridor and the granite steps and paving were installed.

Floor: The concrete floor is covered with 2'-5" square granite pavers installed in 1984-86 over concrete. Near the east end of the corridor, five 1984-86 granite risers ascend to the elevator lobby.

Walls: The north and south walls are 1884 concrete covered in a smooth concrete parging installed in 1984-86. The west wall is finished with 1984-86 gypsum board. To the east, the corridor is open to the elevator lobby (1P13).

In 1937-38, approximately 8'-6" of the original 1886 corridor was removed to enlarge the central elevator lobby.

Ceiling: At the east end of the corridor, the barrel vaulted concrete ceiling is 9'-1" above the floor, and meets the north and south walls 7'-0" above the floor.

Door openings: The doorway in the west wall has a 1984-86 fire-rated, hollow steel frame.

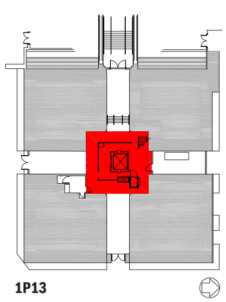
Doors: The opening is fitted with a pair of 2'-11 3/4" wide x 6'-11" high, 1984-86 steel doors with wired safety panels.

Hardware: The 1984-86 door hardware includes three 4-1/2" high butt hinges; an 8" high "Schlage" mortise lockset with lever knobs; and panic hardware on the east face.

Lighting: The corridor is lit by three 1984-86 surface-mounted fixtures with glass globes and protective cages. These fixtures are used throughout the pedestal spaces.

Stair: The 1984-86 granite steps that ascend to the elevator lobby have 6" risers, 1'-0" deep treads, and bronze handrails.

Equipment: A sprinkler pipe, suspended from the ceiling, connects to the pipes in the elevator lobby to the east.



1P13

ELEVATOR LOBBY (1P13)

This large, 27'-0" square, centrally positioned lobby houses the stair and elevator that ascend to the upper levels of the pedestal. The current appearance of this space is the result of extensive modifications carried out in 1937 and 1984-86.

As completed in 1884, this area had a very different character. The four 10'-0" wide corridors extended through the concrete foundation to a small 10'-0" square space in the general location of the current elevator. This was the bottom of a shaft or well that extended upward to the original second level (now level 3P) *[see*

Figure 105. The 10' well in 1P, before it was enlarged in 1937-38. [14.2 #4, NPSL/SLNM]'

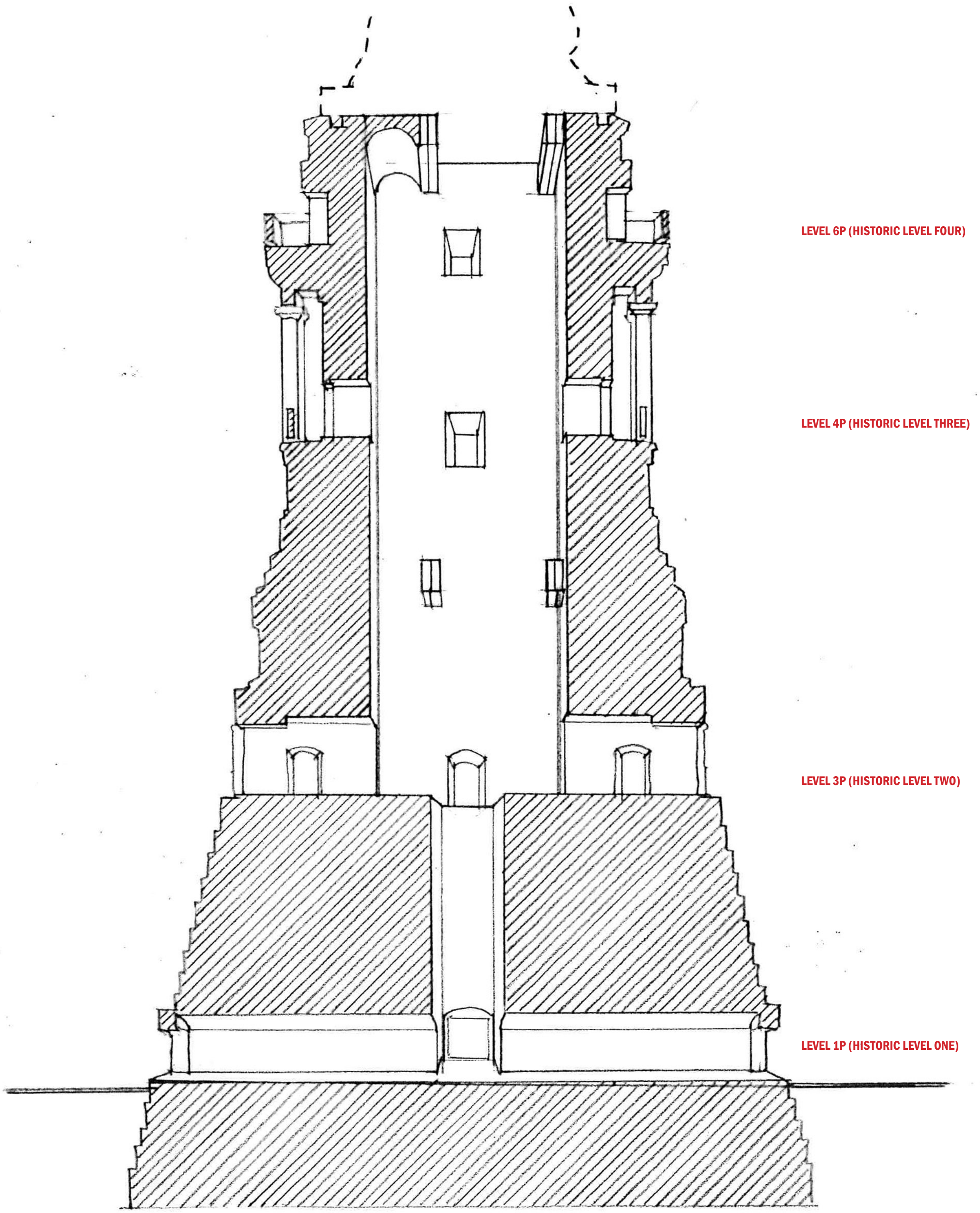


Figure 106. The foundation and pedestal prior to the assembly of the Statue, looking south. Note the tunnels into 1P, and the small, 10' shaft extending up to what is now 3P. [JGWA, 2010]

Figure 107. The stair in Level 1P in February 1984; photograph by Jet Lowe. [HAER NY,31-NEYO, 89-57, Library of Congress]

Figure 108. The west corridor at 1P (1P12), looking west (left) and east (below). [JGWA, 2010]

Figure 109. The elevator lobby at 1P (1P13), looking west (upper left) and southeast (left). [JGWA, 2010]

Figure 110. The elevator lobby at 1P (1P13), looking south. [JGWA, 2010]

Figure 111. East pedestal corridor (1P15) at elevator lobby (1P13). Friable finishes at the ceiling and north wall of the corridor are symptoms of water percolating through the masonry of the pedestal. [JGWA, 2010]

Figure 106]. In 1907-08, a small elevator and a stair were inserted in the shaft. A larger space was created in 1937, after the removal of a large volume of concrete *[see Figure 105]*. The larger shaft that extends upward from the southeast portion of the lobby, and part of the concrete west wall is a result of that project.

Floor: The concrete floor is finished with 1984-86 2'-5" square granite pavers. There is a metal access panel in the floor between the main elevator and the "Alimak" lift for access to the elevator pit.

Walls: The wall material is original 1884 concrete. Large portions of the original concrete were cut back in 1937-38; more in the 1960s, and still more in 1984-86. The remaining current surfaces are covered in 1984-86 parging formed as 5-1/2" tall horizontal bands from floor to ceiling. The east section of the south wall was constructed in 1984-86, in an area where original concrete was removed in the 1960s. The new wall was added to create the first aid room (1P16).

Ceiling: The ceiling is made up of the 1984-86 steel framing for the platform above. The base of the platform is 10'-0" above this floor.

Along the north and west sides of the room, the ceiling is formed of the overhang mass of the 1884 concrete structure. The half-vault surface is formed of concrete applied in 1984-86 over the surfaces exposed in 1937-38 and 1960s.

Door openings: There are openings in all four walls to the adjacent corridors. The north corridor was enclosed in gypsum board in 1984-86 to create an elevator machine room (1P14); the doorway to that space has a plain, fire-rated steel frame.

North door (to 1P14): The 1984-86 steel door is 2'-11 3/4" x 6'-7" high.

Hardware: The 1984-86 hardware includes an 8" high "Schlage" mortise lockset with lever knobs, and three 4-1/2" high butt hinges.

Elevators: The first elevator was installed in this location in 1907-08, and was described by the Otis company as "an Otis double screw drum type machine, with a rise of 105 feet eight inches and a lifting capacity of 3,000 lbs. at the speed of 350 feet per minute."[11]

The 1984-86, two-tier passenger elevator providing access to the upper levels is located near the center of this lobby. Metal pipe rails and a turnstile are used to control the visitor circulation. Sandblasted steel panels form a solid barrier below the west handrail.

In the southwest corner of the elevator enclosure is a control panel formerly used to operate the elevator.

Additional access is provided with an "Alimak" lift and"Wheel-o-vator" lift in the northeast corner of the space.

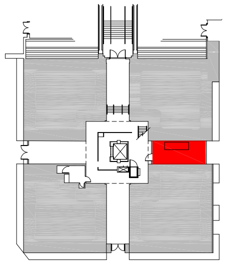
Stairs: The earliest stair installed at level 1P was positioned next to the original elevator; both were installed in the original 10' square shaft.

The 1984-86 steel stair begins near the northwest corner, and ascends sixteen risers west to the 2P level. The brushed metal railing supports a polished chrome handrail.

Lighting: The space is lit by three typical 1984-86 ceiling fixtures with protective cages. Emergency lighting is mounted to the east and west walls.

Equipment: There is a ventilation panel in the base of the wall enclosing the elevator machine room (1P14); and a fire alarm annunciator, exit sign, and pull on the west wall.

There are two bronze outlets in the floor to the west of the elevator.



1P14

ELEVATOR MACHINE ROOM (1P14)

This is one of the four original 1884 corridors that extend through the concrete mass of the foundation. After the completion of the Statue in 1886, this corridor was closed off at the north end by a concrete wall (the same situation existed at the south corridor). An elevator machine room was first placed here in 1907-08. When AMI was constructed, the ends of these corridors were opened up to the new museum space. In 1984-86, the mechanical equipment for the new two-tier elevator was placed here and the corridor was again enclosed at both ends.

Floor: The concrete floor is finished with 1984-86 granite pavers (similar to those used in the adjacent lobby). A 9" wide raised barrier near the south end of the room rises up 8" from the south floor, then 3" down to the north floor, forming a trough to contain the machinery.

Walls: The west, east, and north walls are concrete with a smooth parged finish surface; the south wall is finished with 1984-86 gypsum board. The north wall is a 1984-86 insertion.

Ceiling: The original barrel vaulted concrete ceiling is 9'-1" (at its highest point) above the south floor, and meets the east and west walls 7'-0" above the south floor.

Door openings: The doorway in the south wall has a plain, fire-rated steel frame installed in 1984-86.

Lighting/electrical: Three utility lighting fixtures are mounted to the ceiling. There is a duplex receptacle on the west wall.

Equipment: The equipment for the elevator, including the large vegetable oil tank, fills the west end of the room. The panels and monitoring systems for the elevator, as well as for the "Alimak" lift and the "Wheel-o-vator" lift, are mounted to the east wall. There is an alarm on the souh wall.

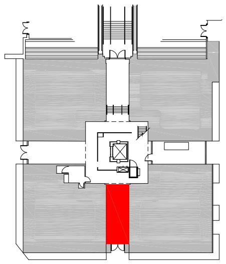
There are air conditioning units in the north wall and on the south wall. A ventilation panel is positioned in the north wall, near the floor. A duct extends up through the floor near the south wall.

EAST CORRIDOR (1P15)

This passage is one of the four original 10'-0" vaulted corridors that extend through the concrete mass of the 1884 foundation. They met at the center of the foundation in a 10'-0" square shaft

Figure 112. Elevator machine room (1P14), looking north (above) and south (left). [JGWA, 2010]

Figure 113. East corridor at 1P (1P15), looking east (above) and west (left). [JGWA, 2010]



1P15

that rose upward to the original second level lobby. This corridor was one of the two original entrances to the foundation (the other one was in the west corridor). In 1907, this corridor was connected by a new tunnel to the northeast sally port.

Floor: The concrete floor is paved with 2'-5" square granite pavers installed in 1984-86. At that time, there was a handrail at the center of the corridor; five granite plugs in the floor mark the locations for the handrail supports.

Walls: The north and south walls are original 1884 concrete, covered in a later concrete parging. The east wall is finished with 1984-86 gypsum board that includes a wide doorway. To the west, the corridor is open to the elevator lobby (1P13).

Prior to the removal of concrete in 1937-38, this corridor extended several feet further to the west.

Ceiling: The 1884 barrel vaulted concrete ceiling is 9'0" (at its highest point) above the floor, and meets the north and south walls 7'0" above the floor.

Door openings: The east doorway has a plain, fire-rated 1984-86 steel frame.

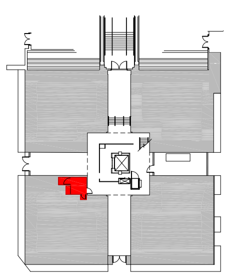
Doors: The opening is fitted with a pair of 2'-11 3/4" wide x 6'-11" high, 1984-86 steel doors with wired safety panels.

Hardware: The 1984-86 door hardware includes three 4-1/2" high butt hinges; an 8" high "Schlage" mortise lockset with lever knobs; and panic hardware on the west face.

Lighting/electrical: The corridor is lit by three typical 1984-86 ceiling fixtures with protective cages. Emergency lighting is mounted to the east wall, above the doorway.

Equipment: There is a ventilation panel above the east doorway.

A fire annunciator and pull are mounted to the east wall.



1P16

FIRST AID ROOM (1P16)

In the 1960s, a large volume of original 1884 concrete was removed from the east side of the south corridor to create a new passage. An infirmary was created in this space in 1984-86. The infirmary includes a kitchenette along the south wall, and a small toilet room to the south.

Floor: The concrete floor is finished with 1'-0" square vinyl tiles.

Walls: The walls are finished with gypsum board that covers the concrete surfaces.

Figure 114. The first aid room (1P16), looking south. [JGWA, 2007]

Ceiling: The suspended acoustical tile ceiling, suspended from a concrete ceiling, is 7'-8" above the floor.

Baseboard: A rubber base trims the walls.

Door openings: The doorways in the north and south walls have plain, fire-rated steel frames.

North door (to lobby): The steel door 3'-2 1/2" wide x 7'-2 1/2" high.

Hardware: The 1984-86 door hardware includes three 4-1/2" high butt hinges, and an 8" high "Schlage" mortise lockset with lever knobs.

South door (to toilet room): The steel door is 2'-11 1/2" wide x 6'-11 1/2" high.

Hardware: The door is hung on three 1984-86 4-1/2" high butt hinges. The lockset has been removed.

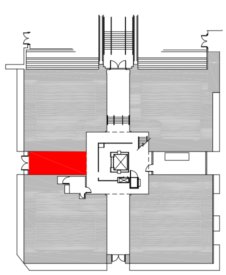
Lighting: The room is lit by fluorescent fixtures in the suspended ceiling.

Furnishings and fittings: The cabinets at the east end of the south wall are three bays wide. The lower cabinet includes a plastic laminate counter with a stainless steel sink, above drawers and cabinet doors. The upper cabinet has three doors.

A narrow closet at the north end of the east wall has a metal door. The lockset has been removed from the door.

Equipment: A paper towel dispenser is mounted to the east wall, and a soap dispenser to the west wall of the kitchenette.

Toilet room: The small toilet room is equipped with a vitreous china toilet on the south wall. Grab bars are mounted to the east and west walls. There is a toilet paper holder on the east wall. The space is lit by an incandescent ceiling fixture.


1P17

SOUTH CORRIDOR (1P17)

This is one of the four original 10'-0" wide vaulted corridors that extend through the 1884 concrete foundation. The south end of this space was enclosed by a concrete wall until the construction of AMI in 1961. Prior to the removal of concrete in 1937-38, this corridor extended several feet further north.

Floor: The concrete floor is covered with 1984-86 2'-5" square granite pavers. Five granite plugs in the floor indicate the location of a handrail that extended along the center of the corridor.

Walls: The east and west walls are concrete, while the south wall is finished with 1984-86 gypsum board. The north half of the east wall was constructed in 1984-86 when room 1P16 was created. To the north, the corridor is open to the elevator lobby (1P13).

Ceiling: The original 1884 barrel vaulted concrete ceiling is 9'-0" (at its highest point) above the floor, and meets the east and west walls 7'-0" above the floor.

Door openings: The south doorway has a plain, fire-rated steel frame.

Doors: The opening is fitted with a pair of 2'-11 3/4" wide x 6'-11" high, 1984-86 steel doors with wired safety panels.

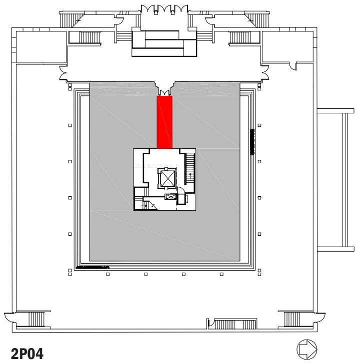
Hardware: The 1984-86 hardware includes three 4-1/2" high butt hinges; an 8" high "Schlage" mortise lockset with lever knobs; and panic hardware on the north face.

Lighting/electrical: The corridor is lit by three typical 1984-86 ceiling fixtures with protective cages. Emergency lighting is mounted to the south wall, above the doorway.

Equipment: A fire extinguisher, annunciator, and pull are mounted to the south wall.

There is a ventilation panel above the south doorway.

Figure 115. South corridor at 1P (1P17), looking south (above) and north (left). [JGWA, 2010]



2P04

CORRIDOR TO ELEVATOR LOBBY (2P04)

This corridor was first created as part of the construction carried out in the 1960s.

Floor: The original concrete floor is covered with coin-patterned rubber flooring.

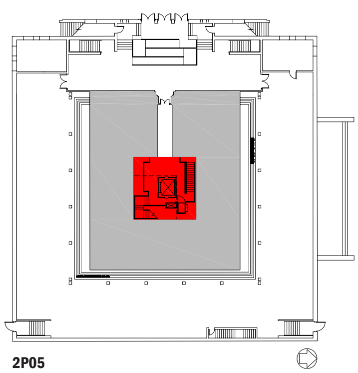
Walls: The walls are concrete. This passage was cut through the original concrete mass of the foundation in the 1960s.

Ceiling: The 1960s barrel vaulted concrete ceiling is 8'-11" (at its highest point) above the floor, and meets the north and south walls 7'-3" above the floor.

Door openings: The doorway in the south wall has a typical steel frame.

Lighting: The corridor is lit by four round typical 1984-86 ceiling fixtures with protective cages. There is emergency lighting on the west wall.

Equipment: There is an exit sign and a ventilation panel above the west doorway.



2P05

ELEVATOR LOBBY (2P05)

From 1884 until 1937-38, this space was a 10' square shaft that extended from what is now level 1P to 3P. In 1907-08, an elevator and narrow stair were inserted in the shaft. In 1937-38, the shaft was enlarged by removing a large mass of concrete from the southeast corner to install a new stair system. Additional concrete was removed in the 1960s and 1984-86 to create the space as it now exists.

Floor: The 1984-86 steel plate floor is finished with rubber flooring.

Walls: The walls are original 1884 concrete, but the current space is the result of the removal of large masses of the concrete, beginning in 1937-38 and continuing to 1984-86. The surface finish dates to 1984-86. Above this space, the wall surfaces that form the northwest corner are the original walls of the 10'-0" shaft that extended from 1P to 3P. These important surfaces retain the original appearance of the 1884 poured concrete.

Ceiling: Along the north and west walls, the 1984-86 partial vaulted concrete ceiling is 8'-11" above the floor. The remainder of the lobby ceiling is open to the levels above.

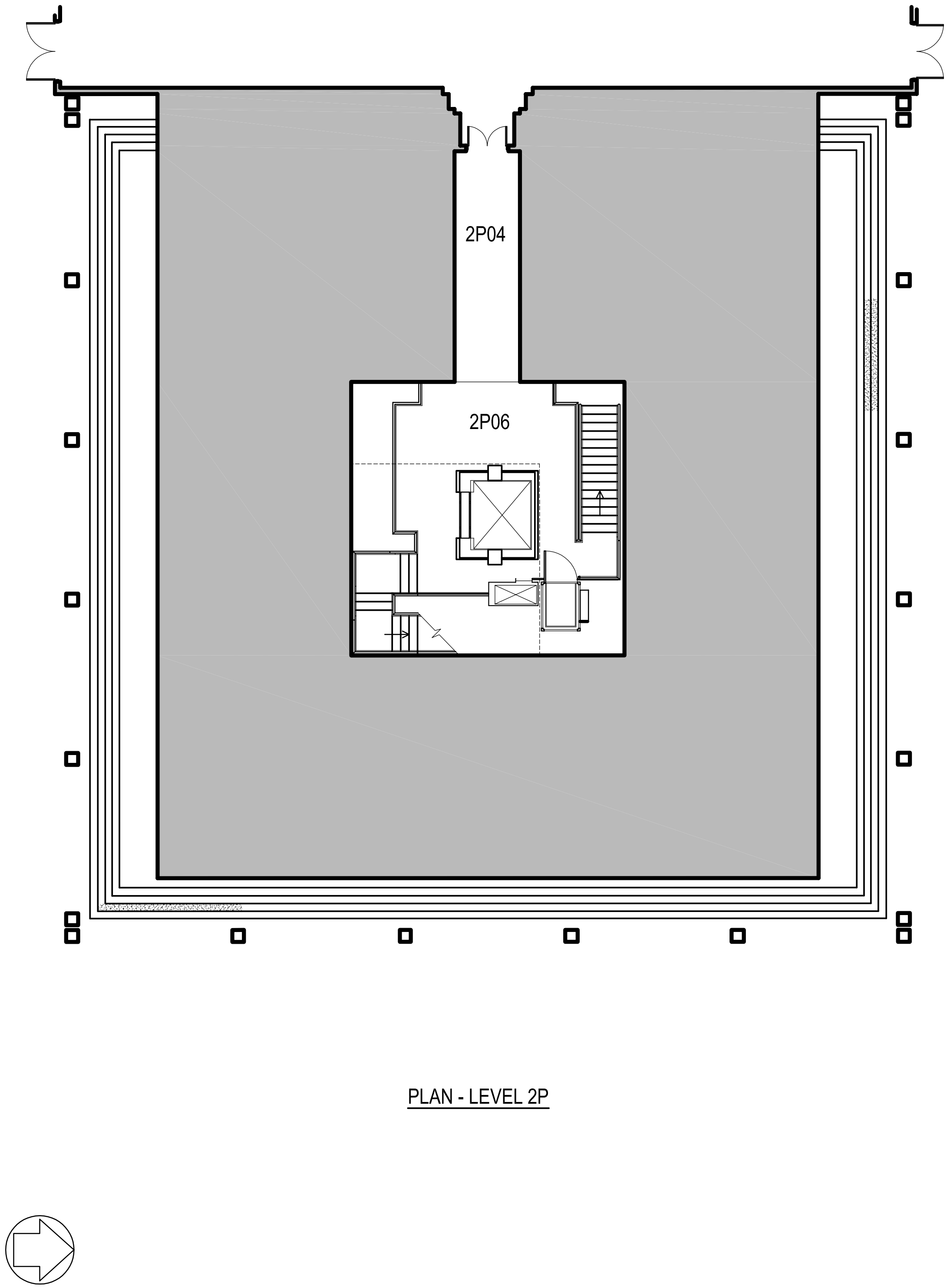


Figure 116. Floor Plan of Level 2P. [Based on ongoing HABS/HAER drawings]

Figure 117. 2P04, looking east (above) and west (left). [JGWA, 2010]

Figure 118. 2P05, looking northeast.
[JGWA, 2010]

Figure 119. 2P05, looking southeast.
[JGWA, 2010]

Door openings: There are no finished doors in this lobby. The opening in the west wall that leads to the 1960s west corridor (2P04) was first created in the 1960s, and then modified in 1984-86.

Elevators: The 1984-86 two-tier passenger elevator providing access to 1P and to the upper levels is located near the center of this lobby. Sandblasted metal railings with polished handrails are used to direct the visitor circulation.

Additional access is provided with an “Alimak” lift and“Wheel-o-vator” lift in the northeast corner of the space.

Stair: The 1984-86 stair from level 1P arrives in the northeast corner of the lobby.

The 1984-86 stair to level 3P begins in the southeast corner of the lobby with three risers south, and then turns to ascend three risers east, four risers north, thirteen risers west, two risers south, thirteen risers east, and five risers north to 3P.

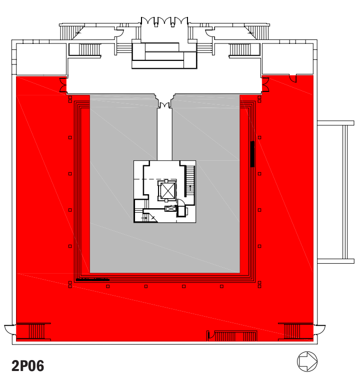
Both stainless steel stairs have typical finishes: diamond treads; solid, sandblasted railings; and polished round handrails.

Lighting: There are five typical 1984-86 ceiling fixtures with protective cages in northwest corner of the lobby; and emergency lighting fixtures on the north, south, west and east walls.

Equipment: Sprinkler pipes with valves extend up through the space on the north end of the west wall. South of the opening to the corridor, there is an exit sign, a fire pull, a security camera, and a corresponding switch on the west wall.

A fire annunciator and two speakers are mounted to the south wall.

An outlet for the vacuum system is located in the south wall.



2P06

FORMER AMI SPACE (2P06)

This space wraps around the east, south, and north sides of the pedestal foundation. Since the American Museum of Immigration exhibits were moved to Ellis Island, this space has not been used by the public.

This stepped foundation remained unfinished and exposed upon completion of the Statue in 1886. Its massive form rose upward in the center of the Fort Wood parade ground. The interior 10'-0" square' well, centered in the foundation, was accessible from two 10'-0" wide concrete portals positioned in the east and west faces of the foundation. The matching north and south portals were apparently closed around the time of the completion. A portion of the 12'-10" wide lintel of the north, south and east portals can be seen at the very bottom of those elevations in this space, and the four modified openings can be seen at level 1P.

In 1907 this foundation was concealed when an earthen mound was placed against the stepped surface, filling in the parade ground to the top of the inner wall of Fort Wood. As part of the creation of the AMI in the 1960s the earth was removed and the foundation was exposed. (The west side is partially exposed in the entrance lobby 0P01).

The following description focuses on the stepped pedestal foundation; a full description of the former museum space can be found in the Fort Wood Historic Structure Report.

Six tiers of the original 1884 concrete foundation are visible in this room. The concrete was poured in stages within wood formwork. The lowest exposed step is 1'-8" high but approximately 1'-3" of additional height is hidden below the concrete floor slab installed in the 1960's. The ascending concrete steps are each 2'-11" high and 9" deep. The top visible step is partially concealed within the concrete ceiling slab. The surface of the steps is covered in a smooth cement parging, covering any evidence of the wood board formwork. The vertical corners of each step are finished in a rounded 1-1/2" radius.

East side of foundation: The east foundation retains evidence for the 1907 entrance stair that provided access to level two (now 3P) in the base of the granite-covered pedestal *[see Figure 121]*. There are the remains and outlines for six 1'-3" wide piers that supported the upper structure of the double-flight entrance stair. The tall, poured concrete piers were constructed against the stepped foundation. The two pairs of flanking piers formed a 5'-9" wide support foundation, while the central pair formed a 10'-3" wide support. These concrete supports were removed when AMI was constructed.

At the south end of the east foundation, a 13'-2" long section of the second tier has been cut back to be flush with the third tier. This cut exposes the true texture of the concrete that is generally concealed by the later smooth parged surface.

North side of foundation: West of center, a 10'-0" wide section of the second and third tiers has been cut back to be flush with the fourth tier. In that section, wood nailers are bolted to the second and fourth tiers.

Systems: It appears that care was taken during the many construction campaigns to keep electrical and mechanical systems from impacting the foundation, but some conduits and fixtures have been mounted to the foundation:

. South side: A conduit mounted to the fourth tier services a series of incandescent utility fixtures: four on the fourth tier and one extending down with a conduit to the third tier. A plywood panel at the east end of the foundation holds an electrical panel (marked LP3WB), a "Zenith" panel, two electrical cabinets, a tumbler switch, and a wood shelf. Two conduits from the electrical panels are screwed into the east end of the first tier.

Two steel angles are bolted into the top of the second tier, at the north end. A copper line extends along the sixth tier.

A pipe bolted with hangers to the fifth tier extends along all three exposed sides of the foundation.

A two-arm ferrous bracket is fastened to the top of the first tier; it is not known what purpose this bracket served.

Figure 120. South elevation of the stepped concrete pedestal foundation within the former AMI (2P06). Blue-green copper staining is visible at hairline cracks in the concrete foundation.

Figure 121. Evidence for the 1907-08 entrance stair on the east elevaton of the foundation in the former AMI space (2P06). [JGWA, 2010]

East side: At the south end of the east foundation, conduit extends to two incandescent fixtures and an emergency lighting fixture on the fourth tier, and down to a duplex receptacle on the third tier.

Small steel angles are fastened to the base of the fourth tier.

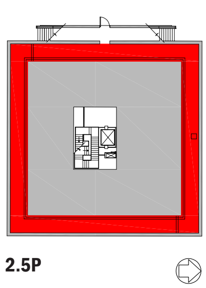
At the north end, conduit extends between two incandescent fixtures on the fourth tier and down to a duplex receptacle on the second tier. A plywood panel, attached with steel angles to the foundation, holds an electrical panel (labeled LP3SA) and a "Zenith" panel. Conduit from the panel services two simplex receptacles on the third tier. A large conduit extends around the north side of the foundation.

A duct sits on the first tier, and a vertical riser extends up the face of the foundation through the framing for AMI.

North side: Two incandescent fixtures on the fourth tier are connected by conduit, which extends down to a duplex receptacle on the second tier.

A plywood panel near the east end of the north side holds an electrical panel (labeled LP3EB) and a "Zenith" panel; a similar arrangement at the west end includes an electrical panel (labeled LP3EB) and another "Zenith" panel, metal boxes, a duplex receptacle, and two additional electrical panels. Conduit from that assemblage extends to a box on the fourth tier for a simplex receptacle. To the east is a vertical section of wiremold fastened directly to the foundation.

Conduit runs between the electrical panel at the east end to a group of electrical panels near the center of the north foundation. The grouping includes a main "General Electric" switch, two "Cutler Hammer" panels, and two boxes. Conduit connects this group with the west panels.



2.5P

LEVEL 2.5P

MECHANICAL SPACE AT LEVEL 2.5P

This narrow space at level 2.5P, between the original pedestal foundation and the 1960s museum upper tier wall, was used as a fan and machine room; the ducts that remain obscure large sections of the north, east, and south sides of the foundation.

From 1885 until 1907-08, this upper section of the concrete foundation was visible, and part of the visitor's perception of

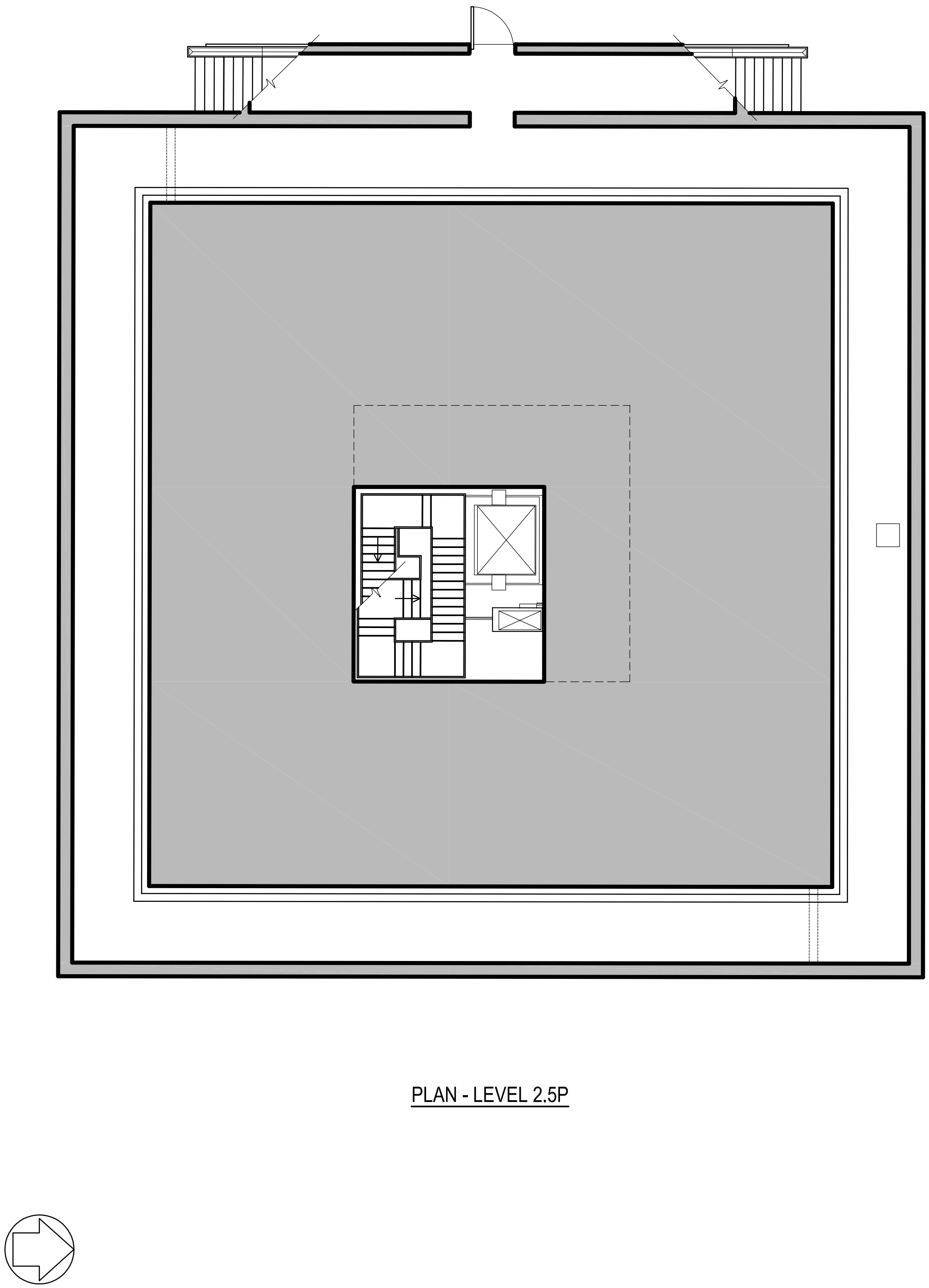


Figure 122. Floor Plan of Level 2.5P. [Based on ongoing HABS/HAER drawings]

Figure 123. In in the former AMI space (2P06), a section of the foundation has been cut back, revealing the original composition of the concrete. [JGWA, 2010]

Figure 124. The mortar poured behind the 1907-08 granite facing stones can still be seen on the foundation in the 2.5 mechanical space. [JGWA, 2010]

the monument. The original wood steps that provided access into the pedestal were positioned on the east face of the foundation until 1907-08. At that time, a monumental double flight of steps were constructed against the granite facing blocks installed at that same time.

Insulated hot and chilled water pipes and drains largely cover the bottom tier of the foundation wall.

The following description focuses on the stepped pedestal foundation; a full description of the 1960s space can be found in the Fort Wood Historic Structure Report.

Foundation: Three tiers of the original 1884 concrete foundation are visible in this room. The concrete was poured in stages within wood framework. The lowest exposed step is 2'-3" high; approximately 8" of additional height is hidden below the concrete slab installed in the 1960's. The ascending concrete step is 2'-11" high and 9" deep. The taller, 4'-0" high top step is partially concealed within the concrete ceiling slab. The surface of the steps is covered in a smooth cement parging, covering any evidence of the wood board formwork. The vertical corners of each step are finished in a rounded 1-1/2" radius.

In 1907-08, these steps were covered in large slabs of rock-faced granite. The cavity behind each stone was filled with mortar. Some of this mortar survived the 1960s removal of the stone blocks and can be seen on the surface of the concrete foundation steps. The irregular appearance of the mortar is a record of the irregular finish on the back face of the stones *[see Figure 124]*.

Several iron ties (1-1/4" wide and 1/8" thick), used to secure the stones, can still be seen on the north and east faces of the foundation.

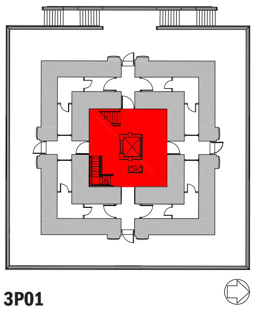
Lighting/electrical: Utility fixtures on the upper tier of the foundation are connected with conduits mounted to the foundation. Other electrical elements include a duplex receptacle on the upper tier of the east foundation.

Heating/air conditioning: The fans and the ductwork for the fans cover the south end of the east foundation; the north end of the south foundation; and the east end of the north foundation.

Plumbing: Large, insulated, chilled and hot water supply and return pipes extend along the bottom tier of the foundation. The pipes sit in brackets that are bolted to the foundation. Additional insulated pipes along the south and north walls sit on bricks on the top of the bottom tier.

An insulated pipe along the second tier, and a copper pipe at the upper tier, are hung from angles bolted to the foundation.

LEVEL 3P (PROMENADE LEVEL)



3P01

ELEVATOR LOBBY (3P01)

This large, 27'-0" square room is at the base of the original shaft that rises up through the concrete and granite pedestal. The space includes four original access corridors centered in the four walls. Now painted, the walls retain the rough texture and character that resulted from the composition of the concrete mixture as it was poured in stages into the wood board formwork. Visible above this room, at the midpoint between levels 3P and 4P, are the four original steel plate girders (anchor beams) that span the space.

This room was the original entry area into the monument, with access through the east corridor. A series of wood stairs against the east foundation wall ascended from the parade ground of Fort Wood to the entrance at the far east end of the corridor.

The room as it now exists is the result of several remodelings, beginning in 1907. As completed in 1886, this impressive, monumental space was composed of raw, exposed concrete surfaces that extended upward to the top of the pedestal. At the center of the room, in the floor, there was a 10'-0" square shaft that extended down through the concrete foundation mass to the original "level one" (now 1P). The shaft opening was surrounded on all four sides by a tall, ornamental iron fence. The only other feature in the room was the impressive southwest iron stair that ascended in five runs to the third level (now 4P). The stair included rails formed of iron plates that featured a perforated disk and scroll pattern. High above the space, the four original anchor beams were more visible than they are now. *[See Figure 126.]*

The room retained its original appearance until 1907, when an elevator was placed in the 10'-0" square shaft. A narrow stair, ascending from the first level, was also fitted into the confined shaft. At the same time, iron gates were placed in the north, south, and west corridor openings. These gates remain *in situ*. The original stair system was not changed during the 1907 remodeling campaign.

In 1937-38, the original stairs and elevator were removed. To permit the installation of the new enclosed steel and concrete stair system, a large mass of original concrete was removed from the south and east sides of the 10' square shaft to the first level *[see Figure 127]*. The enlarged space allowed the new stair to rise upward from level one (1P) to level four (now 6P). The new enclosed elevator shaft serviced the same levels. *[See Figure 128]*

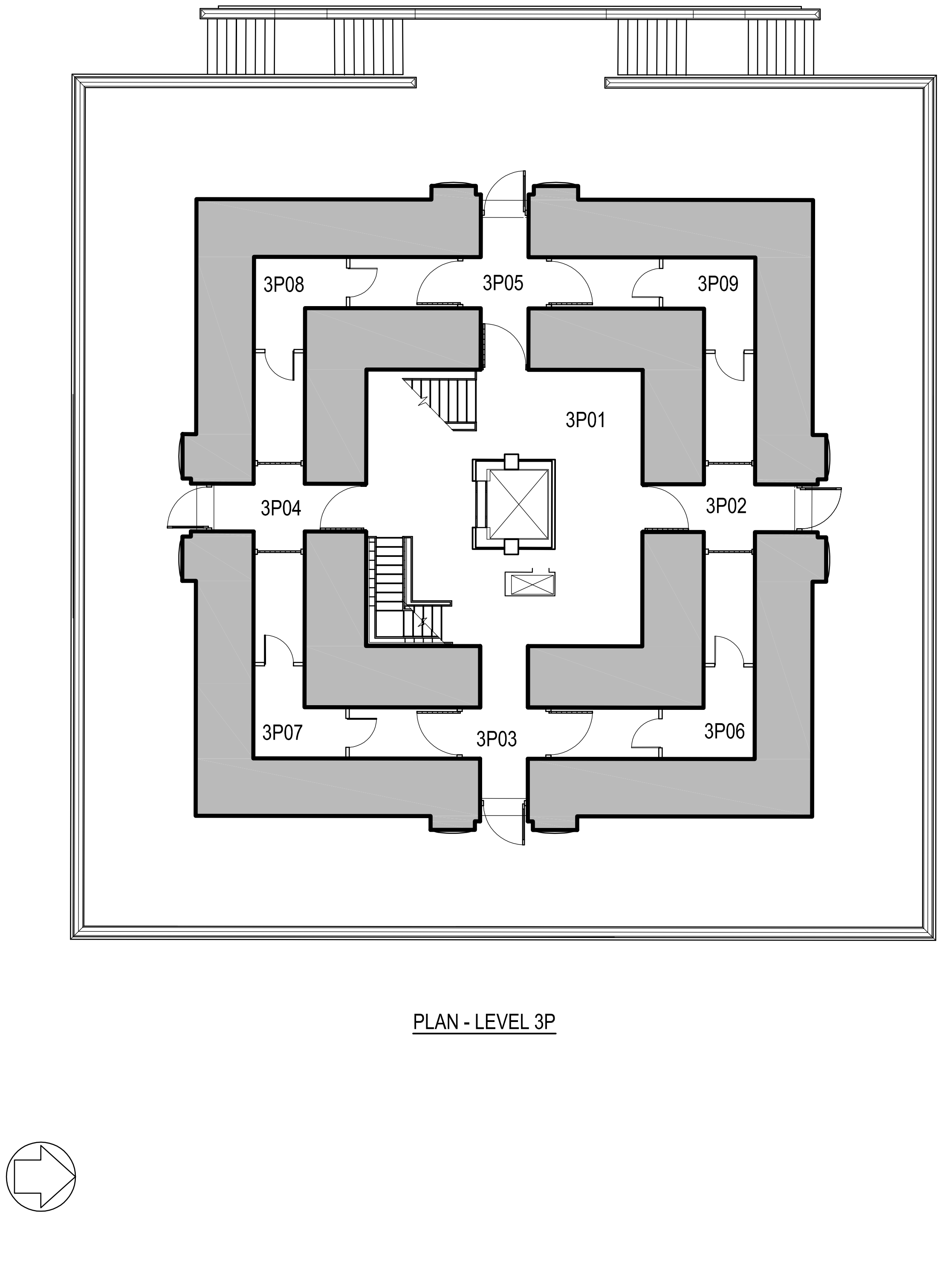


Figure 125. Floor Plan of Level 3P. [Based on ongoing HABS/HAER drawings]

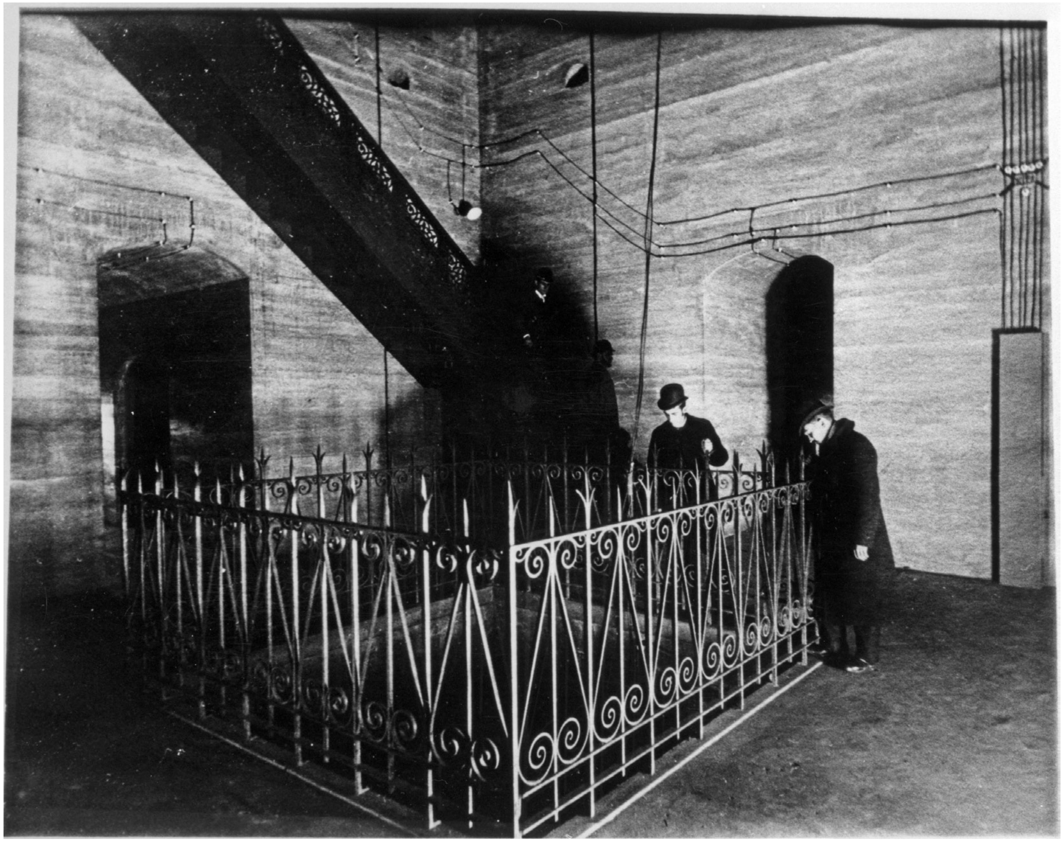


Figure 126. The 10' square well and original railing at 3P, before the installation of the elevator in 1907-1908. [NPS, STLI, Ref.Lib., Int. #1]

Figure 127. Removal of the concrete from the center shaft in 1937-38.[NPS, STLI, Ref.Lib., 4.5 #45]

Figure 128. Level 3P in February 1984; photograph by Jet Lowe. [HAER NY,31-NEYO,89-61, Library of Congress]

Figure 129. 3P in 1984; photograph by Jet Lowe. [HAER NY,31-NEYO,89-60, Library of Congress]

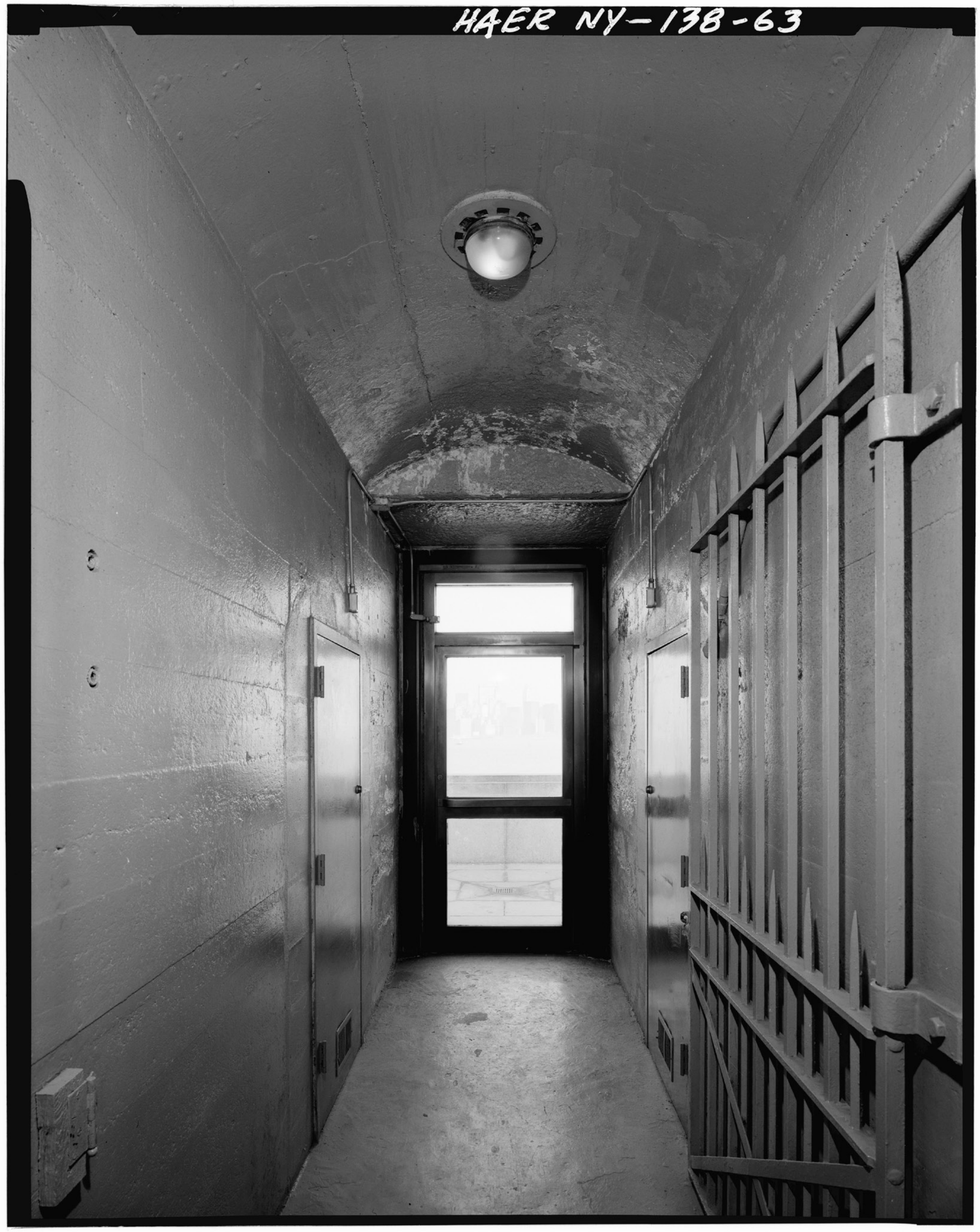


Figure 130. A 3P corridor in 1984; photograph by Jet Lowe. [HAER NY,31-NEYO,89-63, Library of Congress]

Figure 131. Looking up from 3P in october 1984; photograph by Jet Lowe. [HAER NY,31-NEYO,89-81, Library of Congress]

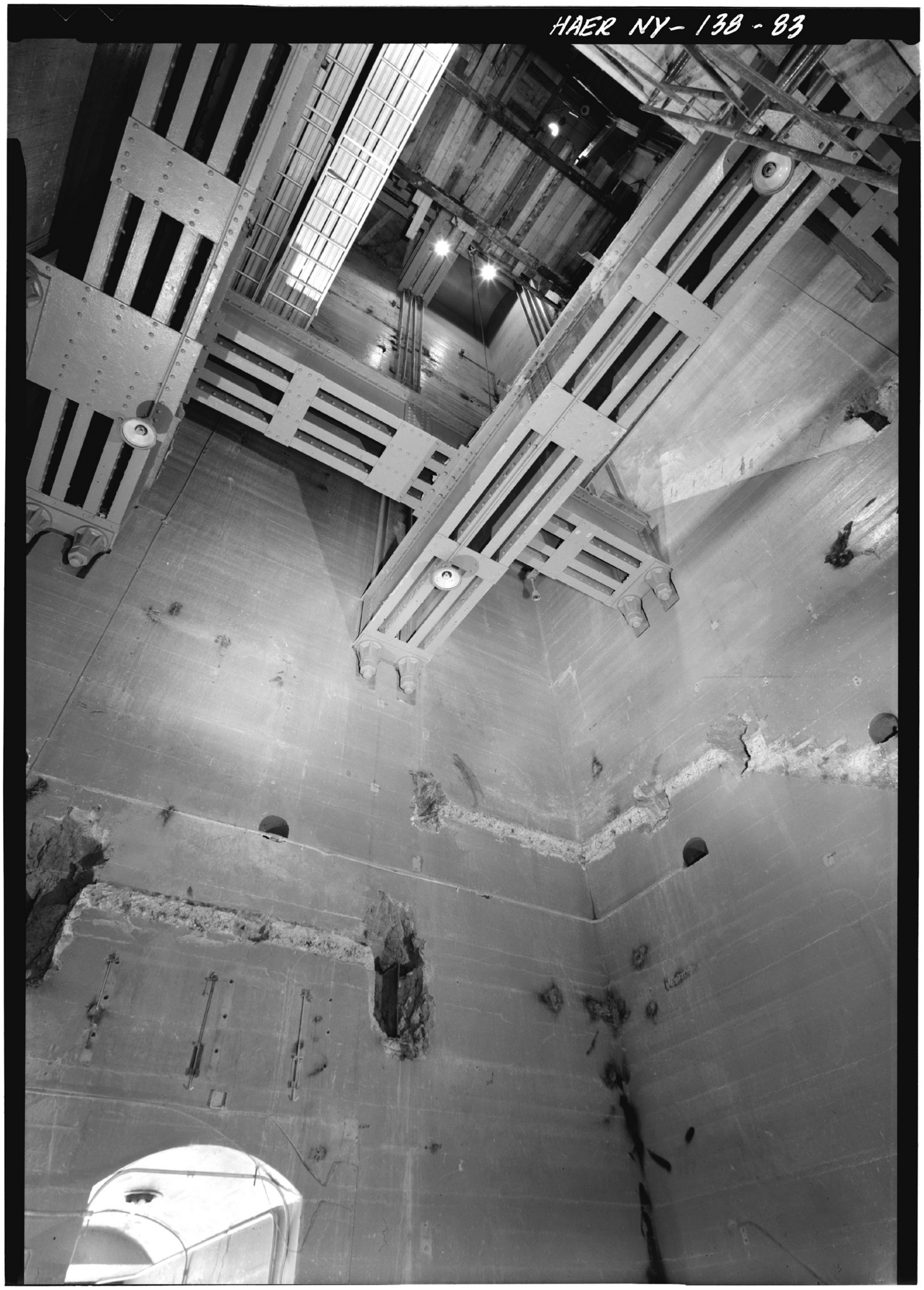


Figure 132. Looking up from 3P in october 1984; photograph by Jet Lowe. [HAER NY,31-NEYO,89-83, Library of Congress]

The 1984-86 rehabilitation project removed all of the finishes and installations from the previous project, and installed a two-level hydraulic elevator in a glass-enclosed shaft and a complex system of stainless steel stairs and platforms. *[See Figure 131 and Figure 132]*

Floor: Prior to the removal of original concrete from the southeast portion of the original central shaft in 1937-38, the entire floor surrounding the shaft was concrete.

The current elevator lobby floor at the promenade level includes the 1984-86 steel plate elevator platform and shaft in the southeast corner of the space, and the top of the original 1884 concrete foundation to the north and west. The floor is covered with coin-patterned rubber flooring installed in 1984-86.

Walls: The original 1884 concrete walls retain the imprint of the horizontal board formwork. The board width varies, averaging about 9". The surface is painted.

Ceiling: The 1984-86 steel plate platform supporting the floor of 4P is 46'-6 1/2" above this floor.

High above this lobby, between levels 3P and 4P, are the four 3'0" high steel plate girders or beams that form the base of the Statue's structural system. The beams are formed from two pairs of 6" wide angles, joined together to form the 3'-4 1/2" wide beams. The upper beams span north to south, and the lower beams east to west. Eight groups of tie bars that extend down from the upper pairs of beams near the top of the pedestal are attached by threaded rod ends to the lower beams. The 4" diameter threaded rods are secured by massive 1'-0" long conical washers and 4" deep, 7-1/2" diameter hexagonal nuts.

Stair: The 1886 iron stair ascended from this space to level three (now 4P) in five runs, beginning immediately south of the west tunnel. That stair was removed in 1937-38, and a concrete and steel stair installed on the south wall, in the same location as the current stair.

The 1984-86 stainless steel stair to 4P begins on the south wall, and ascends nine risers east to a landing, then nine risers north to a long landing that extends along the east wall. At the north wall, the stair turns and ascends eight risers west to another long landing along the west wall. Glass panels have been inserted above the landing railing.

From that landing, there are ten risers south, seventeen risers east to a landing along the east wall, nine risers north to a landing (again, with glass panels above the railing), eight risers north to a corner landing, and finally three west to arrive at level 4P.

The corresponding stair that visitors use to descend from 4P begins in the southwest corner of the 4P elevator lobby with a run of seven risers south. The stair continues with thirteen risers descending north to a landing, seventeen risers east to a glassed-in landing, ten risers south, nine risers west to a landing, nine more risers west, and eight risers north to arrive at 3P.

The 1984-86 stainless steel stairs have typical finishes: diamond treads; sandblasted railings; and polished round handrails.

Lighting/electrical: The space is lit by a combination of fixtures. Round sconces are mounted to all four walls. 1984-86 boxed sconces on the east and south walls and on the east framing of the elevator shaft highlight the historic structural elements. There are

Figure 133. 3P01, looking southwest (left) and northeast (below). [JGWA, 2010]

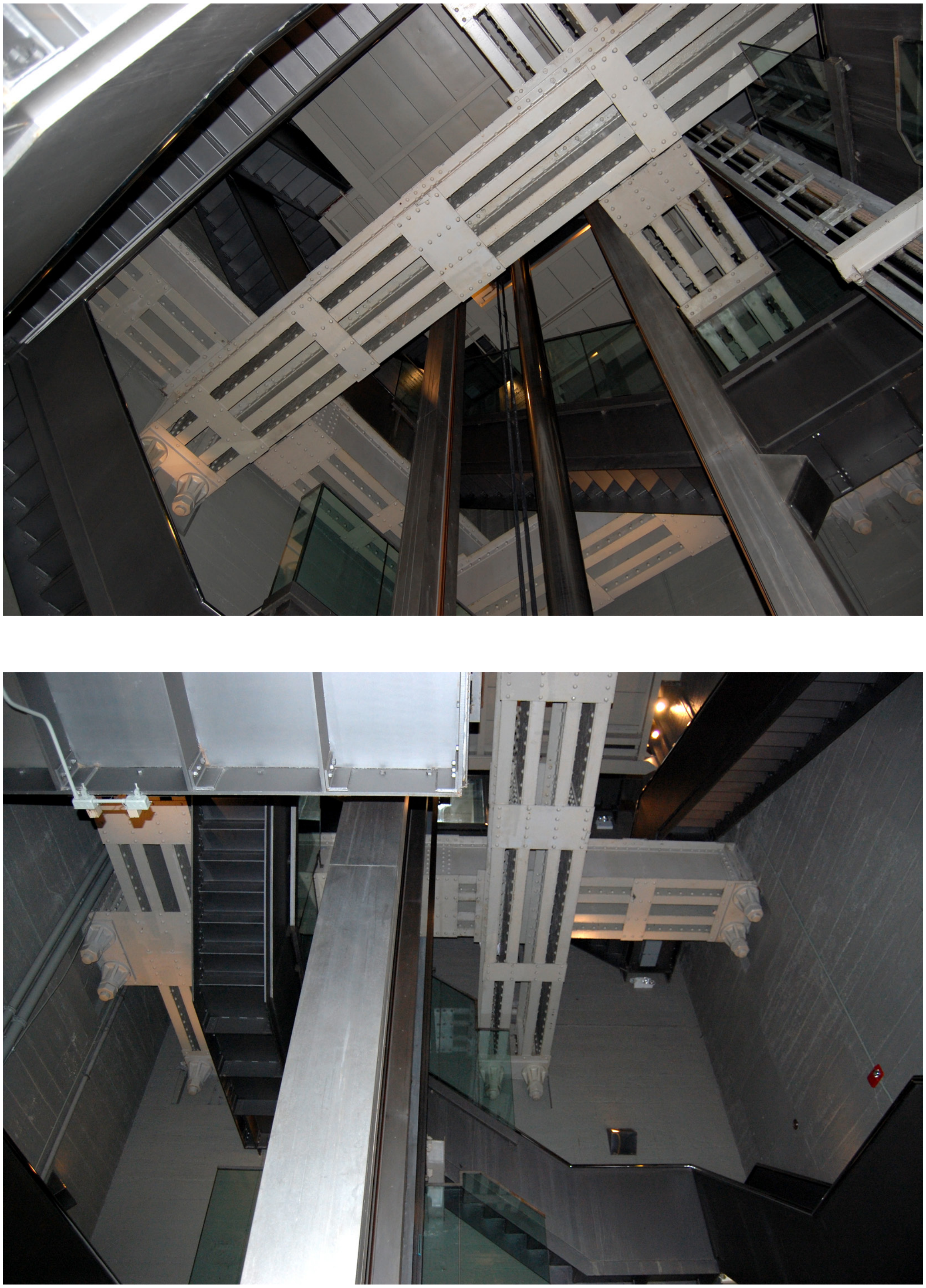


Figure 134. The structural system, looking up from 3P to 4P. [JGWA, 2010]

Figure 135. One of the tension rods/eye rods at the lower set of structural beams between 3P and 4P. [JGWA, 2010]

Figure 136. 3P02, looking north. [JGWA, 2010]

emergency lighting fixtures on the east and south walls and in the framing for the northwest landing of the stair to 4P.

Other electrical elements include duplex receptacles on the east and west walls; and an electrical panel in the south wall.

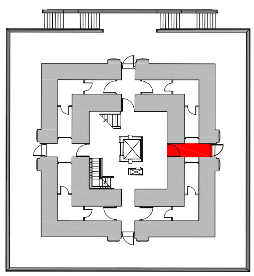
Elevator: The 1984-86 hydraulic (oil) elevator is located near the center of this lobby, where an elevator was first installed in 1907. Stainless-steel railings that match the stair railings are used to direct the visitor circulation. Additional access is provided with an "Alimak" lift and "Wheel-o-vator" lift in the northeast corner of the space.

Equipment: On the south wall, there is a security camera; a fire extinguisher; a fire annunciator, two speakers, and extinguisher; an intercom outlet; and an outlet for the vacuum system.

A thermostat and fire annunciator are mounted to the north wall.

Sprinkler pipes extend up along the east wall, and branch off into the south and west corridors (3P04, 3P05).

Furnishings and fittings: Metal display frames are mounted to the south and east walls.



3P02

NORTH CORRIDOR (3P02)

The north corridor is one of the four original passages that provide access to the large central space in the pedestal. The 4'-8" by 17'-0" long, tunnel-like space is open at each end. At the midpoint of the flanking walls there are 5'-0" wide arched openings that provide access to the internal passages surrounding the elevator lobby.

Although Hunt's original design included an exterior terrace that would have connected the exterior opening at the end of this corridor to the other three corridor openings, the terrace was not constructed. From 1886 until the 1960s construction of AMI, the opening at the north end of the corridor was enclosed in various manners. The gate still in use at the south end of the passage was installed in 1907.

Currently, the passage opens to the roof terrace, or promenade, at the top level of the 1960s AMI structure.

Floor: The 1884 concrete floor is covered with coin-patterned rubber flooring installed in 1984-86.

Walls: The walls are original 1884 concrete covered in paint. The impressions of the original 9" high horizontal wood formwork are visible in the wall surfaces.

Ceiling: A shallow, concrete, barrel-vault ceiling extends north to the original granite opening to the Promenade level. The barrel-vault is 10'-0" at its highest point and meets the east and west walls 9'-3" above the floor (the same height as the granite lintel at the north end of the corridor).

Door openings: There are four original openings in the corridor: the openings at each end, and the two openings to the inner passages (3P06 and 3P09). Three doors have been inserted into this corridor: a 1907 iron gate at the south end; a 1984-86 bronze exterior doorway with a single-light transom at the north end; and a circa 2004 roll-down metal door mounted to the granite lintel at the north entrance.

The 1984-86 north doorway has a 4-1/4" wide bronze frame.

South gate: The 4'-4 1/2" wide 1907 iron gate has 7'-10" high, 1-1/4" thick pickets that alternate with 3'-1" high pickets.

Hardware: The gate hardware includes two strap hinges that are affixed to the east wall, and a hasp for a padlock. The gate swings in two directions (180 degrees).

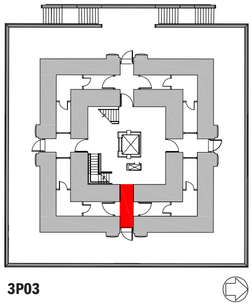
North door: The 1984-86 bronze door is 3'-1 3/4" wide x 7'-0" high ” wide and has two glazed panels. The glazed transom is 2'-8" wide and 1'-2" tall.

Hardware: The 1984-86 hardware includes a bronze push bar on the interior face, a bronze grip on the exterior face, and concealed pivot hinges in the lintel and threshold.

Heating: There is a 1984-86 heating unit recessed in the west wall, near the floor. A metal cover conceals the unit and the recess.

Lighting/electrical: The corridor is lit by a 1984-86 bronze ceiling fixture with an opal glass pillbox shade; and by a typical 1984-86 ceiling fixture with a protective cage near the north end of the corridor.

Equipment: A fire pull is mounted to the east wall. A sprinkler pipe, suspended with straps from the ceiling, splits off into the corner corridors to the east and west.



3P03

EAST CORRIDOR (3P03)

This is one of four original passages that provide access to the space in the pedestal. Upon the completion of the monument, this corridor served as the only accessible entrance into the pedestal. A series of simple wood stairs ascended from the parade ground at the base of the stepped concrete foundation, up to the massive granite exterior doorway. This space continued to be the only entrance into the monument until 1907, when a narrow stair and elevator were installed in the 10'-0" shaft to provide access from the first level (1P).

The finishes in the east corridor are similar to those of the north corridor. Other elements in the east corridor include:

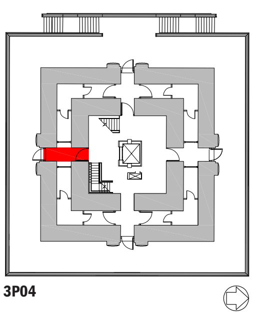
Door openings: There is no gate at the west end of the corridor, and no evidence that one was installed in 1907. The 1984-86 bronze doorway opening and door to the exterior is similar to the corresponding doorway in the north corridor. A roll-down metal door was inserted in circa 2004.

Lighting/electrical: Like the north corridor, the east corridor is lit by a bronze ceiling fixture with a pillbox shade; and by a smaller typical 1984-86 ceiling fixture with a protective cage at the east end of the corridor.

At the west end of the corridor, there are marks on the concrete indicating the positions of two electrical boxes (one on the north wall, and one on the south wall) connected by conduit.

Heating: There is a heating unit recessed in the south wall, near the floor. A metal cover conceals the unit and the recess.

Equipment: A sprinkler pipe, suspended from the ceiling, branches off into the corner corridors.



3P04

SOUTH CORRIDOR (3P04)

This corridor duplicates the north corridor, and, like that passage, the door opening at the south end did not provide access from the exterior until the AMI promenade was constructed in the 1960s.

The finishes in the south corridor are similar to those of the north corridor. Other elements in this space include:

Door openings: Three doors have been inserted into this corridor: a 1907 gate at the north end; a 1984-86 bronze exterior doorway (similar to the north doorway); and a circa 2004 roll-down metal door.

North gate: The iron gate is 4'-4 1/2" wide and has 7'-10" high, 1-1/4" thick pickets that alternate with 3'-1" high pickets.

Hardware: Two strap hinges are affixed to the east wall.

Heating: There is a 1984-86 heating unit recessed in the west wall, near the floor. A metal cover conceals the unit and the recess.

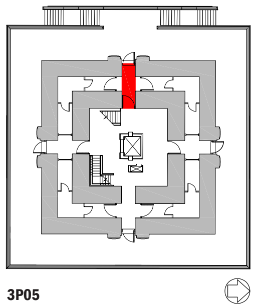
Lighting/electrical: Like the north corridor, this space is lit by a bronze ceiling with a pillbox shade; and by a smaller typical 1984-

Figure 137. 3P04, looking south. [JGWA, 2010]

Figure 138. 3P05, looking west. [JGWA, 2010]

86 ceiling fixture with a protective cage at the south end of the corridor.

Equipment: A sprinkler pipe, suspended from the ceiling, branches off into the corner corridors.



3P05

WEST CORRIDOR (3P05)

This passage is one of the four original corridors that connect the exterior to the central space of the pedestal. Until the construction of the AMI promenade in the 1960s, the opening at the west end of the corridor did not provide access to the exterior. In 1907, access to this corridor and to the north and south corridors was prevented by the installation of the still extant massive iron gates.

The finishes in the south corridor are similar to those of the north corridor. Other elements in this space include:

Door openings: Three doors have been inserted into this corridor: a 1907 gate at the east end; a 1984-86 bronze exterior doorway (similar to the north doorway); and a circa 2004 roll-down metal door.

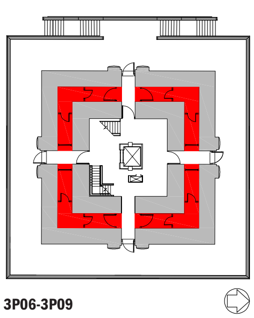
South gate: The iron gate is 4'-4 1/2" wide and has 7'-9" high, 1-1/4" thick pickets that alternate with 3'-1" high pickets.

Hardware: Two strap hinges are affixed to the south wall.

Heating: There is a 1984-86 heating unit recessed in the north wall, near the floor. The metal cover has been removed.

Lighting/electrical: A 1984-86 bronze ceiling fixture has a glass pillbox shade.

Equipment: A sprinkler pipe, suspended from the ceiling, branches off into the corner corridors.



3P06-3P09

CORNER CORRIDORS (3P06-09)

These outer, 5'-0" wide vaulted concrete corridors surround the central space of the pedestal. Other than decreasing the mass of the pedestal, there was no known purpose for these spaces. By 1907, a series of gates were installed to prevent public access.

The four original 1885 L-shaped corner corridors have similar finishes.

Floor: Original concrete.

Walls: The walls of the corridors are original 1885 concrete. In 1984-86, concrete block partitions were inserted to form lockable storage areas in the corners of the corridors.

Figure 139. 3P06, looking north from the east corridor (3P03). [JGWA, 2010]

Figure 140. 3P07, looking south from the east corridor (3P03). [JGWA, 2010]

Figure 141. Typical corner storage area at 3P. [JGWA, 2010]

Ceiling: The original 1885 barrel-vault concrete ceilings are 7'-2" above the floor at their highest point, and meet the side walls 6'-3" above the floor. The surfaces retain the imprint of the original wood board formwork.

Door openings: Two types of gates provide access to the corridors.

East gates: The 1907 iron gates in the two openings to the east corridor (3P03) are made up of 1-1/4" thick steel pickets, ranging from 5'-8 1/2" high to 6'-2" high (at center), alternating with 3'-1" high pickets. Three steel bars extend across each gate, with two additional bars forming “x” bracing at the bottom of the gate.

Hardware: Iron strap hinges wrap around a bar affixed to the west wall; a hasp and padlock secure the gate.

West gates: The 1984-86 gates in the two openings to the west corridor (3P05) are made up of 1/4" thick, 2" deep steel pickets fastened to steel braces.

Hardware: A continuous hinge is mounted to a steel bar that is bolted with two braces to the east wall.

Fixed 1984-86 steel fences, made up of 1/4" thick, 2" deep pickets welded to steel braces, enclose the corridor openings at the north and south main corridors (3P02, 3P04).

The doorways in the 1984-86 concrete block partitions have plain steel fire-rated frames.

Doors to lockable storage: Each of the 1984-86 flush steel doors are 33'-1/2" wide x 6'-2" high x 1-3/4" thick.

Hardware: At each door, the hardware includes three 4-1/2" butt hinges and a "Schlage" mortise lockset with lever knobs.

Lighting/electrical: Each of the lockable storage spaces have two typical 1984-86 ceiling fixtures with protective cages. Bronze ceiling fixtures with opal glass pillbox shades are used in the visible arms of the corridors. Other consistent electrical elements include switches in the concrete block partitions.

Equipment: Sprinkler pipes, hung with straps from the ceilings, extend through the corridors.

NORTHEAST CORRIDOR (3P06)

Besides the typical finishes, the northeast corridor includes the following individual characteristics.

Walls: A 2'-1 1/2" high x 2'-5 1/2" wide, shallow, table-like recess in the west wall of the south arm of the corridor is similar to the one in 3P07, but is not as finely finished. This feature appears to be integral to the poured concrete construction of the wall; it may be the location for one of the two bronze tablets produced by Tiffany and Company.

Lighting/electrical: In addition to the typical switches in the concrete block partitions, there is a also a switch in the east wall of the south arm.

SOUTHEAST CORRIDOR (3P07)

Besides the typical finishes, the southeast corridor includes the following individual characteristics.

Walls: There is a 2'-1 1/2" high x 2'-5 1/2" wide, shallow, tablet-like recess in the west wall of the north arm of the corridor. The recess includes a 2" frame that surrounds a 1'-7" x 2'-1" panel. Overall, this feature is well-finished; it may be the location for one of the two bronze tablets produced by Tiffany and Company.

Lighting/electrical: In addition to the typical switches in the concrete block partitions, there is a also a switch in the east wall of the north arm.

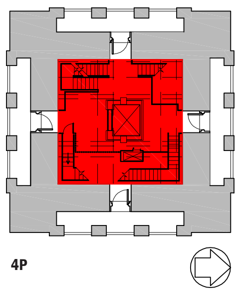
SOUTHWEST CORRIDOR (3P08)

Besides the typical finishes, the northeast corridor includes the following individual characteristics.

Lighting/electrical: An electrical box is mounted to the east wall of the north arm. Four conduits extend from the box down through the floor.

NORTHWEST CORRIDOR (3P09)

All of the finishes and systems in this corridor are typical.



LEVEL 4P (BALCONY LEVEL)

Each of the walls of the balcony level (4P) space includes an original, centrally positioned corridor opening. The short corridors end in doorways that provide access to the exterior loggias. As completed in 1886, a narrow 4'-9" wide iron balcony or gallery extended around the interior space to provide access to the short corridors. The central interior space of the pedestal was open above and below.

The original stair from level 3P arrived at this level near the southwest corner. The ascending stair, consisting of two runs, was located against the south and east walls. The gallery and stair rails were formed of sheet-iron panels with perforated disk and scroll motifs.

The central shaft remained unencumbered until the first elevator was installed in 1907. An additional platform was inserted to connect the elevator to the original gallery. All of this material was removed in 1936-37, when a new stair, elevator and floor system was installed; the 1936-37 features were removed in turn as part of the 1984-86 rehabilitation.

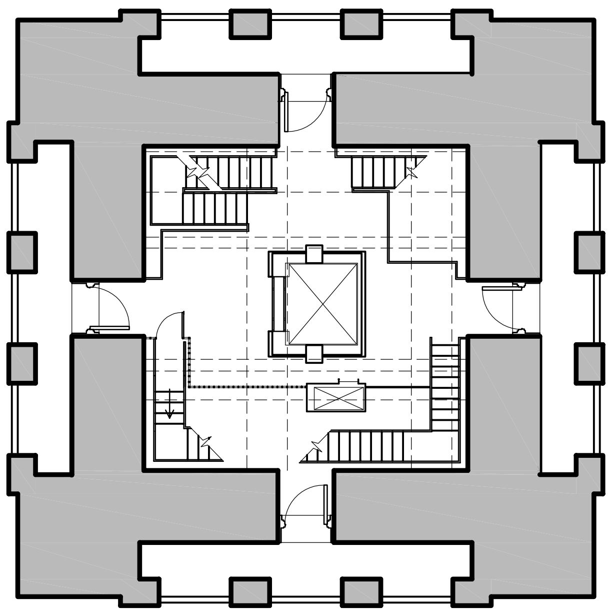
Floor: The 1984-86 steel deck elevator platform is covered in coin-patterned rubber flooring.

Walls: The walls are original concrete now covered in paint. The impression of the original horizontal wood formwork is visible on the wall surfaces.

The eight original groups of vertical steel tension bars are positioned against each of the four walls, with two groups on each wall. The eye bars are 5" wide and 1" thick. Each group consists of four vertical bars. The upper and lower bars join at lap or knuckle joints connected by a threaded 3-1/2" diameter rod secured at each end by a massive, 6" wide hexagonal iron nut. At the connection, the upper run of four bars is 2'-1 1/4" wide, and the lower extension is 1'-10 1/4" wide.

Ceiling: The steel platform supporting the floor of 5P is 25'-1 1/2" above this floor.

Door openings: There is a metal vertical bar gate at the entrance to the southeast stair. The vertical bars continue to the north to enclose the stair.



PLAN - LEVEL 4P

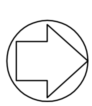


Figure 142. Floor Plan of Level 4P. [Based on ongoing HABS/HAER drawings]

Figure 143. 4P, looking northeast. [JGWA, 2010]

Figure 144. 4P, north corridor. [JGWA, 2010]

Figure 145. 4P, looking east into southeast stair. [JGWA, 2010]

Figure 146. 4P, looking east towards the northeast stair. [JGWA, 2010]

Figure 147. 4P, looking northwest. [JGWA, 2010]

Figure 148. 4P, west corridor. [JGWA, 2010]

Door: The 2'-10" wide, 7'-8 1/2" high gate is made up of 1-3/4" thick metal pickets.

Hardware: The door hardware includes a pair of 4" hinges, an emergency push bar, a grip, and a deadbolt.

Stair: The main 1984-86 stainless steel stair to 5P begins on the west wall, with a flight of eight risers north to a corner landing. The stair turns 180 degrees and ascends eight risers south to 5P. The finishes are typical: diamond treads; sandblasted solid railings; and polished round handrails.

The corresponding stair that visitors use to descend from 5P to 4P begins at the southwest corner of 5P and descends seven risers north, then nine risers south to 4P.

A 1984-86 stair in the southeast corner ascends to 6P. The stair is enclosed with metal pickets along the south run, and with pickets above a typical sandblasted railing to the east. The stair begins with five risers east, then turns to ascend seven risers north, seven south, seven north, seven south, and seven north to arrive at 6P. The stair finishes are typical. Strip lighting extends along the base of the stair railing.

Elevator: The 1984-86 hydraulic elevator is located near the center of this lobby. Stainless-steel railings that match the stair railings are used to direct the visitor circulation. Additional access is provided with an "Alimak" lift in the northeast corner of the space; the lift shaft is enclosed with a glazed partition.

Lighting/electrical: The level is lit by typical 1984-86 ceiling fixtures with protective cages on the steel platform for 5P. Boxed fixtures on the walls highlight the original structural elements. Emergency lighting fixtures are mounted to the north and east walls and to the framing for the northwest stair landing.

Other electrical features include a duplex in the south wall.

Equipment: There is an intercom outlet, a fire pull, a vacuum outlet, and a security camera on the south wall. A thermostat and fire annunciator are mounted to the north wall.

Sprinkler pipes extend up the north wall; sprinkler pipes branch off to serve the north and west corridors.

A fire extinguisher is mounted to steel wire mesh attached to the fencing at the southeast stair.

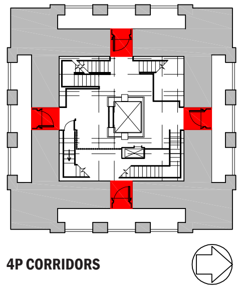
4P CORRIDORS

Four 4'-8" wide, 6'-0" long original corridors connect the main space in 4P to the north, south, east, and west loggias.

Floor: The original concrete floors slope down 2" to the exterior. Beyond the doors, the surface steps down 6" to the granite surface of the outside loggias.

Walls: Two courses of the original granite facing on the exterior of the pedestal extend into these corridors. Two courses of the original granite facing on the exterior of the pedestal extend into these corridors. In each corridor, the 1'-11 1/2" high lower course extends in approximately 1'-8". The upper course, near the ceiling, is 2'-2" high and extends in 1'-11". There is a 2'-0 1/4" high concrete surface between the blocks.

Ceiling: In each corridor, the original concrete ceiling, 7'-6" above the floor at the interior end, extends to the original granite lintel at the exterior end.



4P CORRIDORS

Door openings: The original granite openings at the exterior ends of the four corridors have original granite thresholds. The openings are fitted with 5-1/4" wide 1984-86 bronze frames.

Doors: Each of the 1984-86 bronze doors is 3'-5" wide x 7'-2 1/2" high x 2" thick and has three glazed panels.

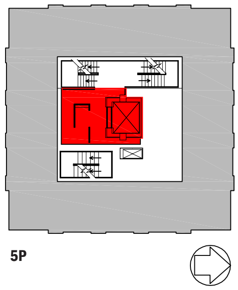
Hardware: The hardware at each door includes a 6-3/4" high mortise lockset with key cylinders; bronze grips; and concealed hinges in the lintel and sill.

Heating: 1984-86 heating units are recessed in the north wall of the west corridor; in the west wall of the north corridor; and in the north wall of the east corridor. There is no unit in the south corridor.

Figure 149. 4P, looking southwest. [JGWA, 2010]

Figure 150. 4P, looking north into the northwest stair. [JGWA, 2010]

LEVEL 5P (ELEVATOR PLATFORM)



5P

This 1984-86 elevator platform is positioned between two original floor levels, 4P and 6P (originally referred to as levels three and four). The current platform is positioned next to the original south and west concrete walls. Except for the original pairs of tension bars on each wall, all of the fittings date to 1984-86.

Floor: The 1984-86 steel platform is covered with coin-patterned rubber flooring.

Walls: The 1984-86 elevator shaft walls are concrete.

The eight pairs of tension bars connecting the main composite beams at the top of the pedestal with the anchorage beams below extend through this space. At this level, the 1" thick bars from the upper beams, spaced 7" apart, connect to the lower eye bars, spaced 3" apart, with 3" diameter horizontal threaded rods and massive 6" nuts.

Ceiling: The steel platform for 6P is 14'-9 1/2" above this floor.

Stair: The 1984-86 stainless steel stair to 6P begins on the west wall. Six risers ascend north to a landing. The stair then turns 180 degrees and ascends six risers south to a landing along the west wall connecting to the “down” stair. Six risers ascend north to a landing, and then six risers ascend east to arrive at 6P.

The stair that visitors use to descend from 6P to this level begins in the southwest corner of 6P, below the remaining original section of stair. Six risers descend west, then six north to the landing along the west wall. From the landing, six risers descend south, then the stair turns 180 degrees and six risers descend north to arrive at 5P.

The stairs feature typical finishes: diamond-patterned treads; sandblasted solid railings; and polished round handrails.

Elevator: The 1984-86 hydraulic elevator is located near the center of the platform, which ends 1'-0" from the south wall. Stainless-steel railings that match the stair railings border the platform; additional pipe railings control visitor traffic. Above the east railing, a steel picket fence is used to further enclose the stair. Glass panels are set above the northeast section of railing.

There is a 1984-86 elevator control panel (no longer in use) south of the elevator.

Additional access is provided with an “Alimak” lift in the northeast corner of the space; the lift shaft is enclosed with a glazed partition.

Lighting/electrical: The space is lit by two can fixtures and two typical 1984-86 ceiling fixtures with protective cages on the base

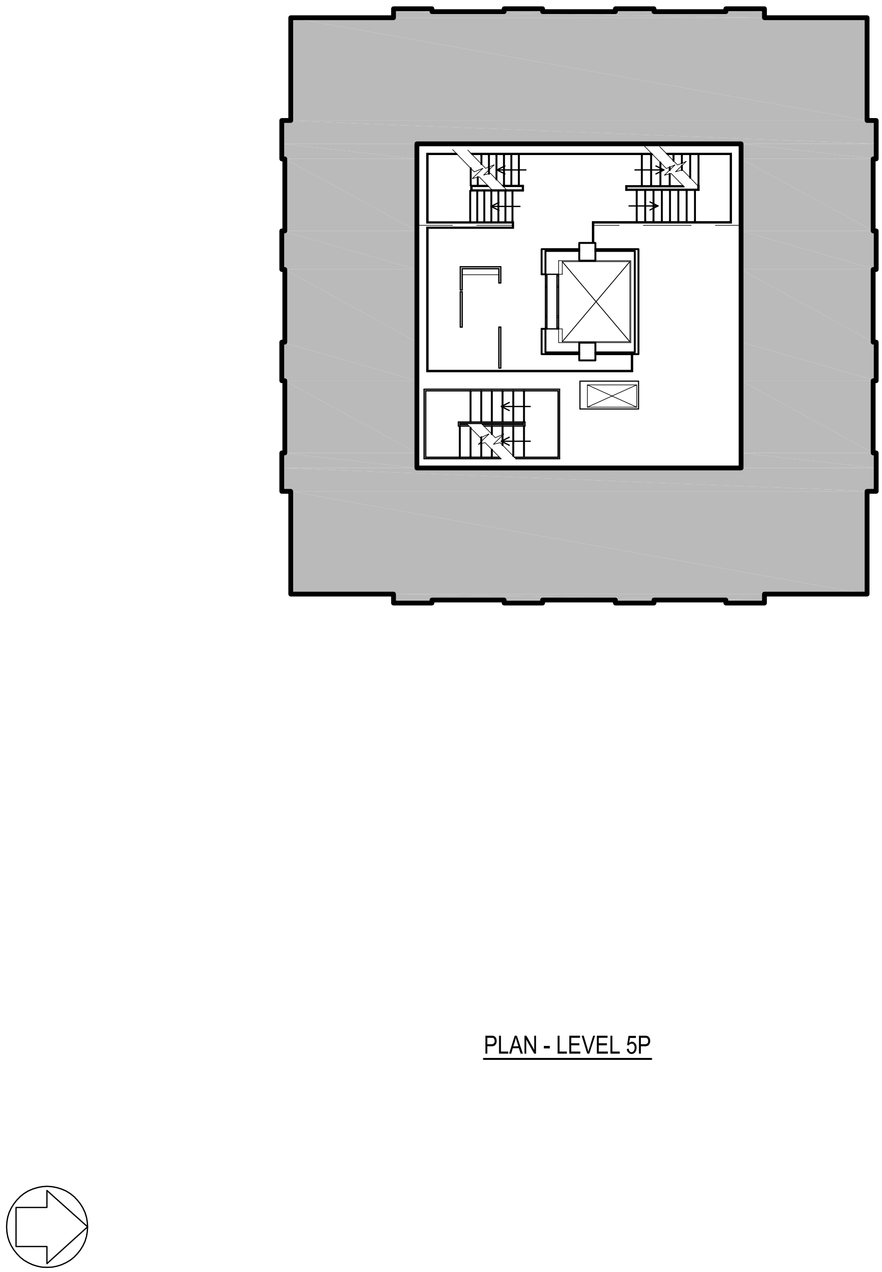


Figure 151. Floor Plan of Level 5P. [Based on ongoing HABS/HAER drawings]

Figure 152. 5P, looking southeast. [JGWA, 2010]

Figure 153. 5P, looking southwest. [JGWA, 2010]

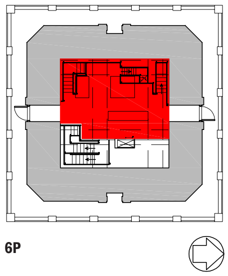
of the platform above. Other lighting is provided by boxed fixtures high on the north wall and on the east side of the elevator shaft, to highlight the tension bars; and by a typical 1984-86 fixture with a protective cage on the west wall.

Emergency lighting is mounted to the bottom of the southwest stair landing, and on the north and west walls.

Equipment: On the south wall, the equipment includes a security camera and outlet; an intercom receptacle; a fire pull, annunciator, and speaker; and sprinkler pipes. A fire extinguisher is mounted to the east railing.

Furnishings/fittings: There is a metal display frame on the west wall.

LEVEL 6P



6P

6P (originally referred to as level four) is the final original level, positioned just below the base of the Statue. The plan includes door openings in the north and south concrete walls that extend as corridors to the exterior balcony. There are stairs in the southeast, southwest and northwest corners. The 1984-86 hydraulic elevator does not extend to this level.

As completed in 1886, this space was not a complete floor level, but was much more open to the central shaft that extends up through the pedestal. Originally, a stair ascended along the east and north walls to arrive at the narrow iron balcony or gallery that was attached to the north, west and south walls of the pedestal shaft. From this level a narrow stair (still partially extant) rose in two runs to the base of the Statue (now level 7P). A second stair, possibly original, was positioned at the north end of the gallery, where it ascended to the base of the Statue. *[See Figure 155]*

The dramatic, open character of the space survived until 1937-38 when the balcony was removed and the floor level was lowered several feet. The new lower level was accessed from a new enclosed stair in the northwest corner and a centrally positioned elevator. The lowered floor level necessitated the construction of short flights of steps to reach the doorways in the north and south corridors and the exterior balcony. *[See Figure 156]*

The original 1886 stair in the southwest corner that ascended to the Statue base was retained but an additional flight of seven risers was installed at its base to connect to the new lowered floor level. *[See Figure 157, Figure 158, and Figure 159]*

These conditions survived until the reconstruction carried out in 1984-86, when the floor level was returned to the level of the original interior gallery. The original stair in the southwest corner was partially preserved but made inaccessible.

Floor: This 1984-86 steel deck is in the position of the original 1886 gallery. In 1937-38, the floor level was lowered approximately 5'-0". It was restored to the original level in 1984-86.

The platform is covered with coin-patterned rubber flooring.

Walls: The north, west, and south walls are the painted original concrete of the pedestal. Steel partitions enclose the emergency elevator shaft on the east wall, and later partitions enclose the southeast stair to 7P.

Ceiling: This platform looks up into the two sets of original massive cross beams (dunnage beams) that bear the downward

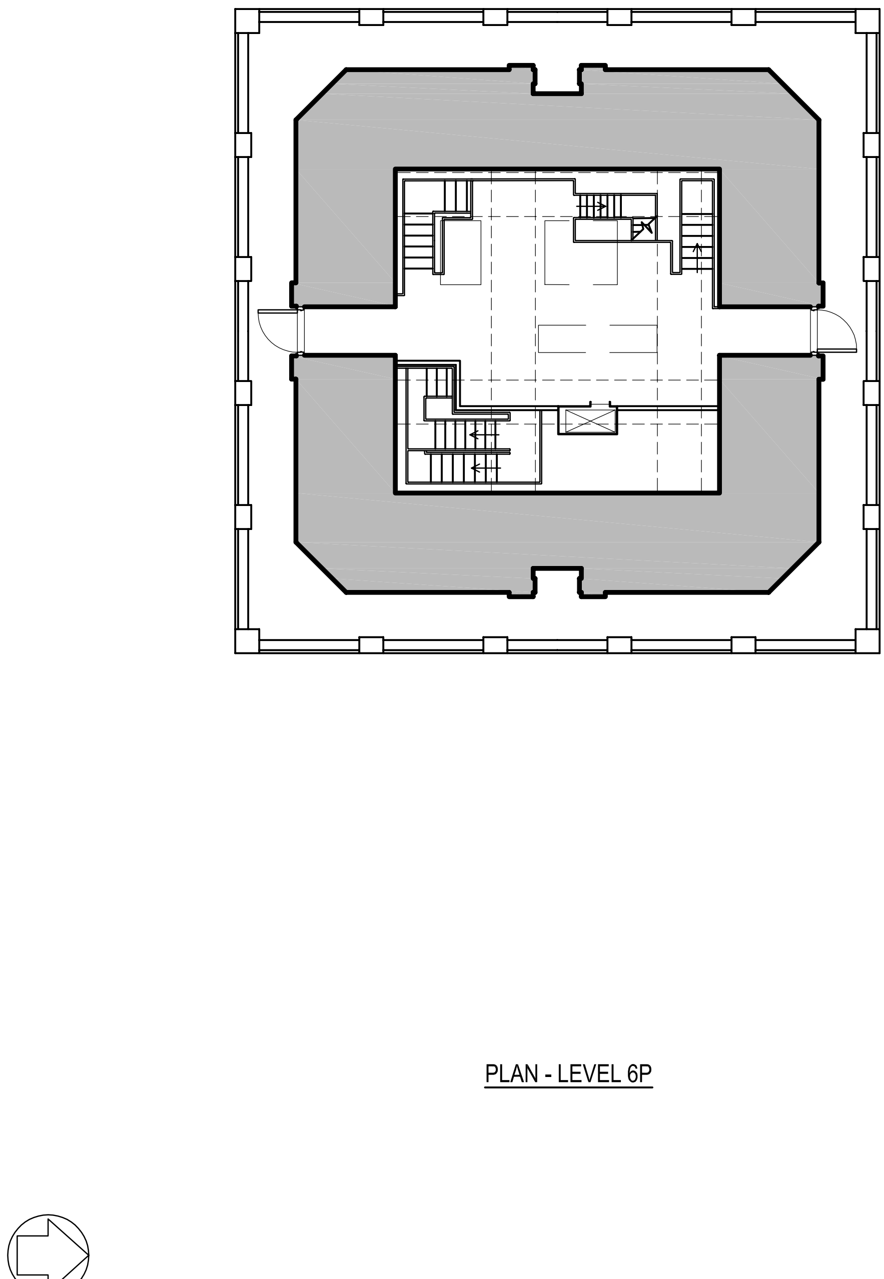


Figure 154. Floor Plan of Level 6P. [Based on ongoing HABS/HAER drawings]

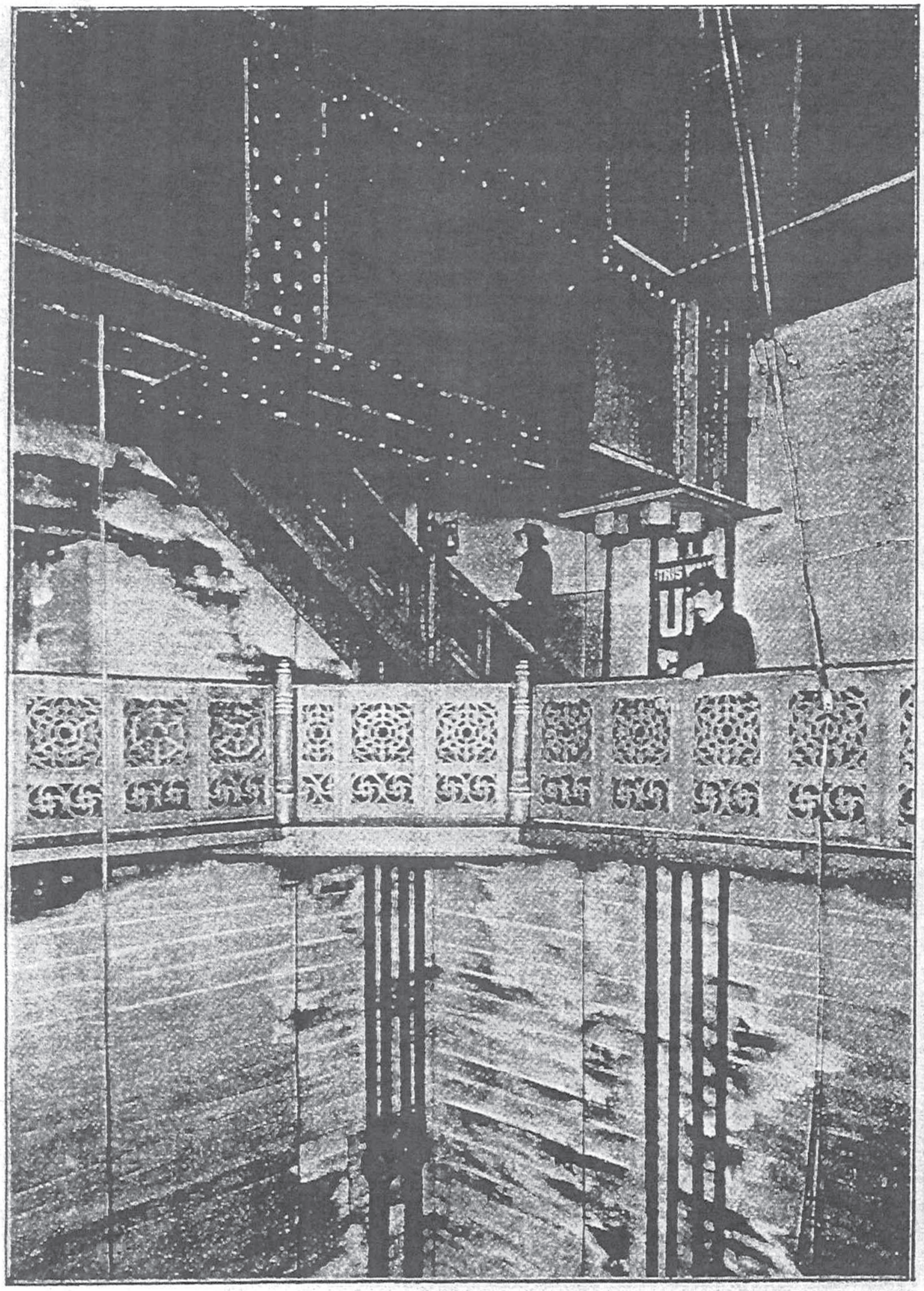
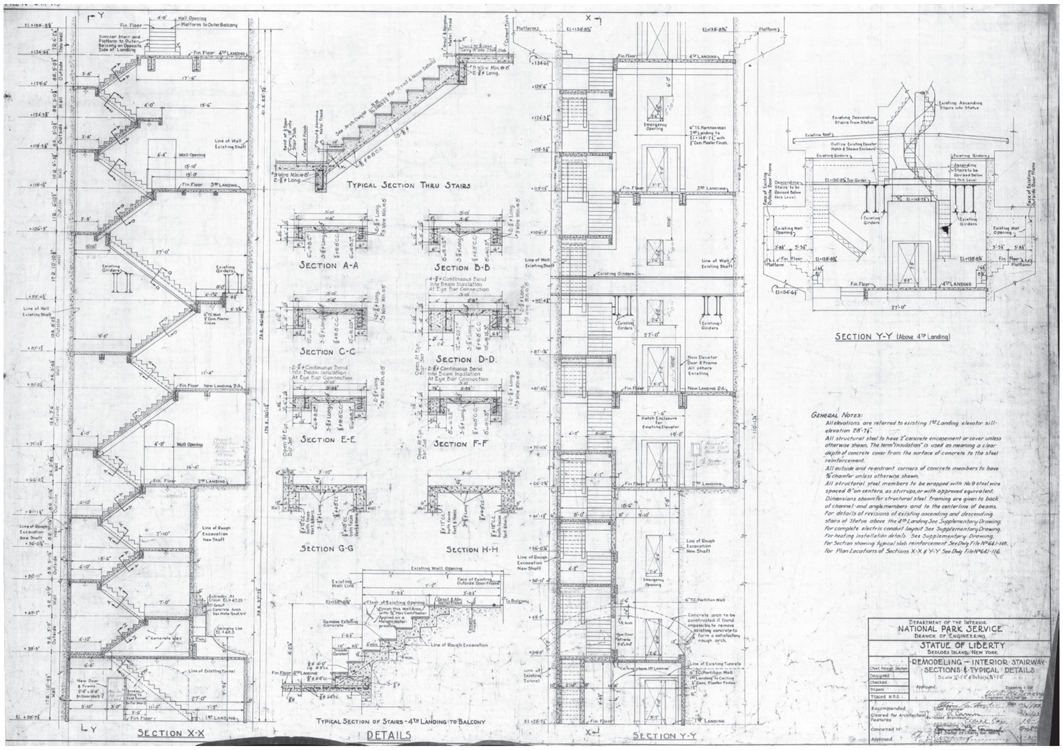


*Figure 155. Level 6P, ca. 1896. [*Photographic Views of the Statue of Liberty and New York Harbor from Recent Original Photographs*, Rand McNally & Co.; Photocopy from Carole Perrault files, NPS, STLI, Ref. Lib.]*



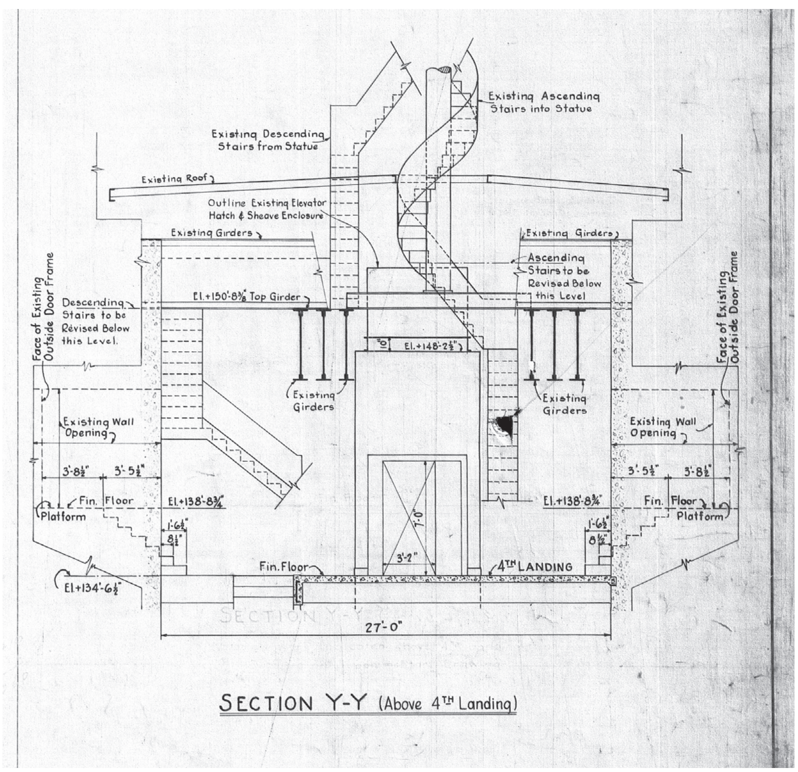


Figure 156. "Remodeling - Interior Stairway Section & Typical Details," December 21, 1937 (image enhanced for clarity). The detail to the left shows the section through what are now levels 6P and 7P. [NPS Denver Service Center, E-tic 2003; and NPS, STLI, Ref. Lib., LCS 22568 BPC STLI 01 FOLDER 2, STLI 36716]

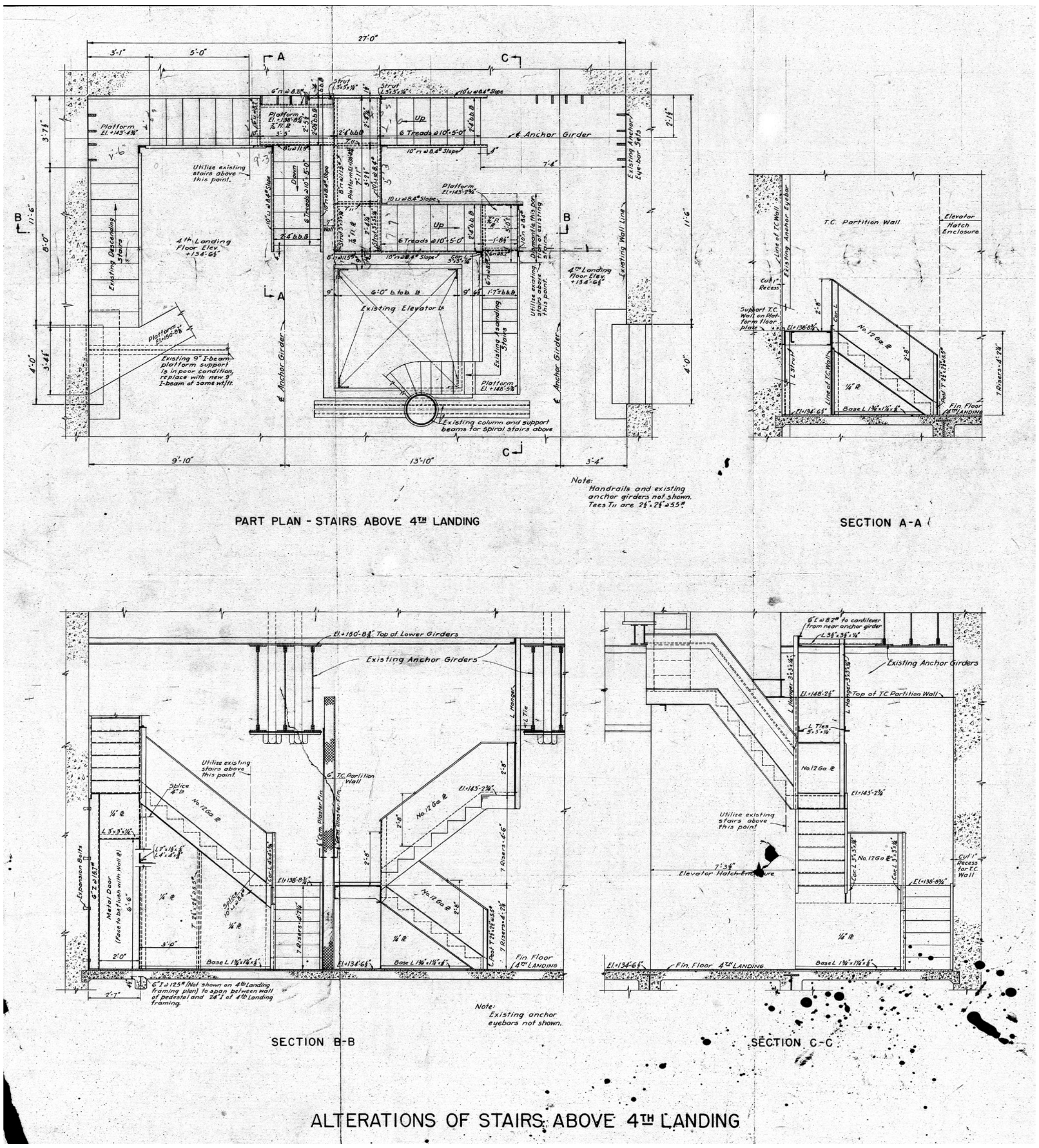


Figure 157. Detail from drawing for the remodeling of the stair, showing the alterations of the stairs above the "4th Landing" (now 6P), March 10, 1938 (image enhanced for clarity). [NPS, STLI, Ref. Lib., LCS 22568 BPC STLI 08 FOLDER 3, STLI 36852]

Figure 158. The original section of stair in 6P, looking west after the lower run was added in 1937-38.[NPS, STLI, Ref. Lib., 14.4 #10]

Figure 159. Original iron stair in the southwest corner of 6P; photograph by Jet Lowe in February, 1984. [HAER NY, 31-NEYO, 89--78, Library of Congress]

Figure 160. Original iron stair in the southwest corner of 6P, with the 1937-38 extension, by Jet Lowe in February, 1984. [HAER NY,31-NEYO,89--77, Library of Congress]

Figure 161. 6P, looking northeast in February, 1984; photograph by Jet Lowe. [HAER NY, 31-NEYO, 89--76, Library of Congress]

Figure 162. 6P, looking northeast. [JGWA, 2010]

load of the Statue. The steel beams are 3'-7 1/2" wide x 4'-4" high; each is made up of three 10-1/2" wide plate girders connected by iron plates. The lower two iron anchorage beams extend east-west, and the upper two beams extend north/south. The upper and lower beams are joined by three 5" diameter threaded rods secured with 9" diameter hexagonal bolts. Lengths of metal wire mesh have been inserted in the gaps between the girders.

The eight original pairs of tension bars connecting these beams with the beams at the lower level of the pedestal extend vertically through this space. In each pair, the 1" thick vertical eye bars are spaced 8-1/2" to 9-1/2" apart.

Additional steel framing has been added to support the stairs and mechanical elements. Some of the spaces between the beams were filled with metal panels in 1984-86 to create flooring areas in 7P. Glass panels replaced some of the metal panels after 2001 to allow visitors to look up into the Statue.

Door opening: The flush steel door to the southeast stairwell is set in a fire-rated steel frame and has emergency hardware.

Stair: A section of the 1886 cast-iron stair remains in the southwest corner. On the west wall, only the stringer and a corner landing remain. On the stringer are remnants of seven 8-1/8" risers with 10-1/4" deep treads. The intact flight on the south wall has eleven risers. The decorative railing, made up of solid panels pierced with a central medallion and scrollwork in the corners, meets the lower run at a 4" square newel post that is capped with an acorn finial.

Two 3/4" thick, 6" to 9" high iron bars that supported the stair extend from the newel post to the south and west walls, where they are bolted to angles that are in turn affixed to the concrete.

Two 1984-86 stairs now provide access to 7P. A stair in the southeast corner, behind the east metal partition, begins with seven risers ascending south to a landing, and then continues with five risers north and four risers west to arrive at 7P. The stair on the west wall ascends seven risers north to a corner landing, then nine risers east to 7P. Both stairs have typical finishes: diamond-patterned treads; sandblasted solid railings; and polished round handrails.

Elevator: The "Alimak" lift on the east wall is accessed through glazed doors. Solid metal panels enclose the shaft.

Lighting: The space is lit by six typical 1984-86 fixtures with protective cages on the framing above. A boxed cage on the west wall highlights the original framing. Conduit extends to the equipment and electrical fittings.

Emergency lighting fixtures are positioned over the openings to the north and south corridors and on the west wall.

Other elements include a duplex receptacle on the west wall, and a lighting panel on the southeast partition enclosing the stair.

Equipment: On the north wall, there is a sprinkler pipe and valve; a fire annunciator; and a "Pelican" emergency lighting station. A fire-extinguisher is mounted to a railing near the north wall.

The equipment on the south wall includes a fire pull and a telephone receptacle near the ranger's station in the southeast corner.

Figure 163. 6P, looking southeast. [JGWA, 2010]

Figure 164. (Above) 6P, looking southwest. [JGWA, 2010]

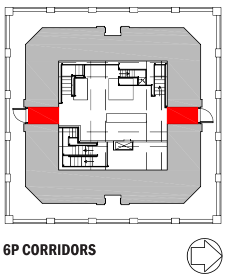
Figure 165. (Left) Section of original stair in southwest corner of 6P. [JGWA, 2010]

Figure 166. 6P, looking northwest. [JGWA, 2010]

Samsung flat-screen monitors hang from the northeast corner of the ceiling, and above the opening to the south corridor. Speakers, receptacles, and switches are positioned near the northeast monitor.

Security cameras are hung from the northeast and southeast corners of the framing above.

Furnishings/fittings: Metal display frames are mounted to the north and west walls.



6P CORRIDORS

6P NORTH AND SOUTH CORRIDORS

The original north and south corridors provide access to the exterior balcony that extends around the top level of the pedestal, just below the base of the Statue. The 4'-0" wide, 8'-3" long passages have floor surfaces that slope towards the exterior to facilitate drainage. On the exterior, there are two additional matching openings in the east and west elevations, but there is no evidence on the interior concrete wall surfaces that these "openings" ever extended fully into the pedestal. The east exterior opening did not extend through the wall because the interior stair ascended from level three (now 4P) along the east wall.

The openings in the north and south walls were originally accessed from a narrow gallery on the north, south, and west walls of the central shaft. The gallery was replaced in 1937-38 by a full floor at a lower level. The level changed resulted in the addition of steps to gain access to the north and south openings. In 1984-86, the floor level was returned to its original position.

Floor: The concrete floors are covered with coin-patterned rubber flooring. Panels of diamond plate steel have been set on the flooring.

In 1937-38, part of the original concrete floor at the interior end of both corridors was removed and replaced by flights of steps, each with seven risers. The steps were removed when the floor level in 6P was restored in 1984-86.

Walls: Four courses of the original granite facing on the exterior of the pedestal extend into these corridors. The courses range from 1'-4" high (at the bottom) to 1'-9" high (at the top); the bottom course extends in approximately 2'-9"; the second course 1'-9"; the third course 2'-10", and the top course 3'-10".

Ceiling: At the exterior ends of the corridors, original concrete ceilings, 6'-8" above the floors, extend to the 4'-6" deep granite lintels of the openings to the balcony.

Door openings: The doorways at the exterior ends of the corridors have 1984-86 5" wide bronze frames.

Doors: Each of the 3'-1" wide x 6'-6 1/2" high x 2" thick bronze doors has two glazed panels.

Hardware: The 1984-86 hardware at each door includes a 6-3/4" "Adams-Rite" bronze mortise lock with key cylinders; a bronze push bar on the interior face; a bronze grip on the exterior face; and concealed hinges in the sill and lintel.

Lighting/electrical: Conduit extends along the ceilings to service the lighting and speakers above the exterior doors.

LEVEL 7P

This visually complex space, difficult to define, is the highest level accessible by the stair system that extends up through the foundation and pedestal. From this level, a separate stair system, in the form of two double helixes around a central shaft, continues upward through the pylon where it terminates at the crown.

This level is defined by the concrete walls at the top of the pedestal. The four walls extend up 4'- 4" above the floor level, which is positioned at the top surface of the steel girders that extend east-west. The floor consists of 1984-86 stainless steel plates and the top surfaces of the original steel girders. Until 1937-38 the only access to this level was the original stair in the southwest corner and a narrow stair near the northwest corner.

There is an additional floor surface, not accessible to the public, at the top of the walls of the pedestal. The concrete surface, approximately 6'- 2" wide along the north, south and west sides, is now encumbered by mechanical equipment. Larger concrete surfaces in the northeast and southeast corners are supported on two concrete arches.

An approximately 1'-4" wide trough, set into the concrete floor surface and now covered by metal plates, extends around the outer edge of the top of the pedestal. Where accessible, the trough is about 2'-2" deep. It probably forms part of an original system that carried water away from the interior of the base of the Statue.

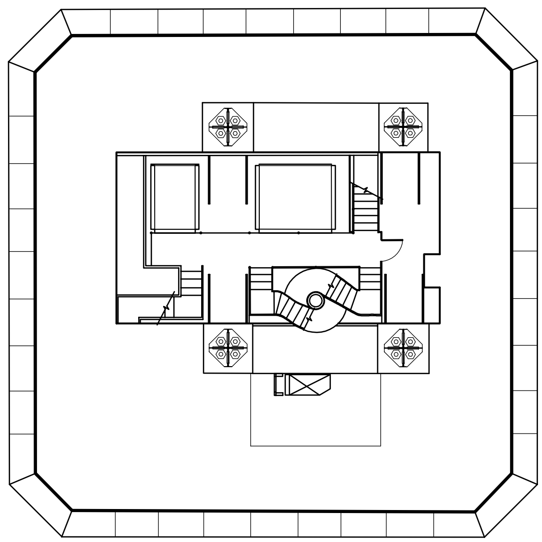
Structure: At this level, Eiffel's skeletal iron support system for the Statue meets the massive steel cross beams embedded in the concrete of the top of the pedestal. The four iron girders forming the central pylon bear on the two upper steel beams that extend north/south.

Beyond the pylon, lattice girders "receive and frame the bottom folds of the draping copper robe, forming the outline for the pedestal cap." A summary of the 1984-86 work described the condition of the girders and the subsequent work:

> These girders were in poor condition. Sections had come in contact with the sagging robe and were almost completely corroded. Elsewhere portions of the top flange of the girders had been cut to allow the installation of guy rods, causing the girders to sag. These guy rods, installed at a very steep angle from the statue's framework, were intended to reduce the structure's tendency to topple. They never functioned as intended. The damaged portions of the girders were replaced and guy rods relocated to clear the lattice beams.[12]

In the northeast and southeast corners of the original shaft of the pedestal are arched concrete platforms. Each arch forms a barrel vault that supports the 4'-8" wide concrete mass above. The east spring line of each arch is incorporated into the mass of the east wall of the pedestal; the west spring line rests on the lower flange of the upper north/south steel plate girder. Between the two platforms, behind the emergency elevator, is a steel catwalk with a pipe rail. A steel ladder on the northeast platform provides access down to the catwalk; there is no corresponding ladder on the southeast platform.

Stainless steel panels installed in 1984-86 form sections of floor; coin-patterned rubber flooring covers the panels. In some of the openings between the beams, glass panels, installed after 2001, allow visitors at 6P to look up into the framework of the Statue.



PLAN - LEVEL 7P

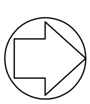


Figure 167. Floor Plan of Level 7P. [Based on ongoing HABS/HAER drawings]

Stairs: The original 1888 double helix stairs that rise up through the pylon begin in this space. The central 1'-0" diameter iron tube that supports the cast-iron, tread-riser units rests on a pair of I-beams that extend north/south and are supported on the lower pair of girders that bear the weight of the pylon.

In 1984-86, the stairs were found to have "sharpened handrails, slipping steps..."[13] The bucket seats that allowed visitors to rest were in poor condition, as were the two rest platforms (one between levels two and three, and one at level six).

Diamond-patterned stainless steel treads were installed on the original iron stair treads, and some of the damage step units were replaced. Sandblasted stainless steel railings with polished steel handrails replaced the original iron railing. On the down stair, a polished steel pipe handrail was mounted to the central shaft.

In 2009, when the crown was re-opened to the public, secondary handrails were installed above and outside of the 1984-86 railings. A handrail for the up stair was mounted to the central shaft.

At 7P, the stair begins with two flights (one for the "down" stair, and one for the "up" stair), each ascending four risers east to a landing.

The surviving original section of iron stair at 6P arrives in the southwest corner of this space, and a section of the handrail extends above the floor level.

The opening above the 1984-86 stair in the northwest corner of 6P can be closed up with a two-panel steel cover, hinged to the west side of the opening; and by a sliding pocket steel panel at the northeast side of the opening.

Elevator: The 1984-86 "Alimak" emergency lift ascends through the east side of the space.

Lighting/electrical: Numerous lighting fixtures were mounted to the lattice girders in 2008. There are spotlights at the bases of the iron girders forming the pylon; fluorescent strip fixtures on the outside corners of the girders; and emergency fixtures on the inside corners. Conduits extend around the space.

Heating/air conditioning: The outer spaces around 7P have been largely filled with mechanical system equipment. Within this space are two heating fans and three dual-temperature heating/cooling units; a fourth unit services the center shaft of the two double helix stairs for the crown. Linear diffusers extend up the iron girders of the pylons. Metal cabinets enclose filter banks, coil banks, and the motors.

Equipment: The copper downconductor for the lightning protection system is routed along the perimeter of the base of the Statue, and fastened to the Statue with metal saddles.

In the southeast corner there are panels for a *Fenwal AnaLaser II* air sampling system, *Apollo* fire sensor boxes, and a panel for a *Time Frame* remote monitoring system.

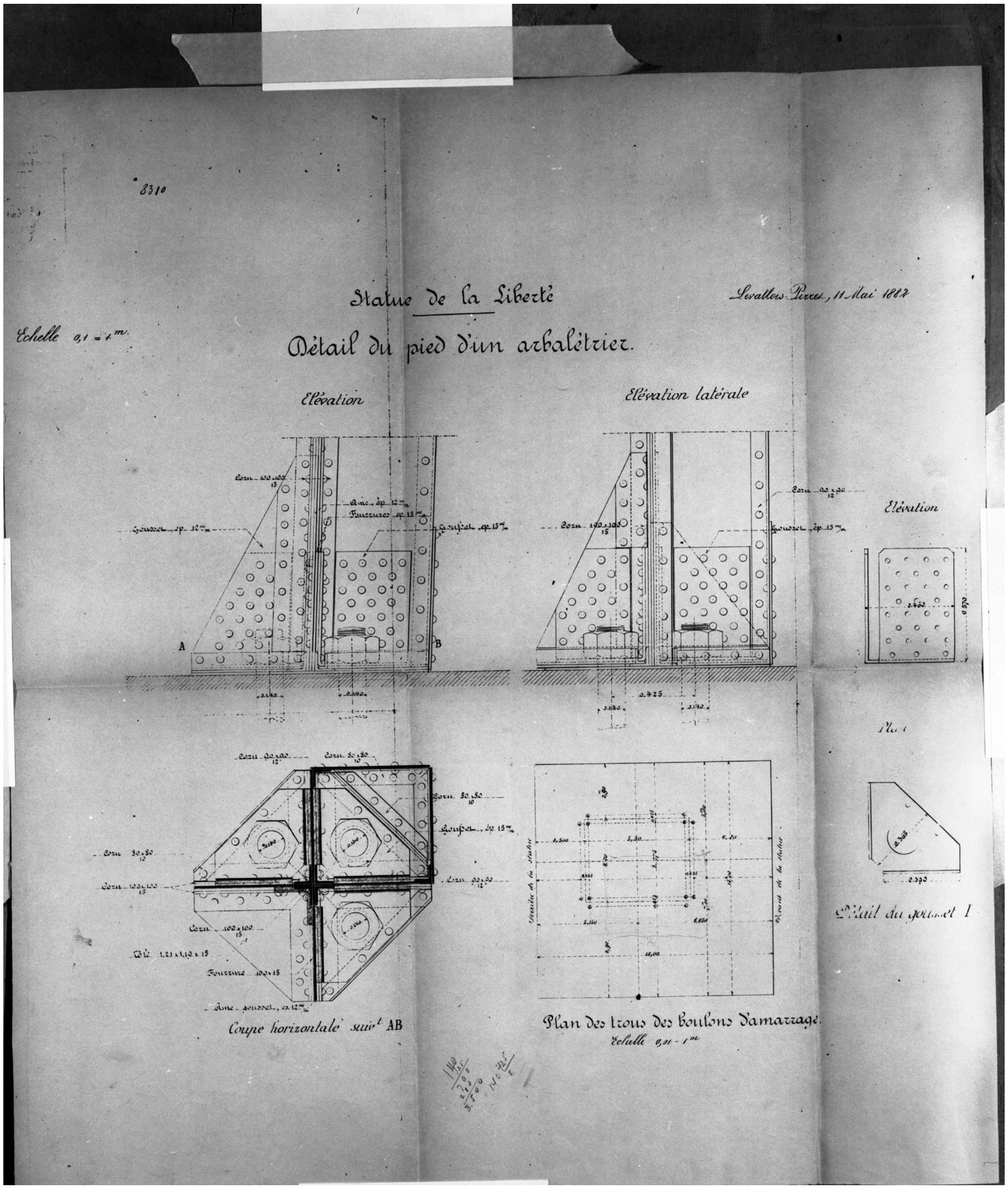


Figure 168. Gustav Eiffel's drawings for the foot of the pylon. [NPS, STLI, Ref. Lib.]

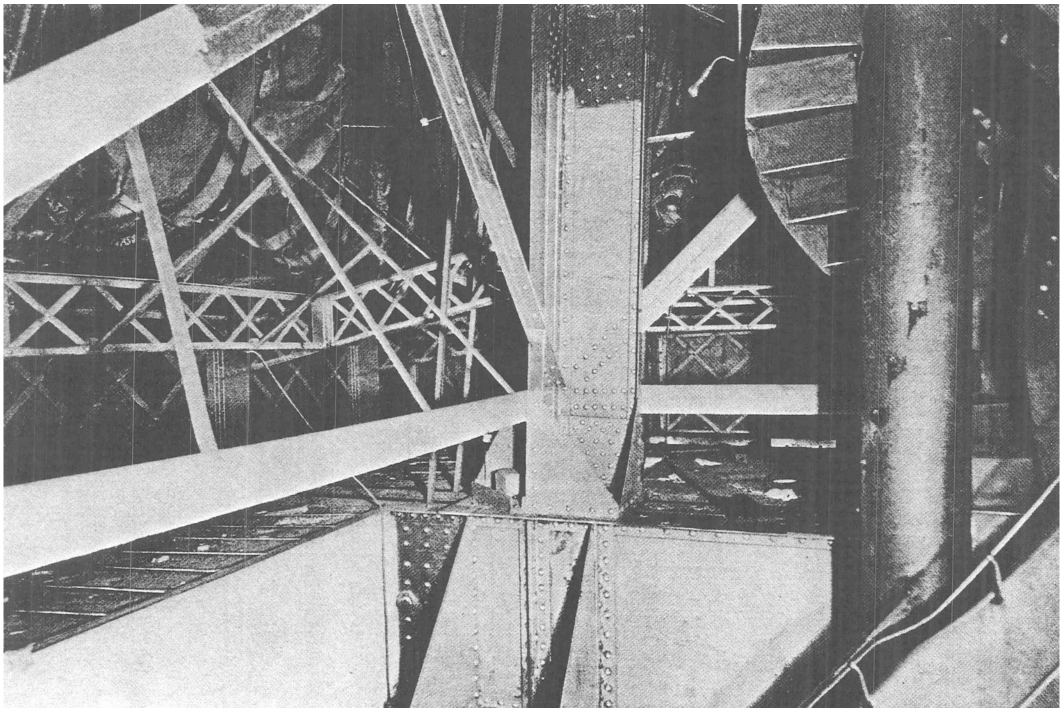


*Figure 169. A view of 7P in ca. 1896. [*Photographic Views of the Statue of Liberty and New York Harbor from Recent Original Photographs*, Rand McNally & Co.; photocopy from Carole Perrault files, NPS, STLI, Ref. Lib.]*

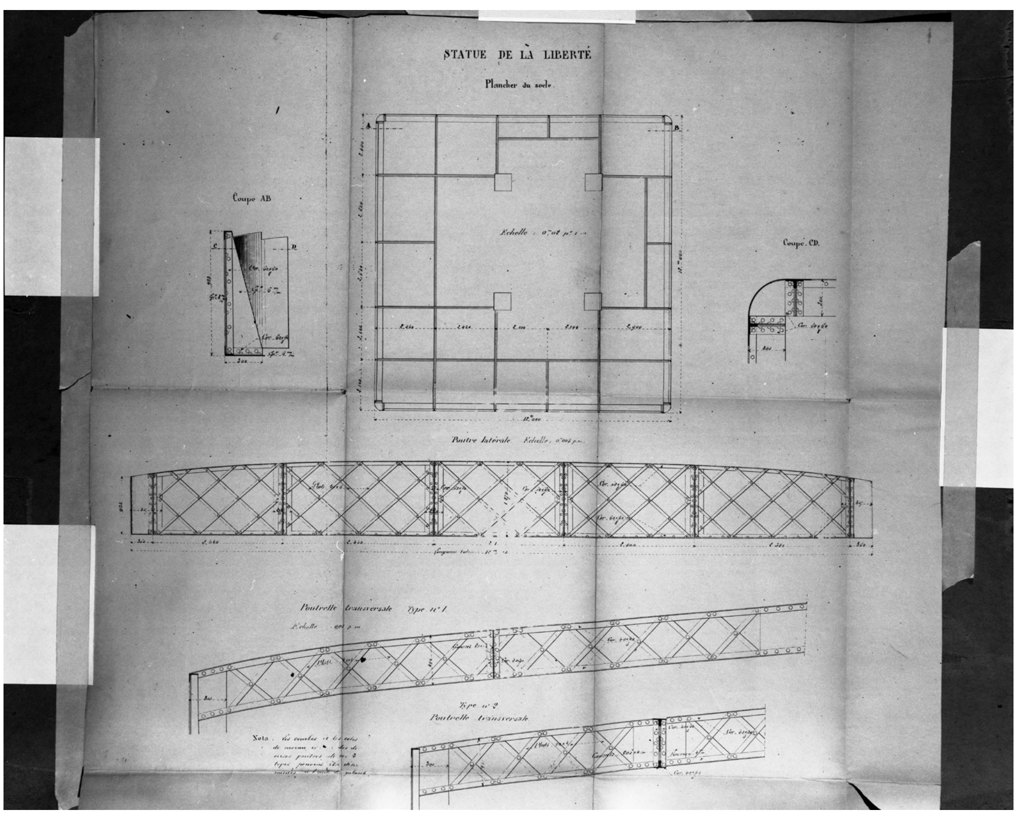


Figure 170. Eiffel's drawings for the lattice framing at the base of the Statue. [NPS, STLI, Ref. Lib.]

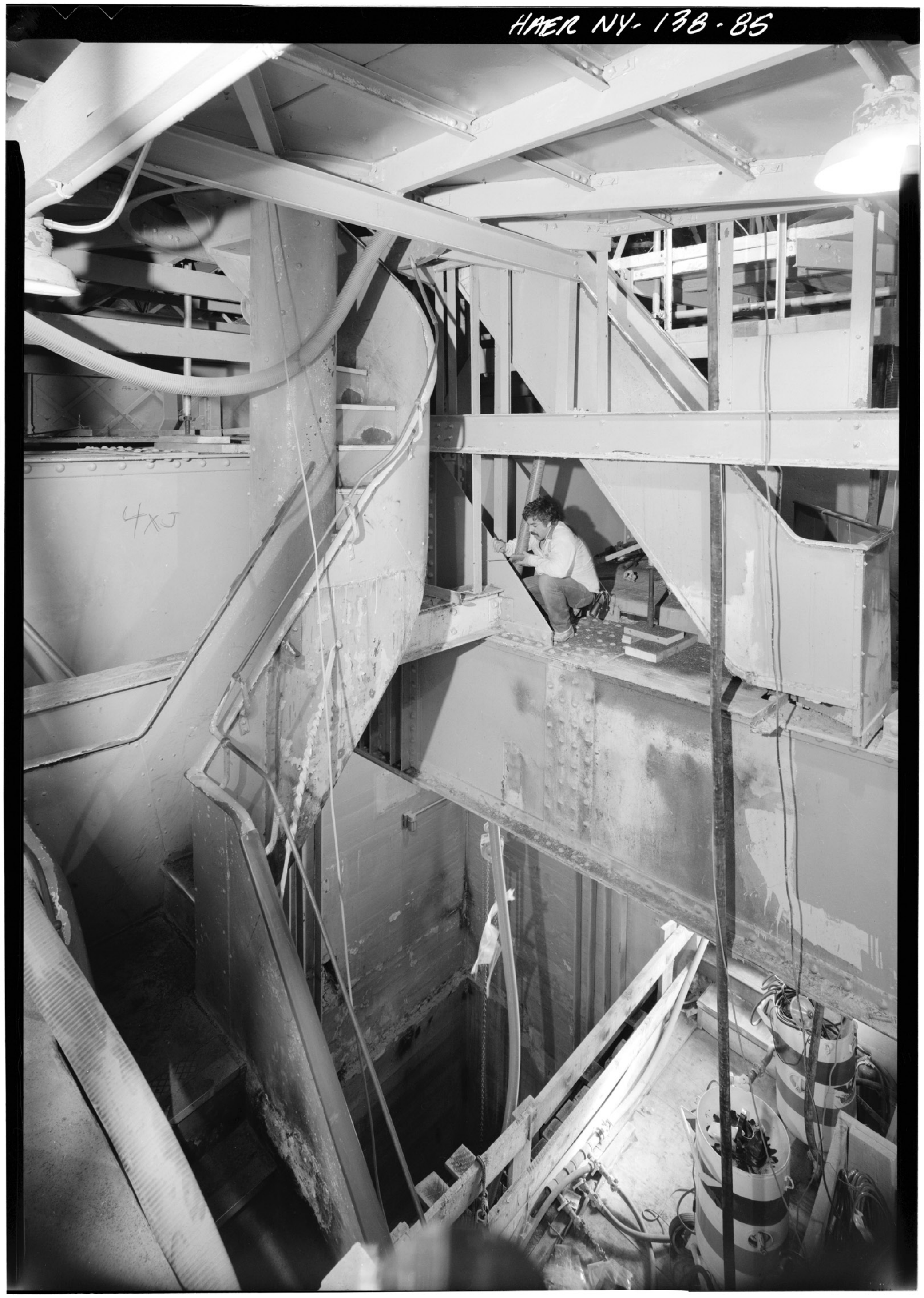


Figure 171. 7P in October 1984; photograph by Jet Lowe. [HAER NY, 31-NEYO, 89-85, Library of Congress]

Figure 172. Detail of connection between pylon and anchorage beam at 7P in October 1984; photograph by Jet Lowe. [HAER NY, 31-NEYO, 89-87, Library of Congress]

Figure 173. 7P, looking southeast. [JGWA, 2010]

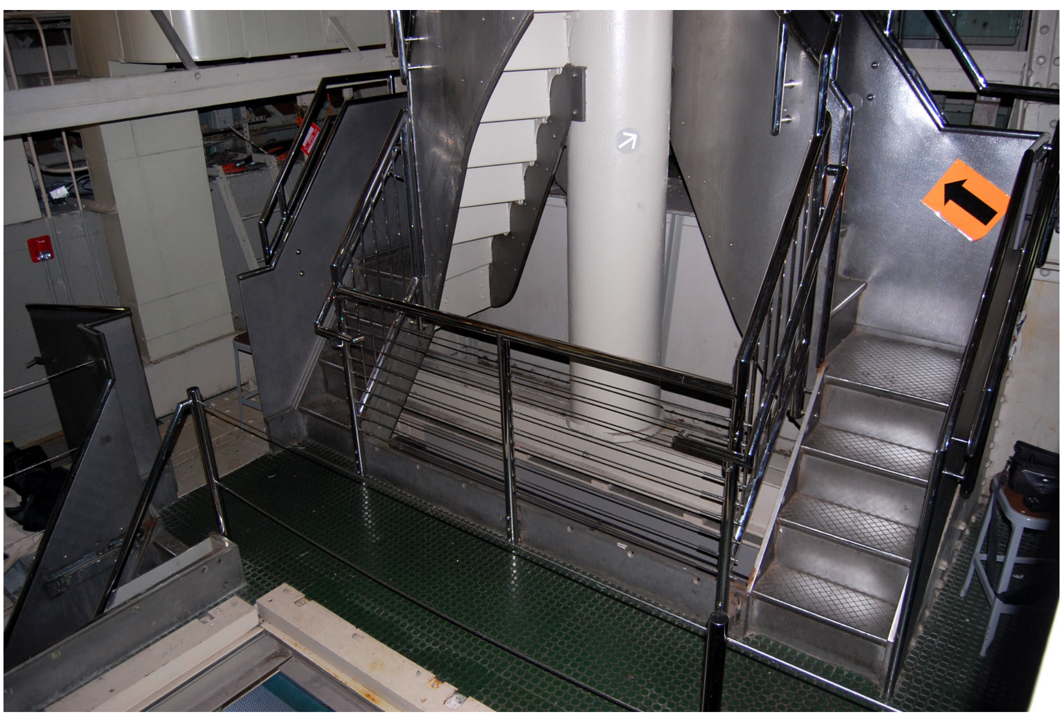


Figure 174. 7P, looking east towards the base of the stairs to the crown. [JGWA, 2010]

Figure 175. (Above) 7P, looking north. [JGWA, 2010]

Figure 176. (Left) Concrete arched platform in northeast corner of 7P, looking north from the catwalk. [JGWA, 2010]

Figure 177. A section of the north end of the trough that extends around the outer edge of the top of the pedestal at 7P. [JGWA, 2010]

Figure 178. North elevation, northeast corner of copper sheathed plinth beneath the Statue (above Level 7P). Galvanic corrosion is occurring where the copper saddle and iron truss work are not sufficiently insulated one from the other. [JGWA, 2010]

LEVELS 1S-8S (STATUE INTERIOR)

Since the completion of the Statue, its dramatic interior space has been accessible to the public from the narrow pair of double helix stairs that ascend up through the pylon. Passage up and down the stairs allows for remarkable views of the structure supporting the copper shell of the Statue. These stairs, installed in 1888, replaced the temporary wooden construction stair.

Framing: E. Blaine Cliver, of the National Park Service, and Robert Baboian of Texas Instruments, described the original framing of the Statue:

> The 151-foot (45.72 meter) Statue has a framework of puddled iron. Her central support system is a pylon with four legs connected by cross bracing. A double-helix staircase rises within the pylon. Connected to the pylon is a secondary framework consisting of iron angle bars. This framework, connected by flat iron bars, provided support for the original armature, a network of 1850 puddled iron bars (2 by 5/8 inches [50.8 by 15.875 millimeters]) that conformed to the outer shape of the Statue. The copper skin is attached to the armature with about 1500 U-shaped copper saddles. The saddles fit around the armature on three sides and are flush riveted with copper to the copper skin. The 80-ton copper envelope (3/32-inch- [2.38125-millimeter-] thick copper) consists of 300 hammered sheets riveted together with about 300,000 copper rivets.[14]

Cliver elaborated on the structural elements of the framing:

> Eiffel's design used flat iron bars in compression to attach the armature and skin to the central structure; its rigid frame supporting an iron skin represents an early example of curtain-wall construction. Acting as large, flat springs, these bars allow the copper skin and its accompanying armature to give under wind loads and thermal stress, dampening their effect.[15]

By the 1980s, the poor condition of the iron armature led the restoration team to replace all of the armature with stainless steel, except for a "few bars in the raised sole of the right foot... this area was in good condition and was preserved as an example of the original construction."[16] The 1984-86 bars are "2- by 3/4-inch (50.8- by 19.05- millimeter) type 316L (UNS S31603) stainless steel." The bars were installed with new copper saddles and rivets, and "skived 'Teflon' was placed between the copper (skin and saddles) and stainless steel armature bars to interrupt corrosive electrolyte continuity."[17]

The interior of the Statue has remained largely unchanged since the 1984-86 work. Some glass panels have been installed in the framing openings at the upper levels of the Statue; these panels can be distinguished from the 1984-86 glass because they are not bolted through the Eiffel framing. The original armature bars remain in the sole of the right foot, and can be seen by crawling in between the mechanical systems in the southwest corner of 7P.

Door openings: At the platform that leads to the right arm and torch, there is a wire mesh partition; in that partition, a wire mesh door is set in a metal frame. The 2'-1 1/2" wide x 3'-8 1/2" high door has a key-operated lock, three 3" high stainless steel butt hinges; and a hasp and padlock.

Figure 179. East elevation, southeast corner at the intersection of the copper plinth and base of the Statue (above Level 7P). Water has collected above the plinth where the sheet metal may have roofed over the pedestal at one time.[JGWA, 2010]

Figure 180. The copper downconductor for the lightning protection system is routed along the perimeter of the base of the Statue. [JGWA, 2010]

Figure 181. The original iron armature bars in the sole of the Statue's right foot. [JGWA, 2010]

Stair: The 1888 intertwining double helix stairs rise up through the pylon. As described in 7P, the 1984-86 campaign replaced the treads and handrail with stainless steel, added a handrail to the interior shaft at the down stair, and removed the bucket seats. During that work, the rest platforms between levels 2 and 3 and one at level 6 were removed. In 2009, when the crown was re-opened to the public, secondary handrails were installed above and outside of the 1984-86 railings. A handrail for the "up" stair was mounted to the central shaft.

With the installation of the "Alimak" lift in 1984-86, new rest platforms were installed at levels 4S-8S, and glazed panels affixed to the framing. At the "up" stair, fifty-two risers ascend to level 4S; sixteen risers to 5S (with an additional step up to the platform); fourteen risers to 6S (plus a step up to the platform); thirteen risers to 7S (with a 1'-2" high step up to the platform); fourteen risers to an intermediate platform; and finally twenty-nine risers to the end of the 1888 stair. Four additional risers ascend from each side of the stair to the 1984-86 crown platform. The "down" stair is similar in configuration.

Lighting/electrical: When early visitors to the Statue climbed to the crown, they carried lanterns to help find their way up the dark, circular stairs. The Statue interior is now fully lit by a combination of fixtures. In his essay on the 1984-86 lighting system for the Statue interior, Howard Brandston explained that

> Lighting the interior to detail the intricacy and beauty of its internal structure was a major goal of this restoration project. The work was accomplished using long life, incandescent and fluorescent lamps, luminaires, and ballasts that were currently available and did not have to be custom designed. However, some of the fixtures and mounting devices had to be specially built.
>
> …Upon entering the Statue, the pedestal is dimly lit and the trip up through the space is a celebration of the structural work of Eiffel with each level of ascent getting brighter until daylight is seen through the crown windows.[18]

Strip fluorescent fixtures are mounted to the outer corners of the girders forming the pylon, supplemented with flood lights mounted to the framing. There are emergency lighting fixtures on the inside corners of the girders and on the bottom of the crown platform.

Equipment: There are security cameras affixed to the framing throughout the Statue. Fire annunciators and speakers are mounted to the framing for the "Alimak" lift.

Figure 182. The double helix stairs, ca. 1890. [S.R. Stoddard, Glens Falls, NY; the Adirondack Museum, New York]

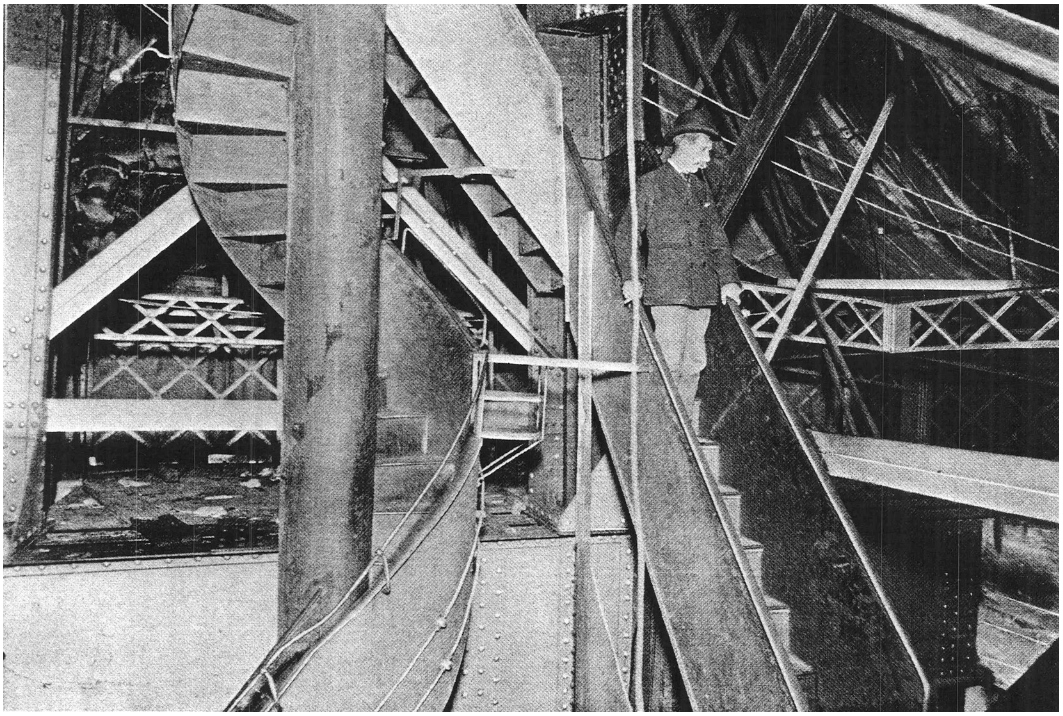


Figure 183. The stairs at 7P, ca. 1896. [Photographic Views of the Statue of Liberty and New York Harbor from Recent Original Photographs, *Rand McNally & Co.; photocopy from Carole Perrault files, NPS, STLI, Ref. Lib.]*

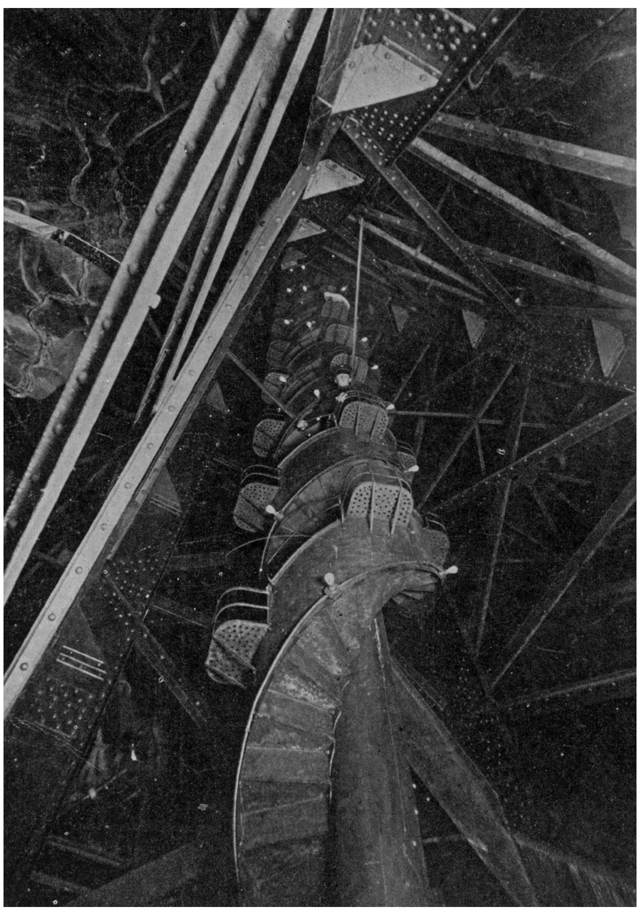


Figure 184. The double helix stairs ca. 1912. [private collection, postcard loaned to Statue of Liberty National Monument; NPS, STLI, Ref. Lib., 14.4 #8]

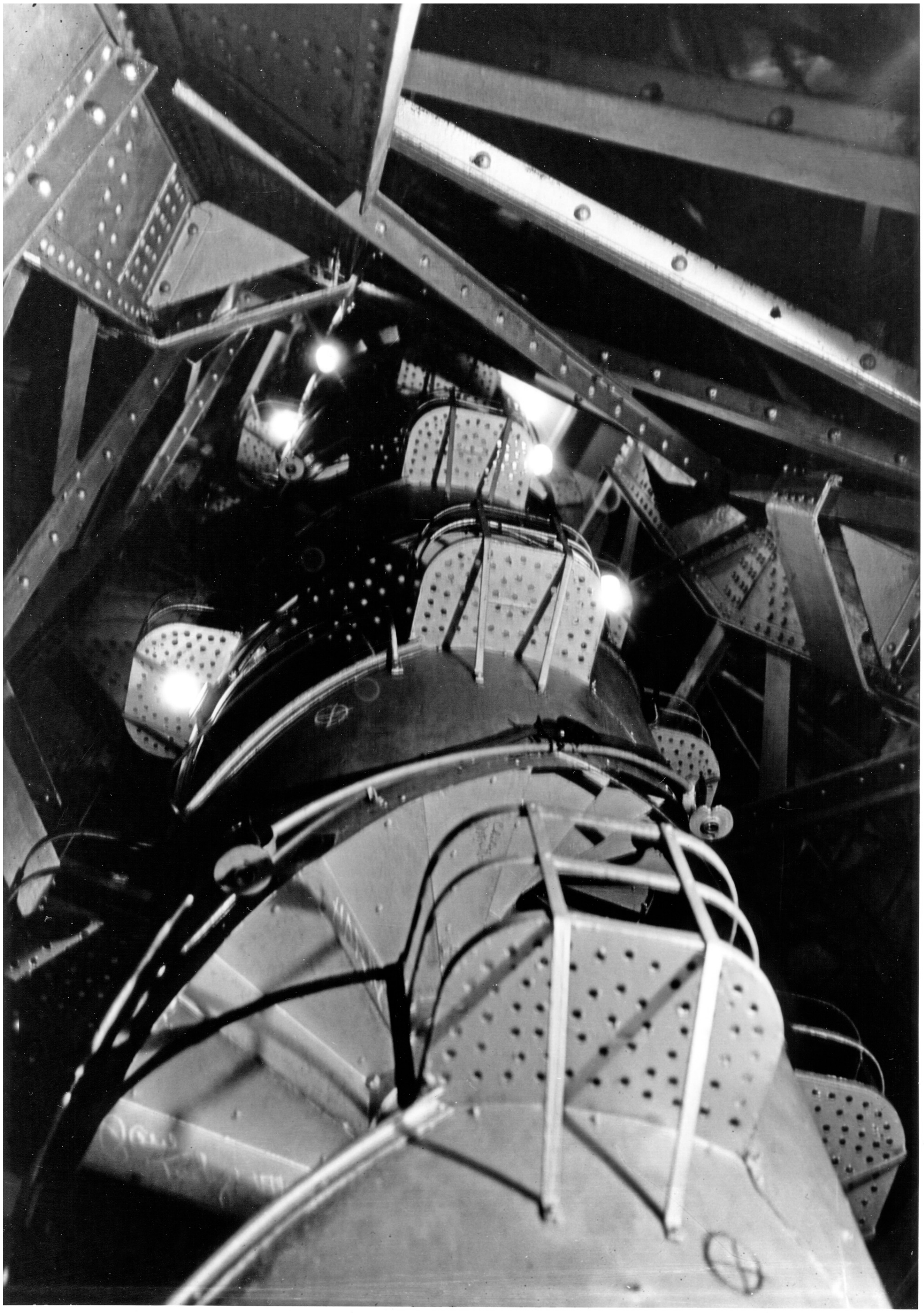


Figure 185. The double helix stairs on August 17, 1934. [Photographed by Allan Rinehart, NPS, STLI, Ref. Lib., 4 4 #15]

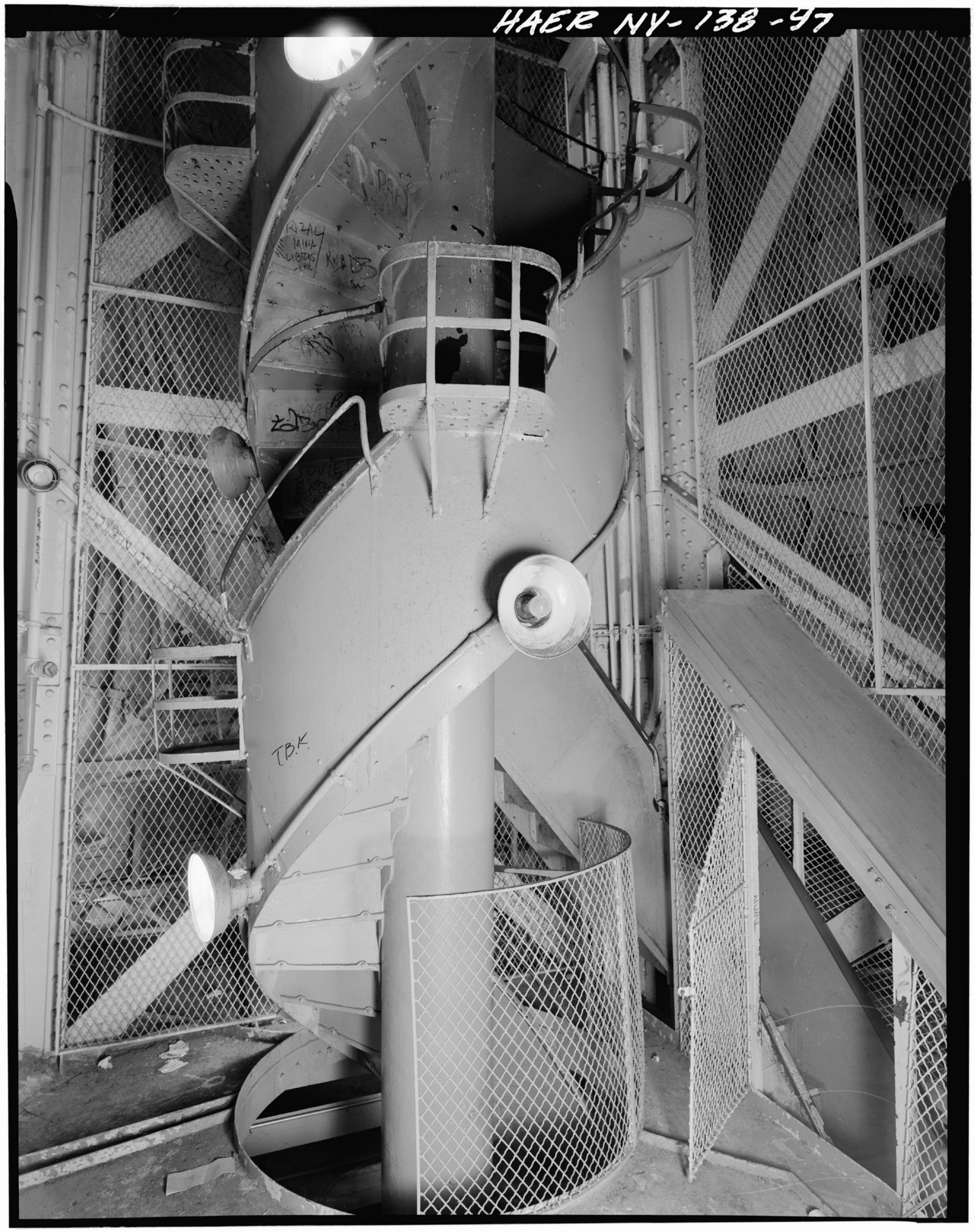


Figure 186. The double helix stairs in February 1984; photograph by Jet Lowe. Note the wire mesh fencing, bucket seats, and graffiti on the stairs. [HAER NY, 31-NEYO, 89-97, Library of Congress]

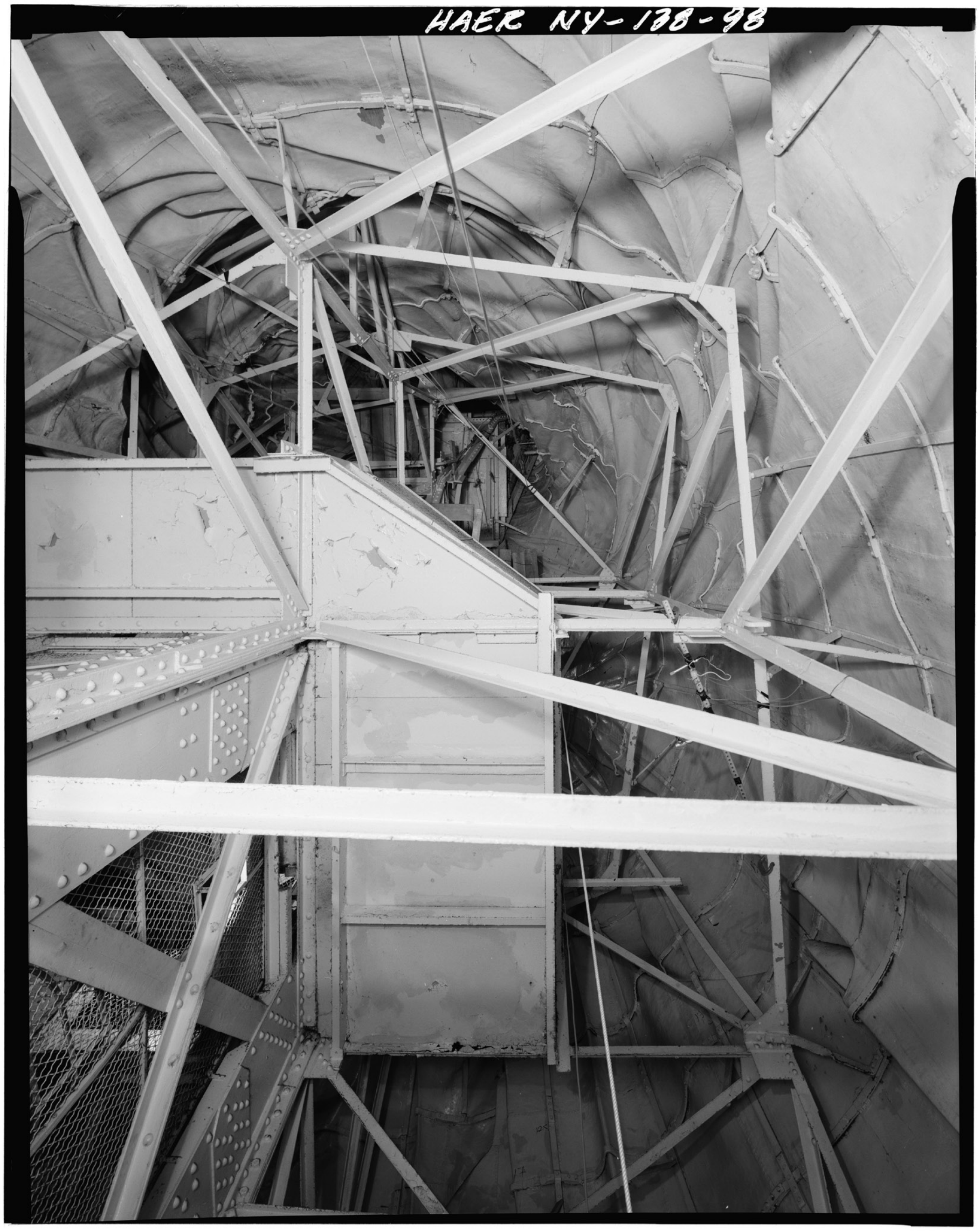


Figure 187. Looking up into the Statue in February 1984; photograph by Jet Lowe. [HAER NY, 31-NEYO, 89-98, Library of Congress]

Figure 188. The structural system of the Statue, looking up from 7P. [JGWA, 2010]

Figure 189. The chains of the shackle from the interior of the Statue (just above 7P). [JGWA, 2010]

Figure 190. The core of the double helix stairs where it rests on the structural beam. The core is also used as an air shaft. [JGWA, 2010]

Figure 191. The double helix stairs rising up through the Statue. [JGWA, 2010]

Figure 192. The double helix stairs, looking down from the crown. New railings were added in 2009. [JGWA, 2010]

Figure 193. The risers and treads of the 1888 double helix stairs are still in place. In 1984-86, the stairs were clad with cast stainless steel treads and risers. [JGWA, 2010]

Figure 194. (Left) The base of the southwest pylon.

Figure 195. (Below) The connection of the upper end of one of the tension rods to the pylon.

CROWN

Since 1888, visitors have ascended the double helix stair so that they could admire the view from the twenty-five openings in the crown. The space is oval in shape with a pair of 1984-86 stairs that are the upper extensions of the 1888 double helix stairs, positioned to the west. The east half of the space includes a small 1984-86 platform in front of the windows.

The original hammered copper surface of the hair and crown are covered in paint; below the level of the platform, the copper is unpainted and has a brown appearance. A photograph of this space, dated 1890, shows an exposed electric light bulb set in a simple socket fixture attached to the plates that join the eight arched ribs that form the Statue's head.

Along with the bronze window sash, the most significant modification made is the platform and the handrail placed on the double helix stairs in 1984-86.

Floor: The existing platform, covered with five diamond-patterned stainless steel plates, was installed as part of the 1984-86 campaign. At the north and south ends of the platform, four risers/winders ascend from the ends of the 1888 double helix stairs. A polished pipe, stainless steel handrail with a sandblasted stringer extends along the inside edge of the platform; this railing replaced a solid sheet-metal railing.

Framing: Eight original arched iron ribs, forming the skeletal structure for the head and crown, begin at the outer strap and meet at the top of the crown. Each rib is formed by a pair of iron angles. Below the outer strap, corresponding ribs extend down into the lower head and neck of the Statue. 1984-86 stainless-steel bars connect the ribs to the armature supporting the copper skin of the crown and hair.

Windows: Visitors ascending to the crown can look east through the twenty-five original window openings forming the "jewels" of the crown.

The existing bronze window sash, glazed with tempered clear laminate glass, date to 1984-86; they replaced earlier sash. Beginning at the north end of the openings, the first four sash are single-light fixed sash; the next three sash have fixed single-light sash with fixed transoms; the eleven center sash have operable transoms with friction hinges; the next three opening have single-light sash with fixed transoms; and the four openings at the south end are fitted with single-light fixed sash. Wire mesh has been installed in the transoms of windows 9-11 and 14-16.

Lighting/electrical: A 1984-86 brass fixture, (currently not in use, and without bulb or shade) mounted to original iron brackets at the top of the crown, replicates the original fixture (based on early photographs of the crown). Four large floodlamps that provide light through the "jewels" are affixed to the two west ribs; they were installed in 1984-86. Below those fixtures, there is emergency lighting on the outer strap of the crown framing. Other electrical fittings include a receptacle on one of the west ribs, and conduit extending down into the Statue.

Heating/air conditioning: The hollow central shaft of the intertwining double helix stairs is used as a diffuser for the crown.

Equipment: A bronze cabinet on the southwest rib holds a telephone and a fire alarm pull. A switch and intercom outlet are mounted to the east side of the cabinet, and a fire annunciator to the west side. There is an additional telephone on top of the cabinet.

A security camera is affixed to the steel bar extending from one of the west ribs. A sprinkler pipe extends up behind another of the west ribs to a sprinkler near the top of the crown.

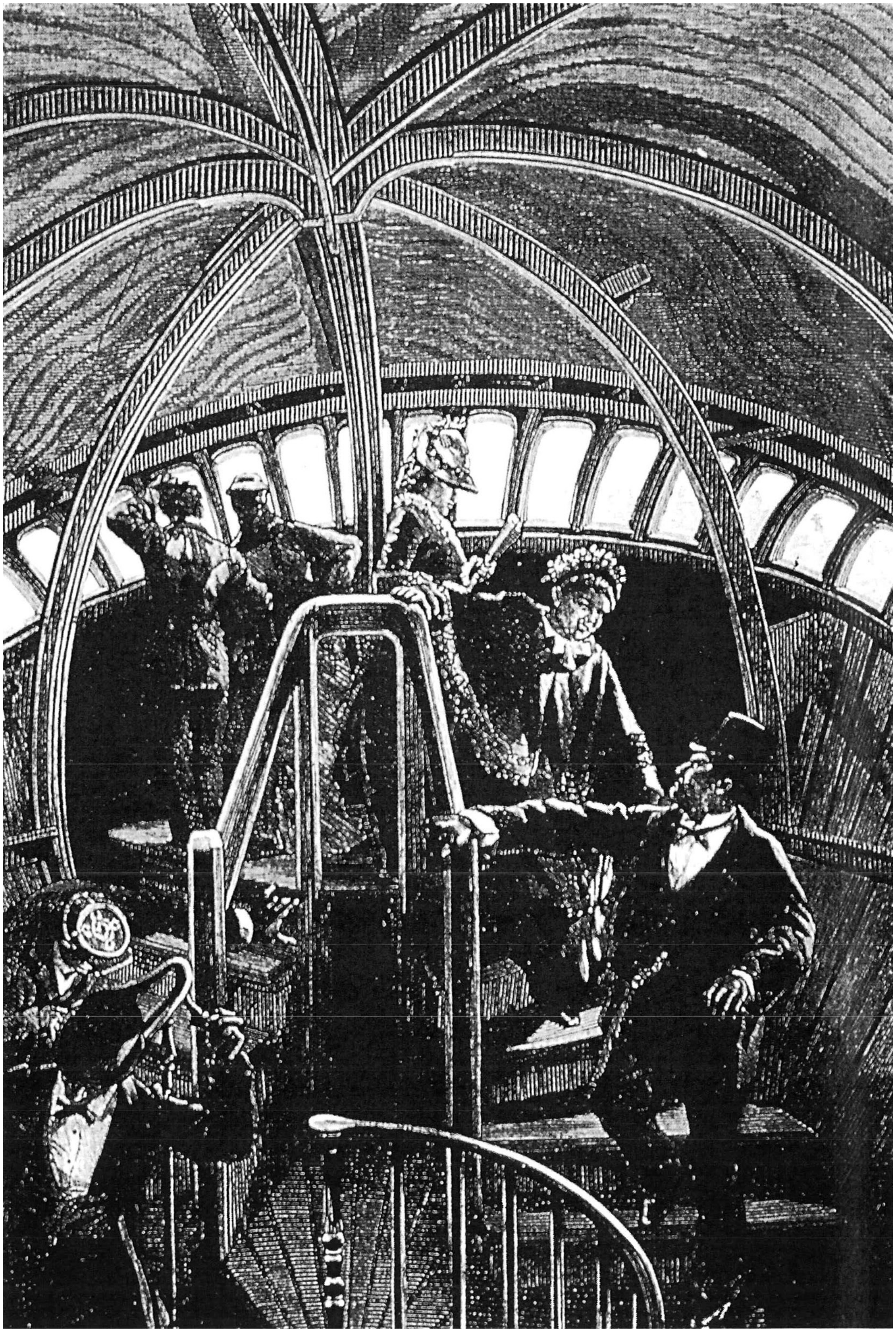


Figure 196. View of the crown's interior during the Universal Exposition in Paris in 1878. (Dessin de M. Oms.) [Le Monde Illustre, 22e annee, No. 1122, September 28, 1878.]

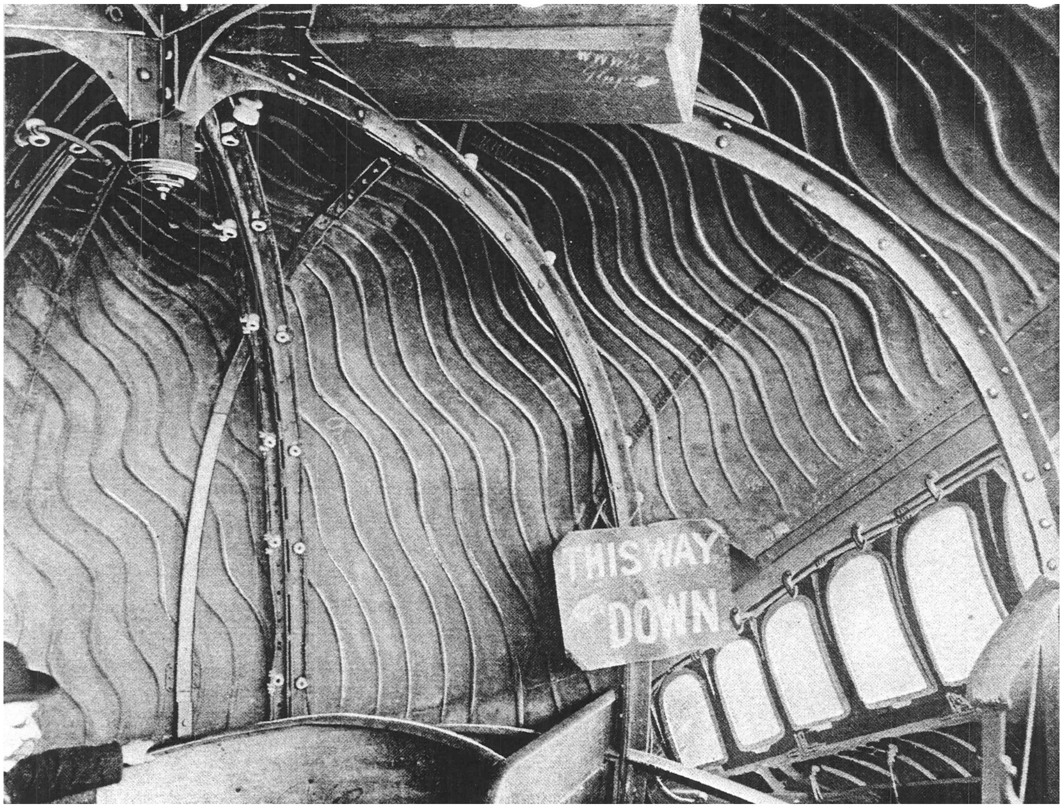


Figure 197. The crown in ca. 1896. [Photographic Views of the Statue of Liberty and New York Harbor from Recent Original Photographs, *Rand McNally & Co.; photocopy from Carole Perrault files, NPS, STLI, Ref. Lib.]*

Figure 198. The crown, ca. 1890. [S.R. Stoddard, Glens Falls, NY; the Adirondack Museum, New York]

Figure 199. The crown in 1951. [Photograph by Fawcett, NPS, STLI, Ref. Lib., 11.4, #22]

Figure 200. The crown in February 1984; photograph by Jet Lowe. [HAER NY, 31-NEYO, 89-116, Library of Congress]

Figure 201. The crown in July 1978. [NPS, STLI, Ref.Lib., 14.3 #1, and Int. #29]

Figure 202. Painting the crown in January, 1975. [photograph by Newman-Schmitt Studio's' Inc., NPS, STLI, Ref.Lib., 6.10 #2]

Figure 203. The double helix stairs, looking down from the crown in February 1984; photograph by Jet Lowe. [HAER NY, 31-NEYO, 89-114, Library of Congress]

Figure 204. The crown, looking north. [JGWA, 2010]

Figure 205. The crown, looking northeast. [JGWA, 2010]

Figure 206. The crown, looking south. [JGWA, 2010]

Figure 207. The crown, looking southwest. [JGWA, 2010]

Figure 208. (Above) The ribs meeting at the top of the crown. [JGWA, 2010]

Figure 209. (Left) The crown, looking northwest. [JGWA, 2010]

Figure 210. (Above) The bars supporting the rays. [JGWA, 2010]

Figure 211. (Left) Detail of crown windows. [JGWA, 2010]

ARM/TORCH

The raised right arm and the hand grasping the torch is one of the most significant parts of the iconic image of the Statue. The torch was designed to include a platform surrounded by a railing, and the access to the viewing platform must have been considered during the earliest design stages of the Statue. Photographs reveal that the torch platform was used for viewing while on display at the Philadelphia Centennial Exhibition in 1876.

Access to the platform was again possible while on display in Paris in 1882 during the first full assembly of the Statue in that city. Upon completion of the Statue in 1886, it became apparent that access to the arm and torch needed to be controlled. In 1887, a gate was installed at the entrance to the arm.

During the 1984-86 restoration, the armature of the arm and torch were replaced with stainless steel, and most of the torch/flame recreated; only the pendant at the base of the torch is original. The original torch and the modified flame, pierced with amber stained glass, are currently displayed in the lobby of the old AMI building (0P01).

On October 20, 2010, a team from John G. Waite Associates accompanied Robert Baboian, Richard Holmes of the National Park Service, and a member of the National Park Service Police on a limited inspection of the interior of the arm and the exterior of the railing and flame.

The torch is made up of five parts: the pendant; the handle; the soffit that curves out to support the railing and platform; the drum; and the flame. The ladder through the arm begins at a platform near level 8S, and extends through the armature to a platform inside of the handle.

ARM/TORCH INTERIOR

Platform: The metal platform at the Statue's shoulder (near level 8S) is riveted to horizontal angles. Later pieces of metal have been added to the platform, including a section of studded steel near the original ladder in the southeast corner.

Framing: E. Blaine Cliver described the framing within the right arm, and the problems encountered in the 1984-86 restoration.

> Although Eiffel's design was found to be sound, a modification of the shoulder supporting the raised arm caused some engineering concern. The arm structure acts as a leaning or cantilevered column, resting – offset– on the central pylon. The arm structure is supported by the light framing of the secondary members. Eiffel's design retained a continuity of arm structure, secondary framing, and central pylon. When the Statue was first erected in Paris, the box truss for the arm was moved outward approximately 18 inches (257 mm). Additional members had to be added to the secondary framing, which resulted in a loss of continuity between the arm and secondary frame. This induced unanticipated stresses and bending into the secondary framing, which was designed to take only tensile or compressive stress.[19]

In the 1930s, additional structural members were added to support the framing. In the 1984-86 work, the National Park Service decided to add structural members to stabilize the framing, and to repair and preserve the physical evidence of the earlier modifications.

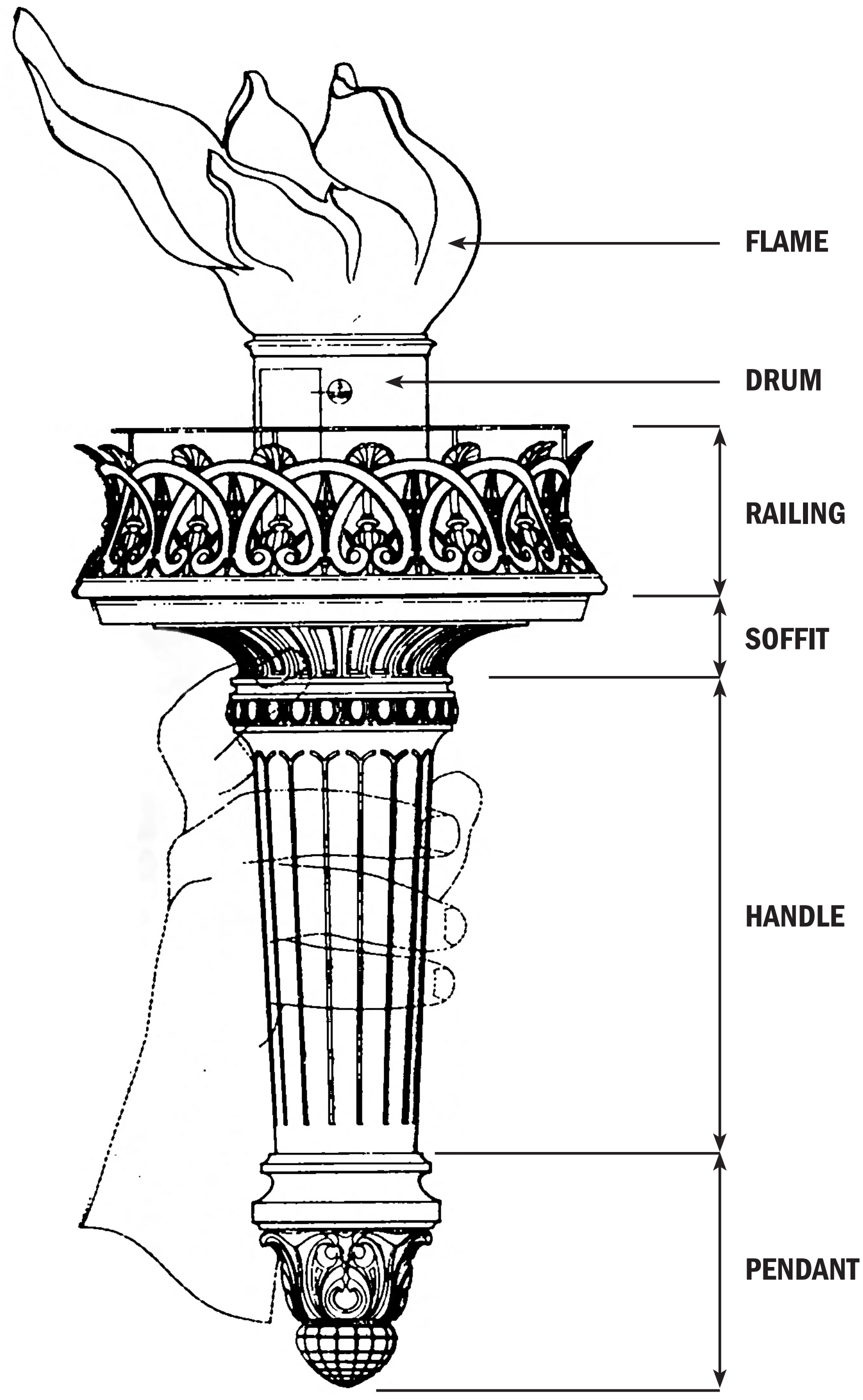


Figure 212. Diagram of torch, adapted from Swanke Hayden Connell Architects and The Office of Thierry W. Despont, "Restoration of the Statue of Liberty", 1984, SOL 356-25902, A-101C

Ladder: The original iron ladder to the torch extends in two long runs to a semi-circular metal platform in the upper portion of the torch handle. The 1'-4 1/2" wide ladder is composed of 2-1/2" x 1/2" iron bar side rails and pairs of narrow iron rod rungs spaced 10-1/2" apart. Iron handrails of 1-1/8" diameter rods are attached to the side rails; at the base of the handrails, the rods terminate with small scrolls.

From the upper platform, a short, slightly curved, five-rung iron ladder connects the upper platform to the exterior platform walkway surrounding the drum of the torch.

Partway up the lower ladder, there is a wire mesh barrier with a gate that secures with a hasp and padlock. Just above that barrier, another gate is made up of metal rods set within a metal frame; it, too secures with a hasp and padlock.

Lighting/electrical: Floodlights, and emergency fixtures are mounted to the west and south ends of the platform at the base of the ladder; a few bare-bulb utility fixtures provide necessary light along the length of the ladder. Other electrical elements include receptacles on the west side of the platform; a duplex receptacle and switch partway up the lower ladder; and an electrical box, duplex receptacle, and switch in the soffit of the torch.

Equipment: A security camera is affixed to the framing at the base of the arm. Other equipment includes a vacuum tube in the northeast corner of the platform; and a "Madah Waves" security system box at the soffit level.

PENDANT

The ladder provides a view straight down into the original pendant. The current appearance of the pendant has not changed since the 1984-86 restoration, as described by Jean Wiart:

> Once in the workshop, the architects decided not to make an entirely new pendant but to restore the upper middle section and to replace the lower middle section. To do this, we hammered the cone-shaped volume of this section from a single piece of copper sheet. The crossing lines were hammered into the metal using the repoussé technique, first from the inside and then from the outside, to highlight the design.
>
> The new copper section was joined to the restored portion of the pendant again using the "wolf's teeth" connection. A new stainless steel armature was also installed. Finally, a seep hole was created in the base of the pendant to evacuate water.
>
> The restored pendant was chemically patined... According to the architects' instructions, a round stainless steel bar was secured around the main armature in the torch handle to provide additional security. The final step was to apply a light green coat of patina to the new portions of the torch to match the color of the Statue.[20]

SOFFIT

The curved soffit supporting the balcony is made up of four sections of copper, each "connected with "wolf's teeth" joints and brazed."[21] The twenty-four openings in the soffit are covered with metal mesh.

TORCH EXTERIOR

Floor: The balcony floor is made up of corrugated copper. The raised sections of the floor expand from 2" wide at the drum to 6" wide at the outer edge of the balcony.

Railing: The copper rods forming the railing are largely hidden behind sixteen intersecting "C"-scroll panels riveted to the main railing. Sixteen anthemions (palmettes) embellish the intersections of the curves at the top of the railing; the ornaments are 11-1/2" wide and 11" high, and are spaced approximately 1'-11" apart (on center). At the base of the railing, where the "C"s meet, spears extend up to bisect the arched spaces formed by the scrolls. Corn cobs curve out from the ends of the scrolls.

The pipe handrail is 4'-2 3/8" high.

Drum: The drum that supports the flame is capped with a 3-3/4" high beak molding.

Door opening: A doorway is set into the south side of the drum. Jean Wiart of Les Metalliers Champenois described the condition of the original door and the creation of the new opening, door, and hardware in 1984-86:

> The original access door that led from the central drum to the walkway platform was warped because there was no reinforcing armature behind the copper sheet. The new door was built with a stainless steel frame made from flat …bars on which three bronze hinges were riveted for added rigidity. A stainless steel lock was made and installed so the door could be padlocked. We also installed a water-tight stainless steel gasket to eliminate the possibility of water entering the drum.[22]

The door and hardware have remained the same since the 1984-86 work.

Door: The door is 1'-10" wide x 4'-4 3/4" high and curves to follow the curve of the drum.

Hardware: The 1984-86 hardware includes three 9-1/2" long bronze strap hinges with 5" high flanges; a small knob on the exterior; a staple hand grip on the interior; and a stainless steel hasp on the interior.

Flame: By 1984, the original flame of the torch "had been transformed so many times in the past 100 years that it resembled a shapeless Chinese lantern." As noted by Jean Wiart, 'The modifications were so numerous, in fact, that reconstructing it according to its original design and shape was a major enterprise; rather than reconstruct it, we had to invent it."[23] The pierced flame with its amber stained glass now exhibited in the lobby of the former AMI was the result of years of trying to light the structure from within. In the 1984-86 restoration, the decision was made to recreate Bartholdi's original flame and light it from the exterior.

The internal armature of the new flame is made of stainless steel, riveted to the copper skin of the flame with copper saddles, insulated with Teflon tape. The flame is covered in 5,000 sheets of heavy gold leaf (33 grains per 1,000 sheets), specially hammered by Etablissement Dauvet.[24]

Lighting/electrical: Sixteen floodlights are positioned behind the anthemion ornaments to light the flame.

Figure 213. The base of the ladder into the right arm, leading to the torch [left] and the wire mesh partition at the north end of the platform. [JGWA, 2010]

Figure 214. The ladder up into the arm. [JGWA, 2010]

Figure 215. The lower section of the ladder ascends to a platform near the top of the torch handle, and a curved, upper ladder then extends up to the doorway in the drum. [JGWA, 2010]

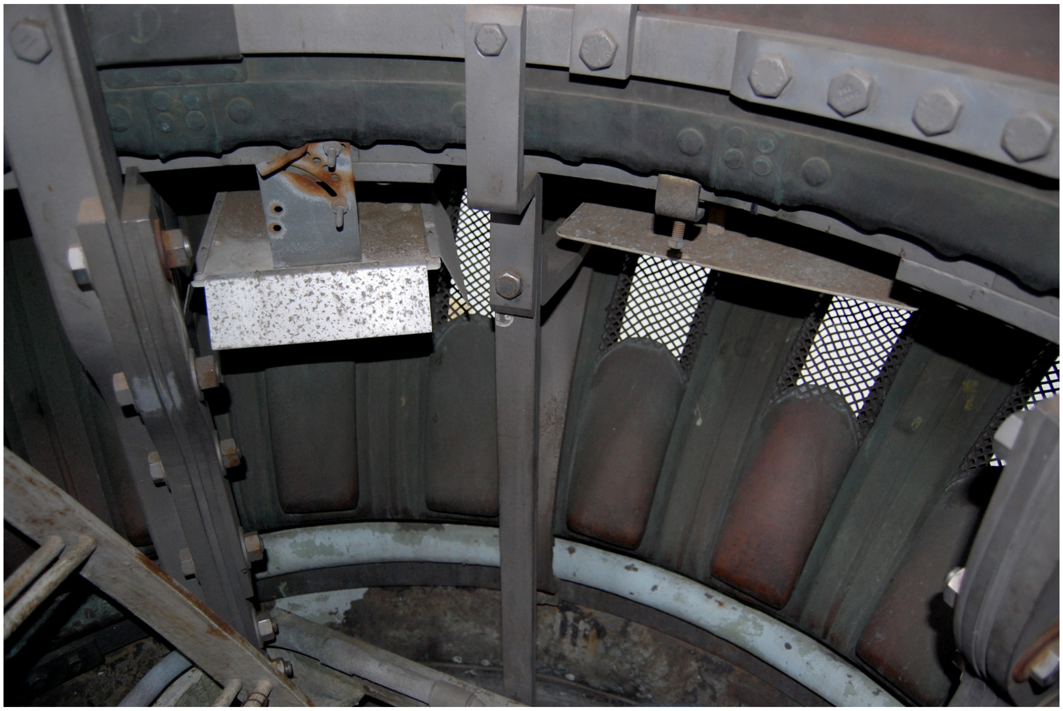


Figure 216. The interior of the torch soffit. [JGWA, 2010]

Figure 217. View looking down into the original pendant with 1984-86 armature. Debris has accumulated in the base of the pendant. [JGWA, 2010]

Figure 218. Electric bulbs in the original torch, ca. 1935. [NPS, STLI, Ref.Lib., 14.2 #1 and Int. #30]

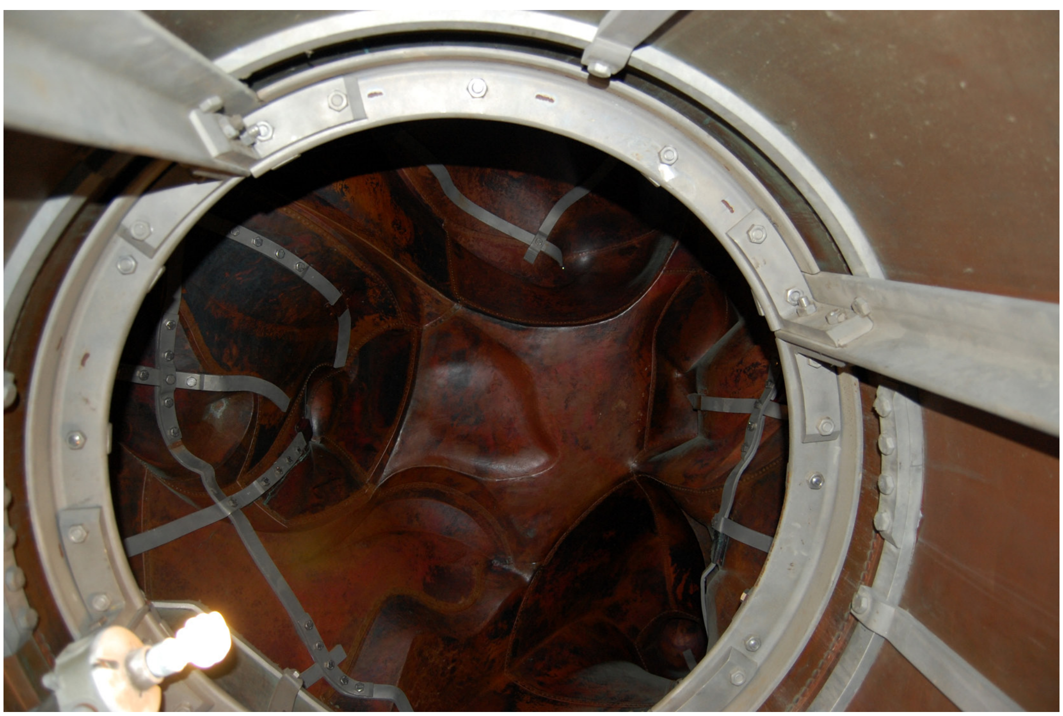


Figure 219. Interior of the flame in 2010. [JGWA, 2010]

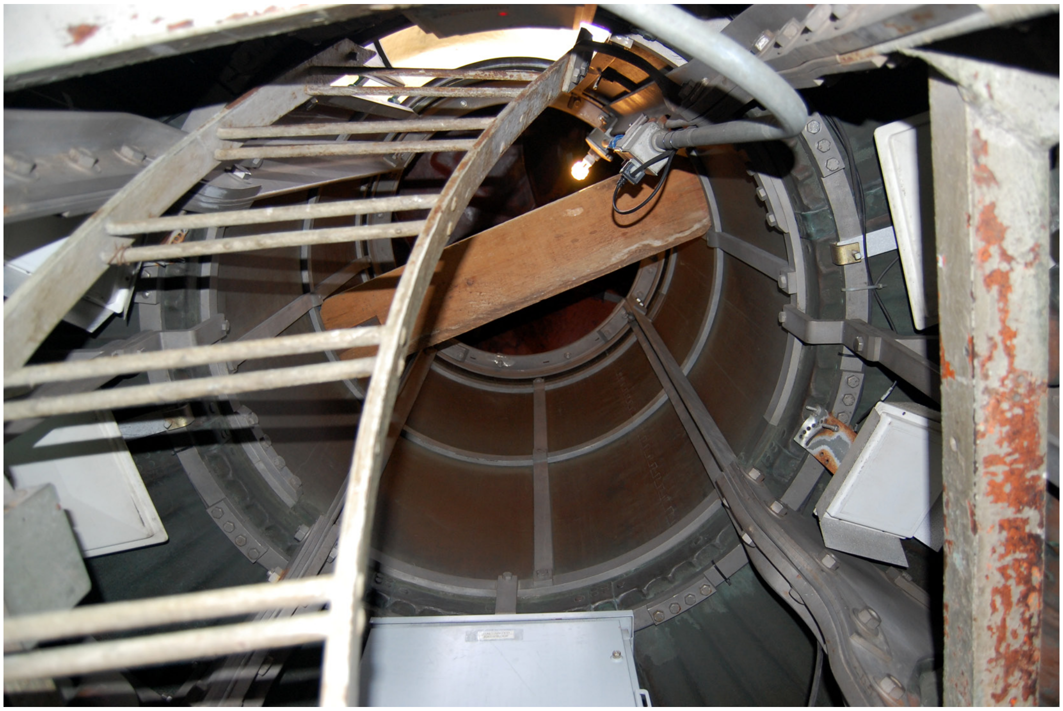


Figure 220. View from platform at top of torch handle, looking up towards the flame. [JGWA, 2010]

Figure 221. The copper sheet metal railing encircling the torch balcony is supported with an armature of flat stainless steel bars. [JGWA, 2010]

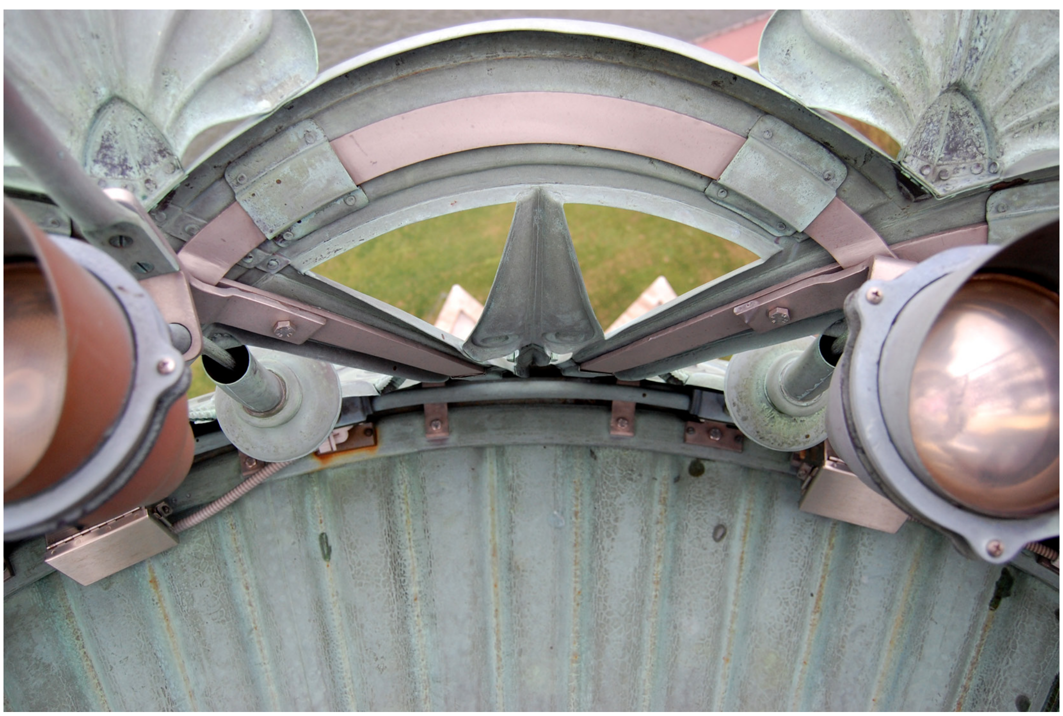


Figure 222. Detail of the torch railing. [JGWA, 2010]

Figure 223. The doorway and door in the south side of the torch drum. [JGWA, 2010]

Figure 224. Beak molding at the top of the torch drum. The vertical wolf's tooth seam is visible in the copper drum beneath the flame. [JGWA, 2010]

Figure 225. Detail of the flame, showing the sheets of gold leaf. Dark areas of eroded gilding are visible. [JGWA, 2010]

NOTES: PHYSICAL DESCRIPTION

1. Lewis I. Sharp, "Richard Morris Hunt and His Influence on American Beaux-Arts Sculpture," in Susan R. Stein, ed., *The Architecture of Richard Morris Hunt* (Chicago, IL.: The University of Chicago Press, 1986) 129.
2. *Sanitary Engineer*, October 23 1886, 491-493.
3. *Sanitary Engineer*.
4. NA, RG 26, LH Site File, NY 131.
5. *Sanitary Engineer*.
6. *Sanitary Engineer*.
7. Barry Moreno, *The Statue of Liberty Encyclopedia* (New York: Simon and Schuster, 2000), 66.
8. Jean Wiart, "A New Torch for the Statue," in R. Baboian, E.B. Cliver, and E. L. Bellante (ed), The Statue of Liberty Restoration (Houston, TX: NACE International, 1990), 136-137.
9. Robert Baboian and E. Blaine Cliver, "Corrosion of the Statue of Liberty: An Overview," in R. Baboian, E.B. Cliver, and E. L. Bellante (ed), *The Statue of Liberty Restoration* (Houston, TX: NACE International, 1990), 76.
10. Pierre Provoyeur, "Artistic Problems," in *Liberty: The French-American Statue in Art and History* (New York : Perennial Library, 1986), 93.
11. *The Indicator* 1, no. 2 (Aug. 1908): 12-13, published in the interests of the Otis Elevator Industry, CLP-e, Elevator 1904-08.
12. Richard Seth Hayden and Theirry W. Despont, *Restoring the Statue of Liberty: Sculpture, Structure, Symbol* (New York: McGraw-Hill, 1986) 81-82.
13. Phillippe Grandjean, "Designs to Move People Through the Statue," in R. Baboian, E.B. Cliver, and E. L. Bellante (ed), *The Statue of Liberty Restoration* (Houston, TX: NACE International, 1990), 54.
14. Baboian and Cliver, 75.
15. E. Blaine Cliver, "Restoring Miss Liberty: The Decision-Making Process," in R. Baboian, E.B. Cliver, and E. L. Bellante (ed), *The Statue of Liberty Restoration* (Houston, TX: NACE International, 1990), 45.
16. E. Blaine Cliver, "Restoring Miss Liberty: The Decision-Making Process," in R. Baboian, E.B. Cliver, and E. L. Bellante (ed), *The Statue of Liberty Restoration* (Houston, TX: NACE International, 1990), 45.
17. Baboian and Cliver, 82.
18. Howard Brandston, "Seeing Liberty in a New Light, in R. Baboian, E.B. Cliver, and E. L. Bellante (ed), *The Statue of Liberty Restoration* (Houston, TX: NACE International, 1990), 61.
19. Cliver, 45.
20. Wiart, 136.
21. Wiart, 137.
22. Wiart, 136.
23. Wiart, 131.
24. Fabrice Gohard, "Addendum: Gilding the Flame," in R. Baboian, E.B. Cliver, and E. L. Bellante (ed), *The Statue of Liberty Restoration* (Houston, TX: NACE International, 1990), 146.

EXISTING CONDITIONS

EXTERIOR CONDITIONS

On the exterior of the monument, the copper sheet metal cladding of the Statue is dirty *[see Figure 101]*. Grey streaking is apparent on the blue-green patina of the copper. There are heavy soil deposits in creases and recessed areas that are not washed by rainwater. Black tar deposits remain where previous coal tar coatings on the interior seeped through seams in the sheet metal. Rust staining is visible streaking from the seams and weep holes. From a general visual survey of the Statue it appears that the surface of the copper has differential development of patina. There is likely a variation in the thickness of the metal resulting from uneven corrosion, as well as from the repoussé process (hammering malleable metal from the reverse side) used to form the sheet metal.

The granite facing of the pedestal is soiled and has varying degrees of vivid blue-green staining *[see Figure 97 and Figure 100]*. While the staining appears to be the result of rainwater runoff from the copper Statue, much of the staining is not occurring as a result of surface runoff. Frequently the blue-green copper staining is concentrated at mortar joints, or appears to exit the masonry through open mortar joints, or appears to migrate through the granite. Often calcium carbonate, or lime run, deposits have formed at mortar joints where water has percolated through the masonry; these deposits are stained blue-green as well. It seems that water from the Statue is not adequately drained away from the pedestal construction. It may be entering the concrete and stone construction above and flowing through the masonry construction before finding an outlet at the exterior face of the granite.

There are significant fractures in the stonework of the pedestal. Vertical and diagonal cracks extend through individual stones (see the accompanying drawings). Often, the vertical cracks align with vertical mortar joints above and below the stones, suggesting that there may be structural movement or settlement. Of particular concern are the vertical and diagonal cracks through the body of the granite spandrel panels at all four of the loggias on Level 4P *[see Figure 99]*. Currently, the stones appear to be held in place by gravity. Until corrective conservation measures are implemented, temporary shoring or bracing should be installed.

Smaller and less threatening fractures exist in the granite stones facing the concrete pedestal. These cracks compromise the integrity of individual stones and they open pathways for water infiltration.

A significant amount of the pointing mortar on the pedestal has failed, leaving open mortar joints. These joints also serve as a means for water to enter the pedestal construction.

Holes for miscellaneous hardware have been drilled in the granite masonry of the pedestal. These holes appear to have been created to support hardware associated with light fixtures, flags or banners, and exterior ironwork. In many cases the remnants of ferrous expansion anchors remain embedded in the stone. As these anchors rust they will expand and possibly crack the stone. Little or no attempt has been made to provide repairs at abandoned holes in the stonework.

The miscellaneous storage of material on the loggias at Level 4P has provided a haven for pigeons. There are bird droppings where the pigeons have been roosting.

Storm water drainage on the exterior of the Statue and pedestal has not been adequately addressed. Water flowing over the copper Statue drains to a sheet metal plinth that rests on the top surface of the masonry pedestal. Little thought appears to have been given to the flow of water beyond this point. From a visual survey there appears to be little or no drip edge at the base of the plinth, and there does not appear to be any means for collecting water and directing it away from the stone facing on the pedestal. The stone paving at the balcony level of the pedestal (Level 6P) and at the loggias (Level 4P) has no internal system of drainage; yet, much of the rainfall that reaches this paving makes its way to the interior of the pedestal. This is particularly evident at Level 6P, where a heavy horizontal line of efflorescence has formed on the inner face of the pedestal's concrete shaft at the elevation of the exterior paving.

The torch and flame are in good condition. There are some dark areas on the flame where the gold leaf has eroded. Debris has accumulated in the base of the pendant.

INTERIOR CONDITIONS

Water has a constant presence in the Statue and pedestal *[see Figure 179]*. It appears that the original designers were aware of the possibilities for water infiltration and condensation, and the need to evacuate water. The sloped trussed framing at the top of the pedestal (above Level 7P) appears to have been roofed with sheet metal to shed water to some type of perimeter drainage system. It seems that this roofing was later cut away and that water from the Statue has since percolated through the pedestal, weeping out of the concrete pedestal shaft on the interior and through the stone masonry facing the exterior of the pedestal. The water has dissolved salts in the masonry construction and redeposited them through evaporation at the surface of the masonry, forming efflorescence. Subflorescence, or the re-crystallization of salt in the pores of the masonry beneath the surface, may cause the concrete and granite to spall if the salt crystals are larger than the pores in the masonry.

The constant presence of water has made it necessary to provide a temporary tarp over the emergency elevator.

Surface finishes within the Statue are dirty where access for regular cleaning is difficult and worn where there is constant contact with visitors. One of the greatest challenges is providing curatorial care for a significant cultural artifact that remains open to the public 364 days a year and receives millions of visitors each year. Although maintenance procedures are followed, ongoing wear is outpacing programs for cleaning and care.

In general, the building systems at the Statue of Liberty appear to be in fair working condition. The main electric service components and fire protection systems appear to be in good condition. However, the heating and cooling equipment is old and mechanical components, such as chillers and pumps, are near the end of their service life. The existing pneumatic temperature control system has air leaks, and there are non-functional actuators on some equipment.

Mechanical systems for heating, ventilation, and cooling, as well as the mechanical systems for the lift and elevators are subjected to the constant demands of institutional use. Generally, these systems have a limited life span, and must be replaced approximately every twenty years.

The existing ventilation and cooling systems in the pedestal and Statue are insufficient. The cooling and ventilation provided for the elevator machine room at Level 1P has proven so inadequate that two split-system air conditioning units have been introduced as a remedial solution to cool the space. The condensers for these systems are located on Level 2P, within the space formally occupied by the American Museum of Immigration. Because the condensers are not located on the exterior of the building, the heat generated in one part of the pedestal (the elevator machine room) is merely translated to another interior space (the former AMI). Similarly, the existing ventilation system in the electrical utility room at level 0P is inadequate to properly dissipate heat generated by the transformers associated with the incoming electrical service.

Air distribution within the Statue is not effective and requires analysis. The air in the body and crown of the Statue is stagnant, warm, and humid in the summer months. Temporary responses have included the introduction of a table-top fan in the cramped space of the crown. *[See Appendix B at the end of the report for the complete text of the MEP engineering evaluation.]*

While maintenance at the Statue and pedestal is critical for the monument's survival, it is not sufficient. Design, conservation, and maintenance efforts are required to insure the long term preservation of the monument.

EXISTING CONDITIONS

DIAGRAMS

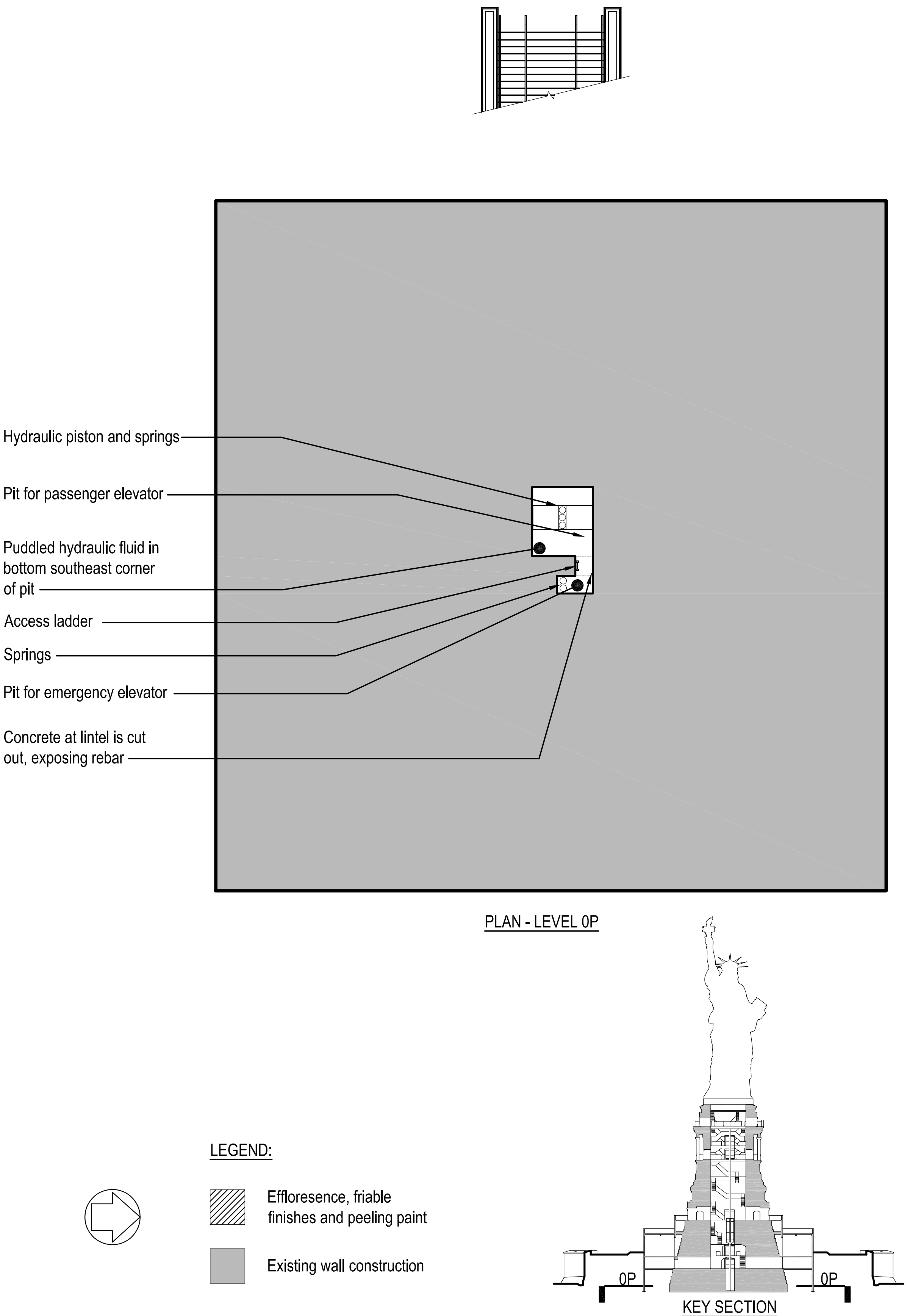


Figure 226. Existing Conditions - Level 0P

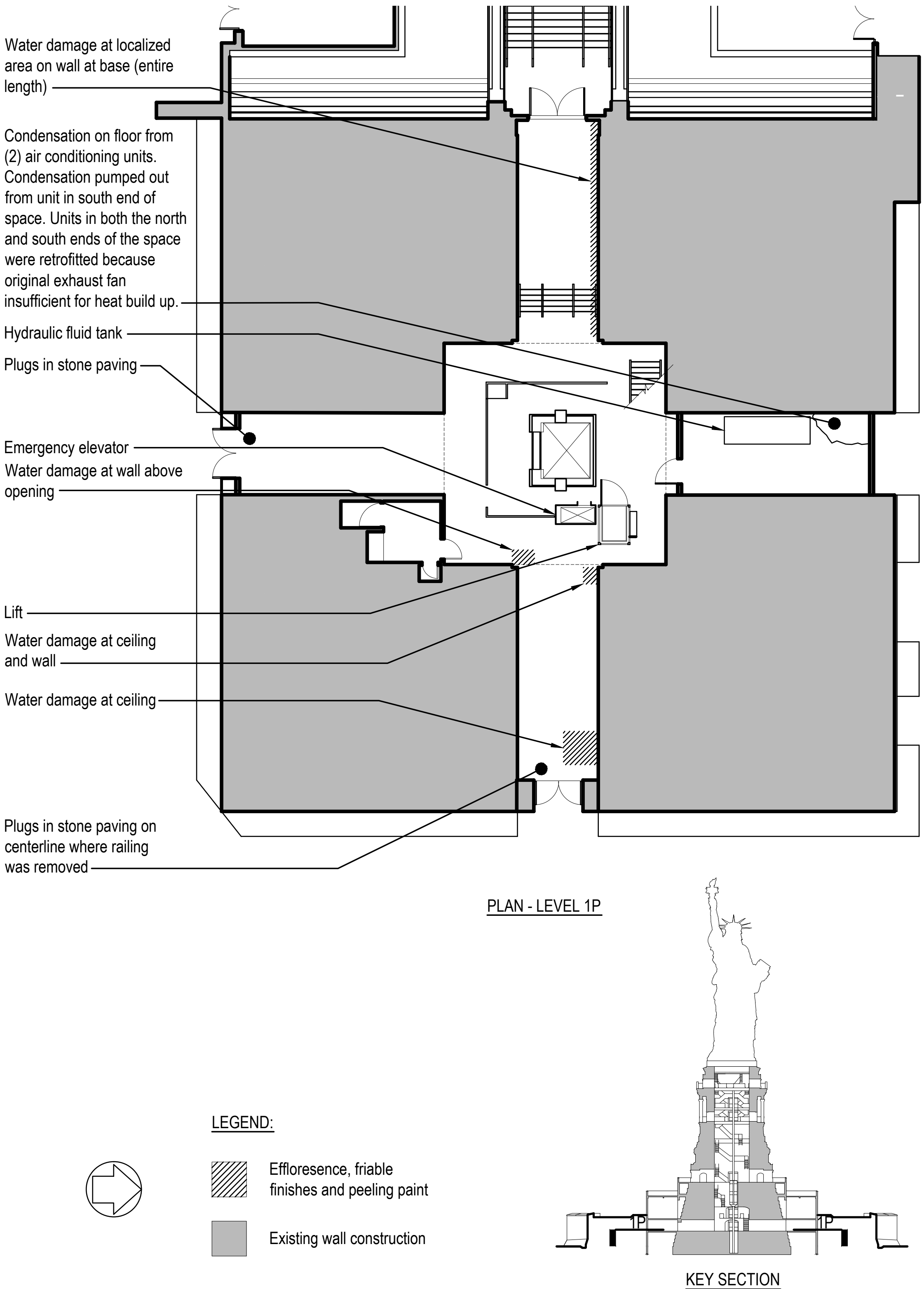


Figure 227. Existing Conditions - Level 1P

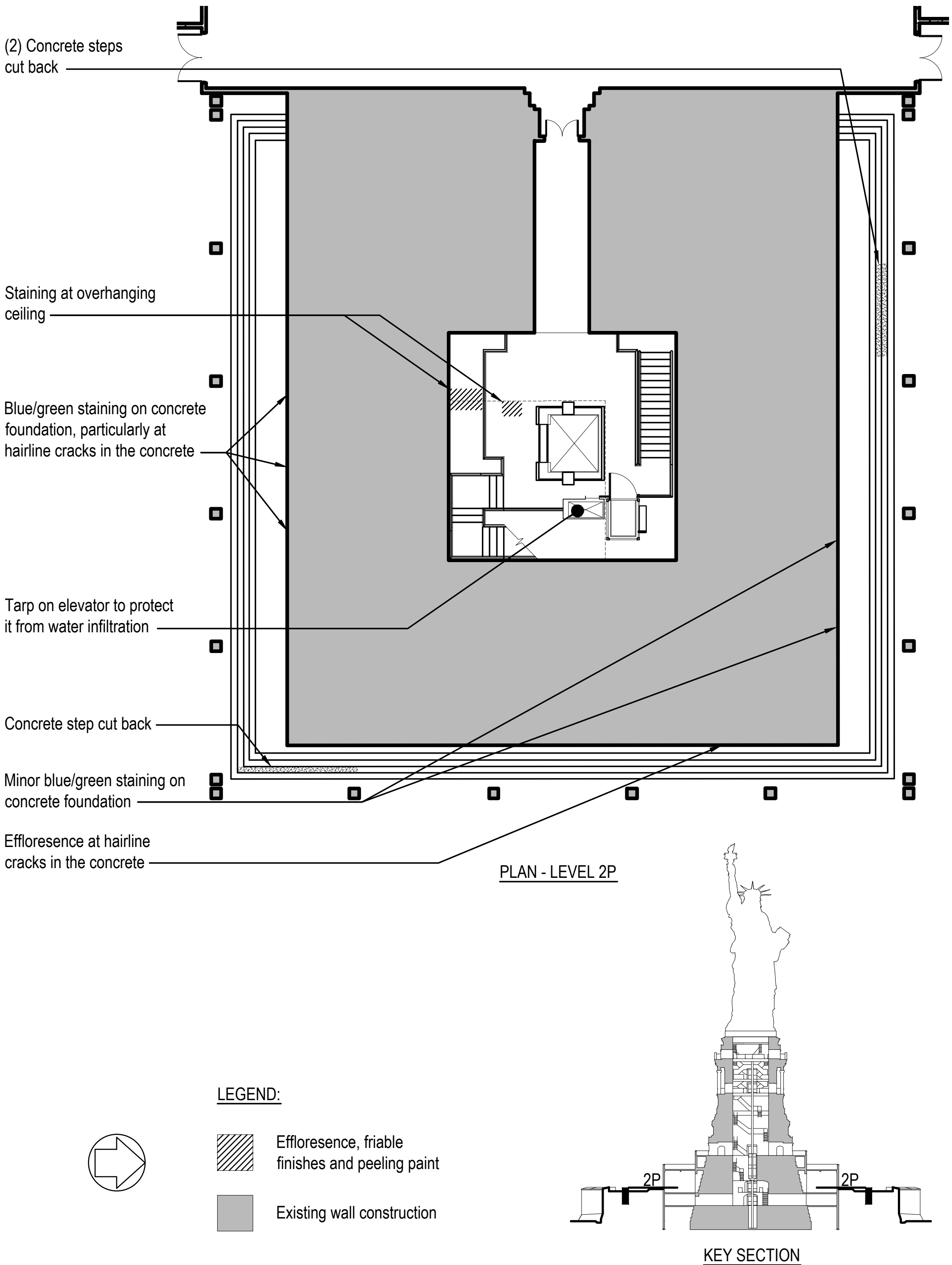


Figure 228. Existing Conditions - Level 1P

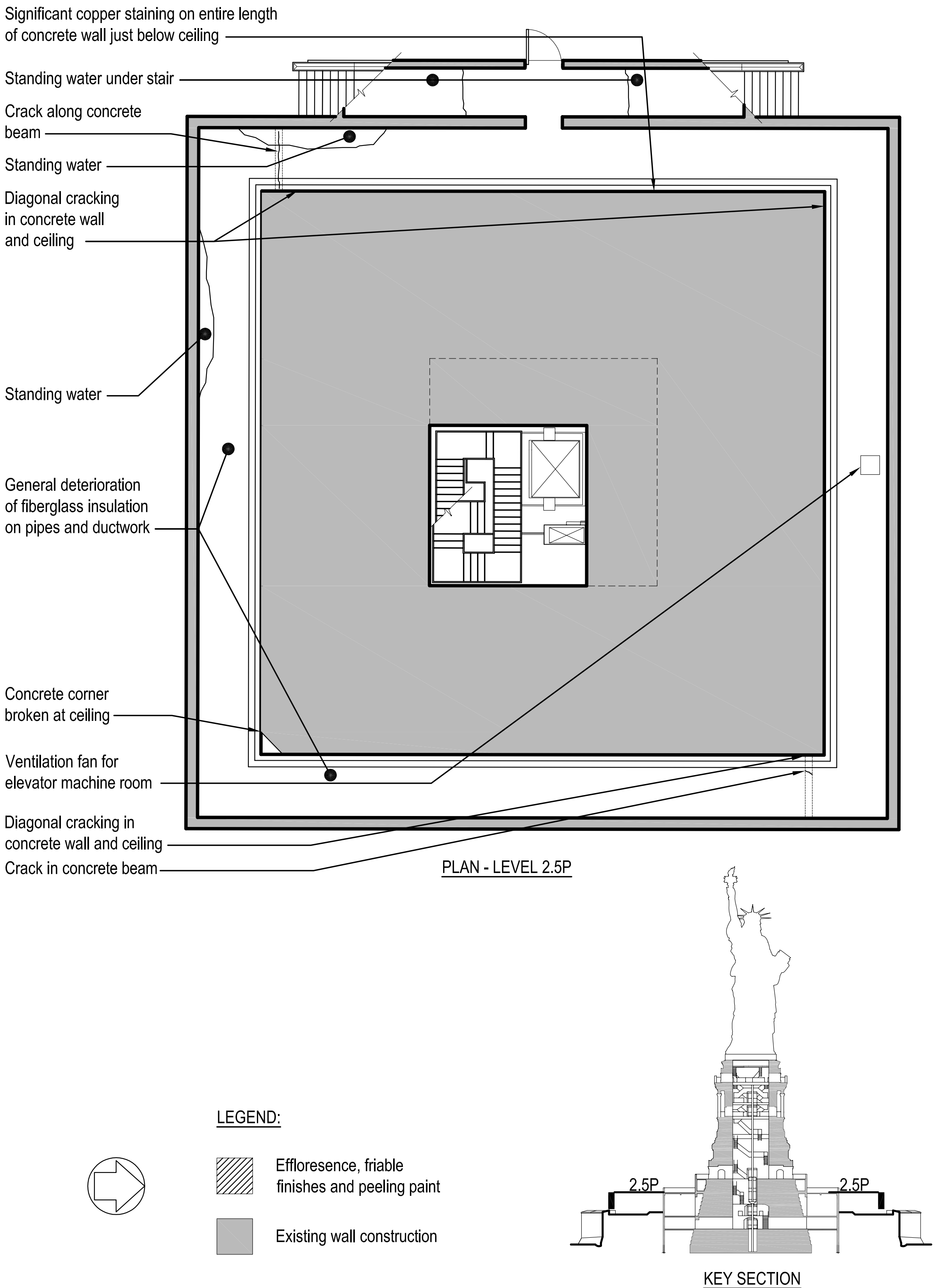


Figure 229. Existing Conditions - Level 2P

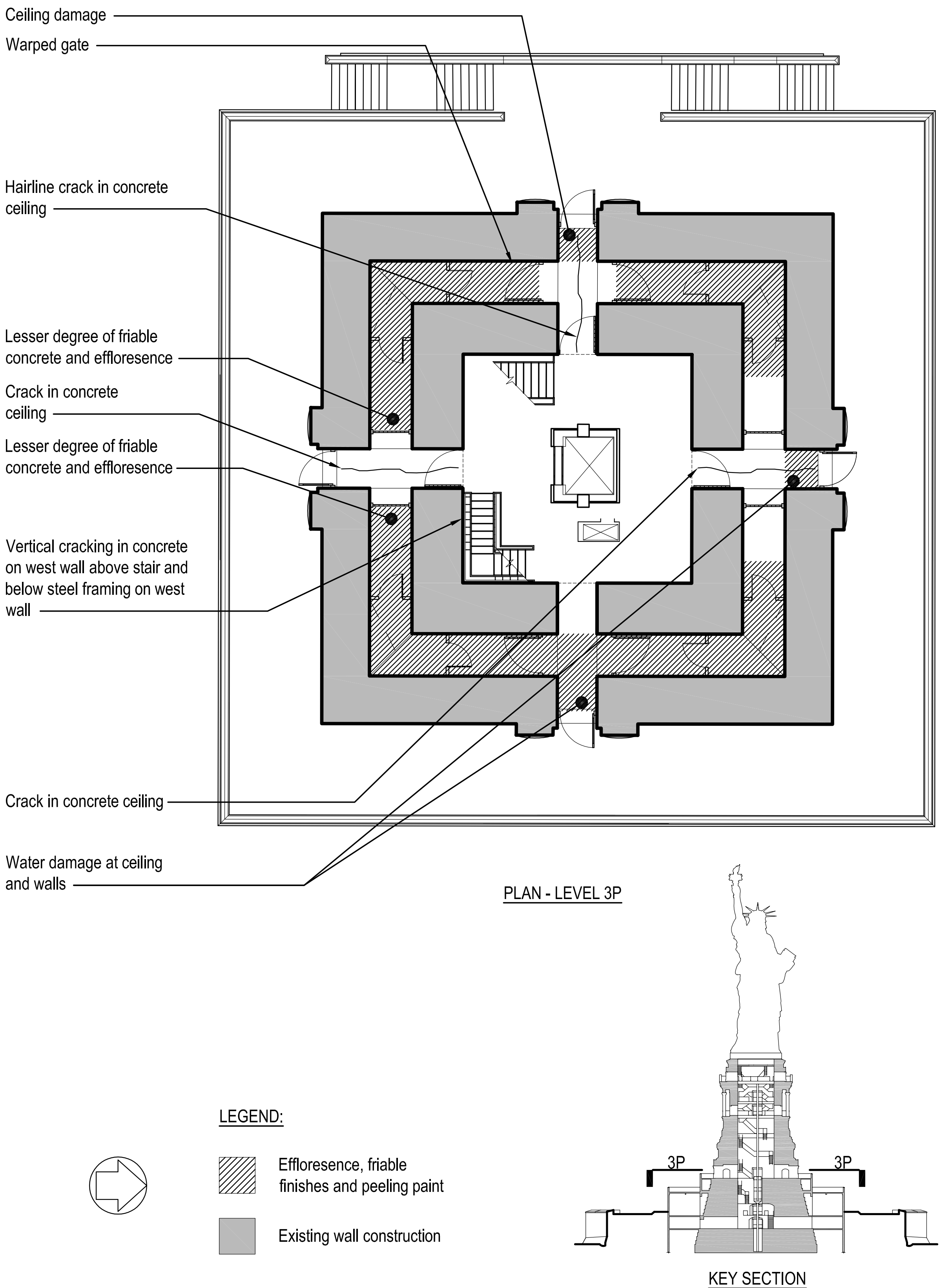


Figure 230. Existing Conditions - Level 3P

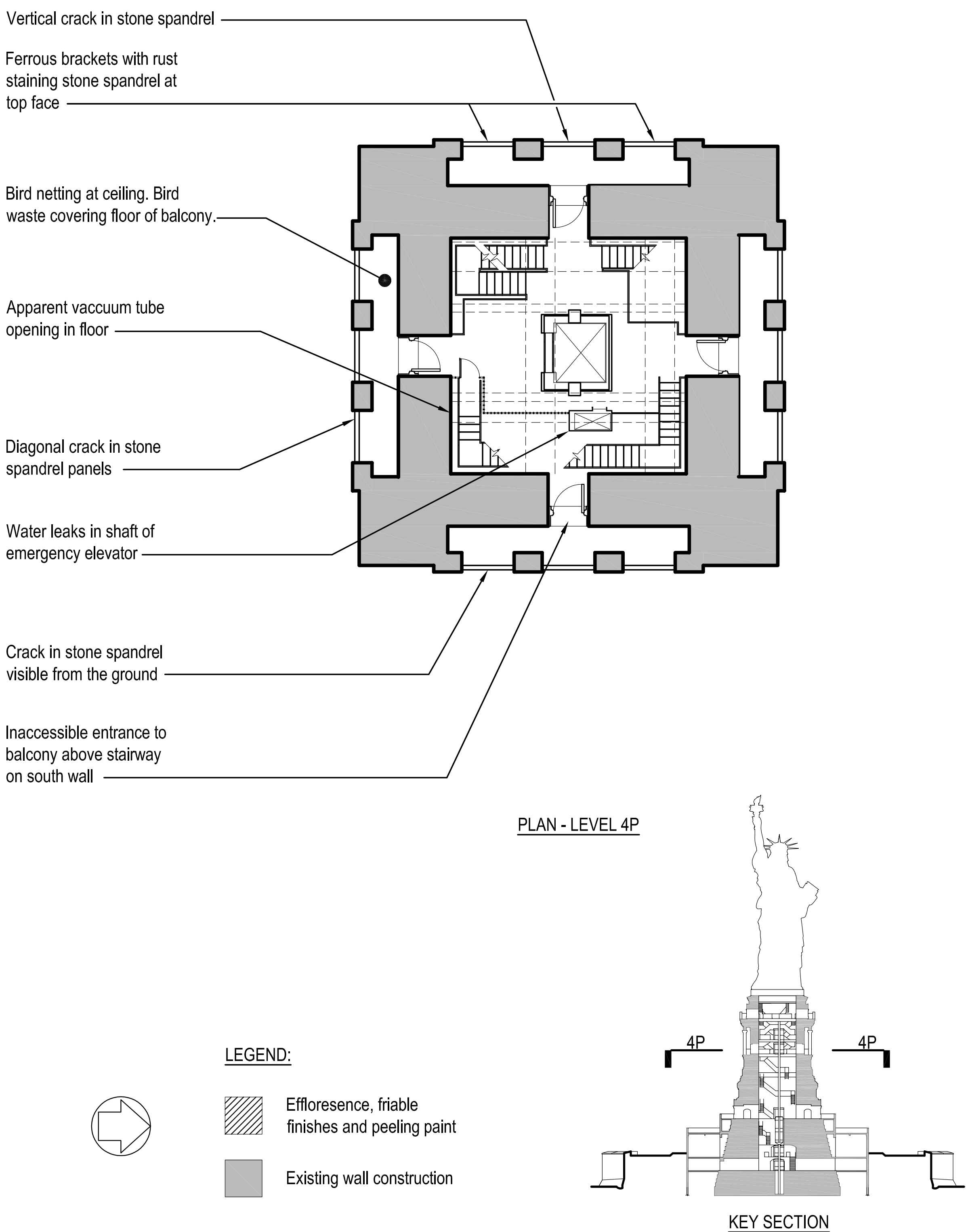
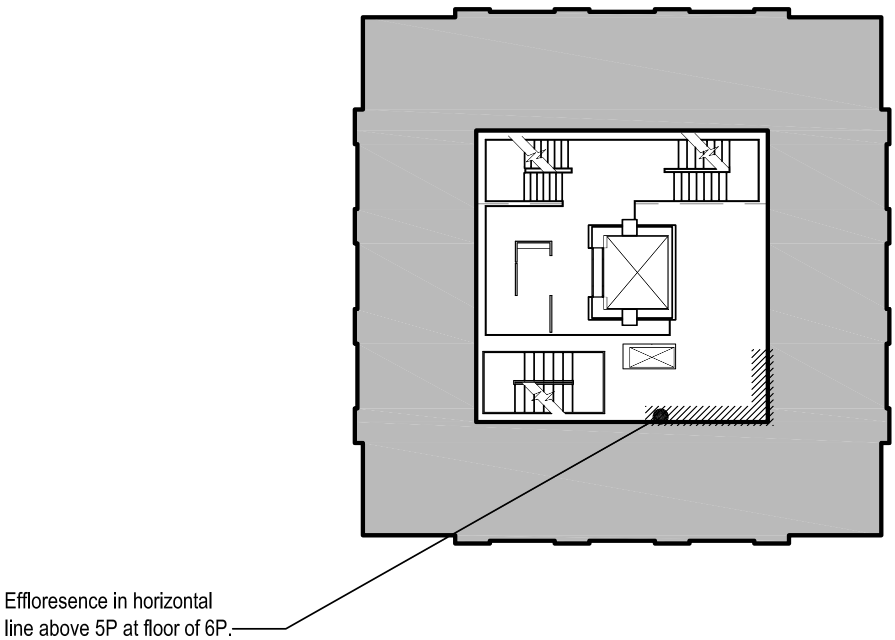
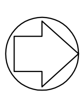


Figure 231. Existing Conditions - Level 4P



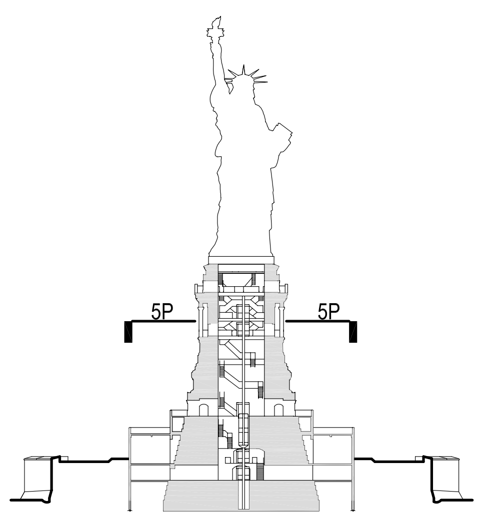
PLAN - LEVEL 5P



LEGEND:

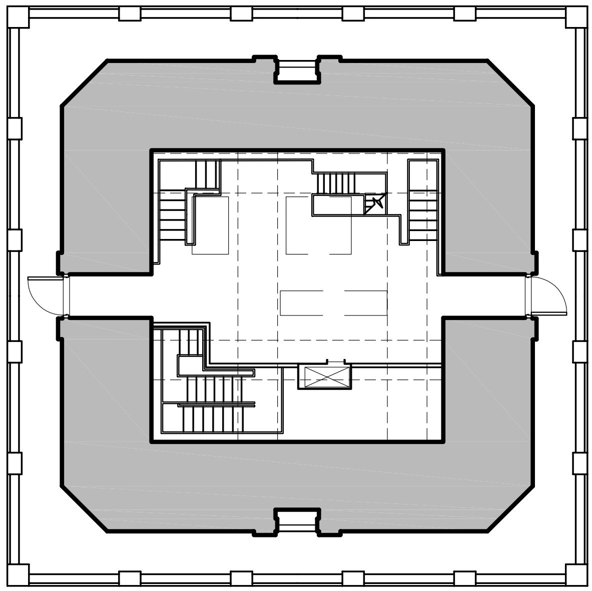
Efflorescence, friable finishes and peeling paint

Existing wall construction

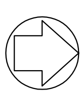


KEY SECTION

Figure 232. Existing Conditions - Level 5P



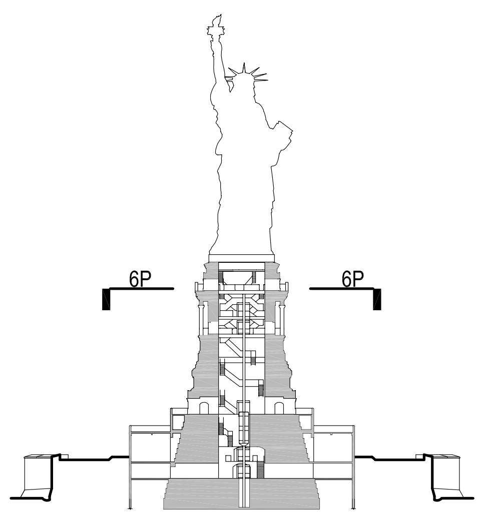
PLAN - LEVEL 6P



LEGEND:

Efflorescence, friable finishes and peeling paint

Existing wall construction



KEY SECTION

Figure 233. Existing Conditions - Level 6P

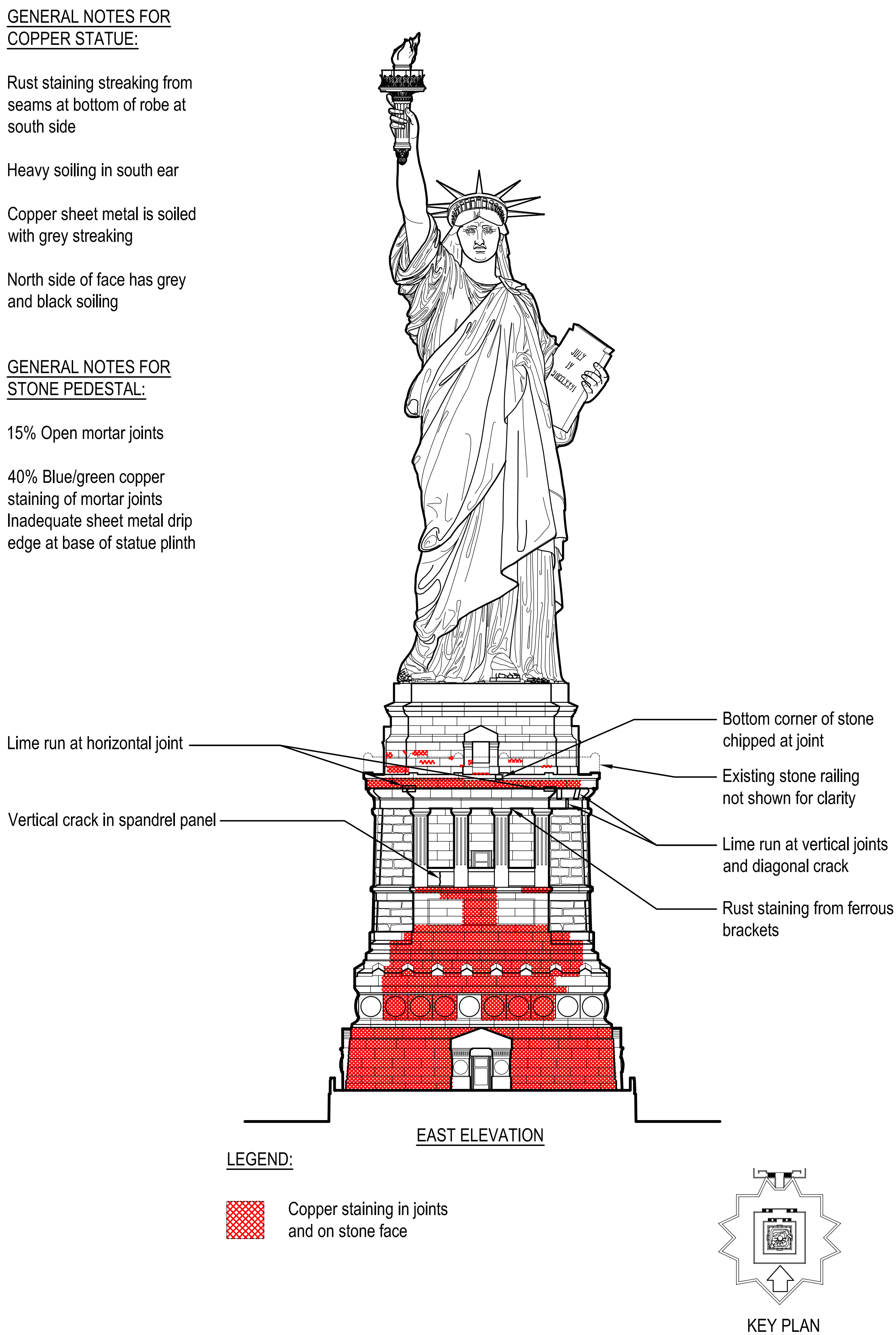


Figure 234. Existing Conditions - East Elevation

GENERAL NOTES FOR COPPER STATUE:

Copper patina is uneven and streaked

Black tar staining and rust staining streaks from panel joints in sheet metal

Copper sheet metal is soiled with heavy black deposits in creases of the metal

Visible holes in saddle brackets of armature, some rust stained

There does not appear to be a well executed drip edge at the base of sheet metal plinth

GENERAL NOTES FOR STONE PEDESTAL:

Stonework is soiled

Approximately 20% open mortar joints. Worse at upper elevations

Stone corners chipped and repaired with mortar

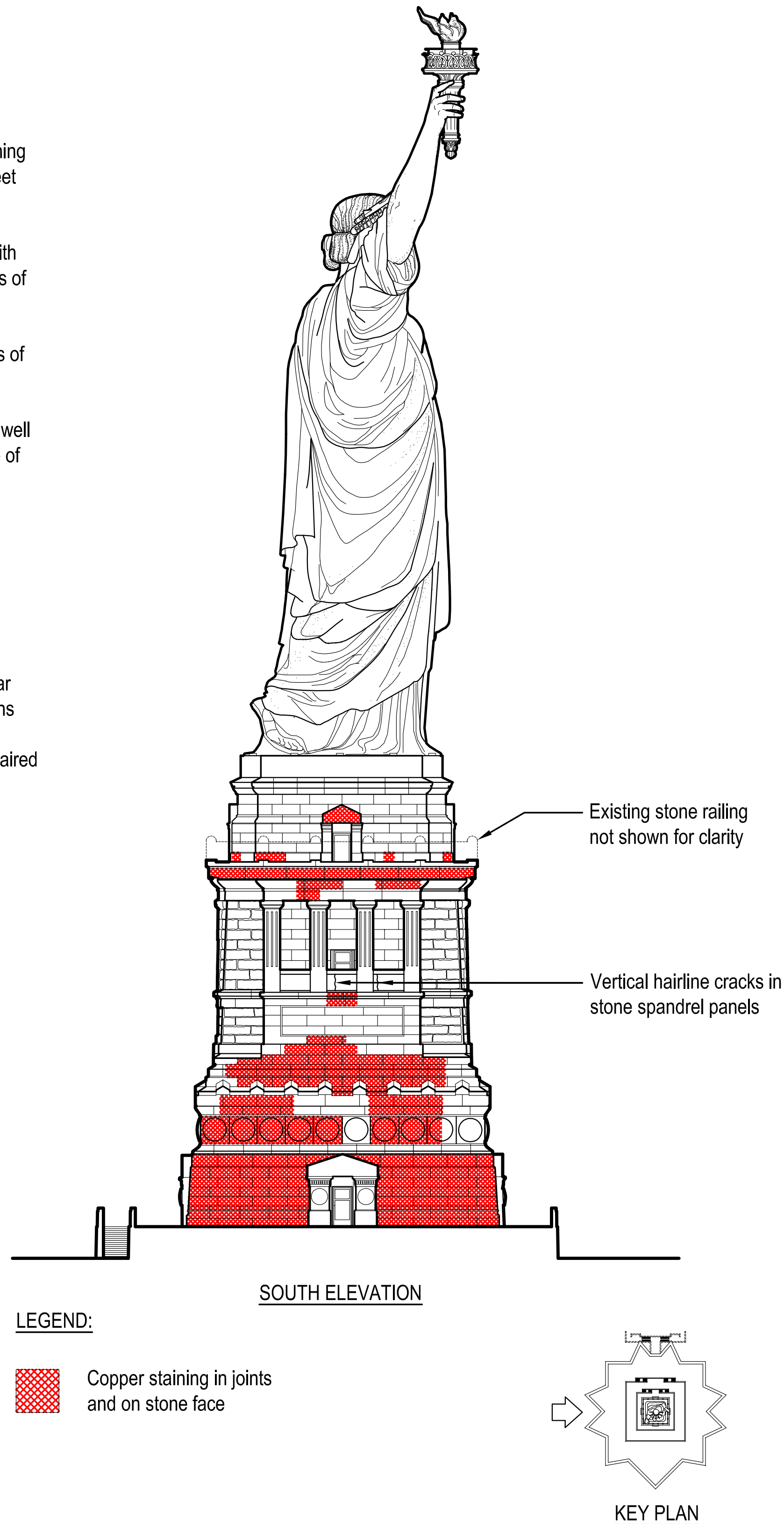


Figure 235. Existing Conditions - South Elevation

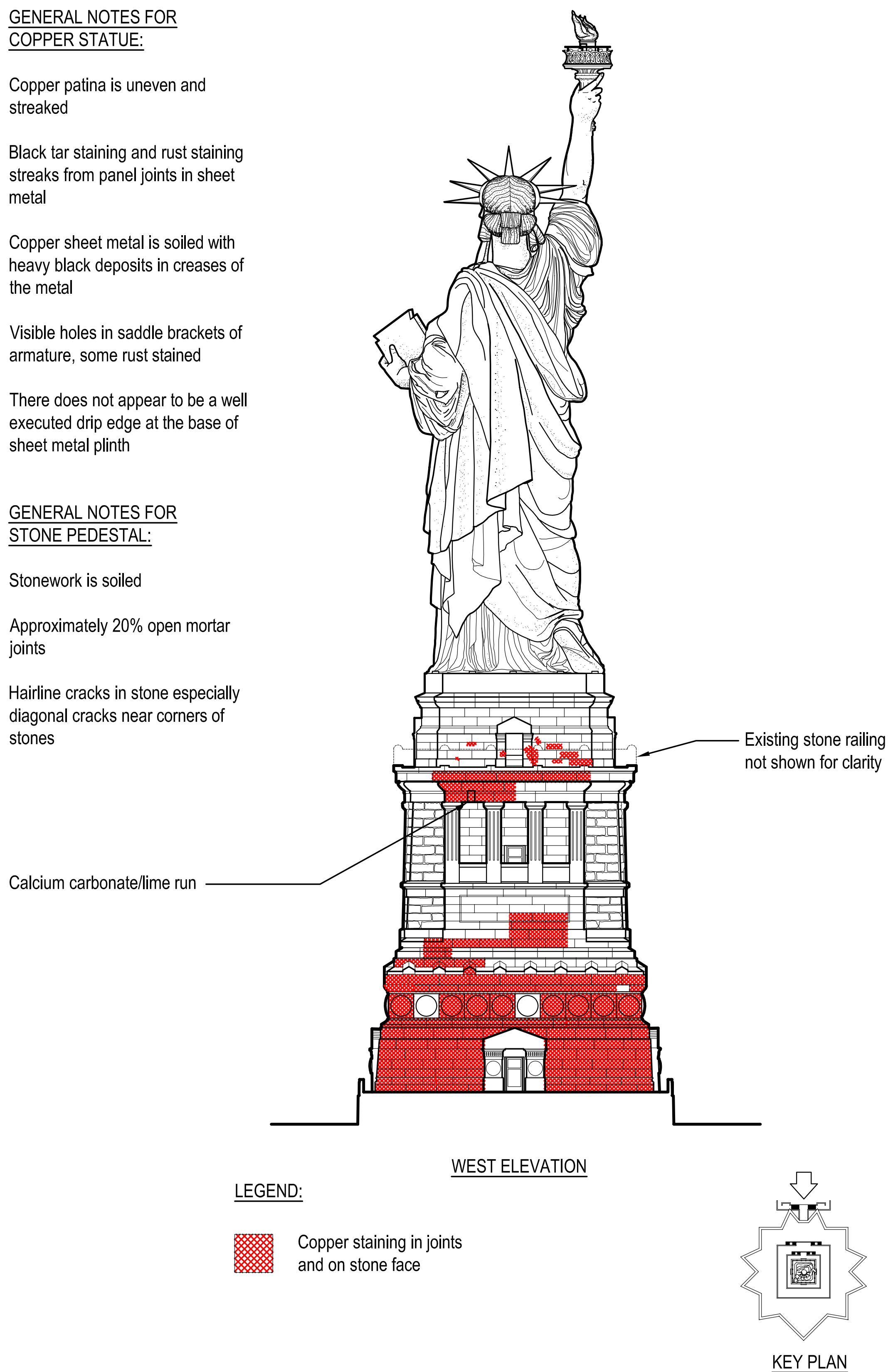


Figure 236. Existing Conditions - West Elevation

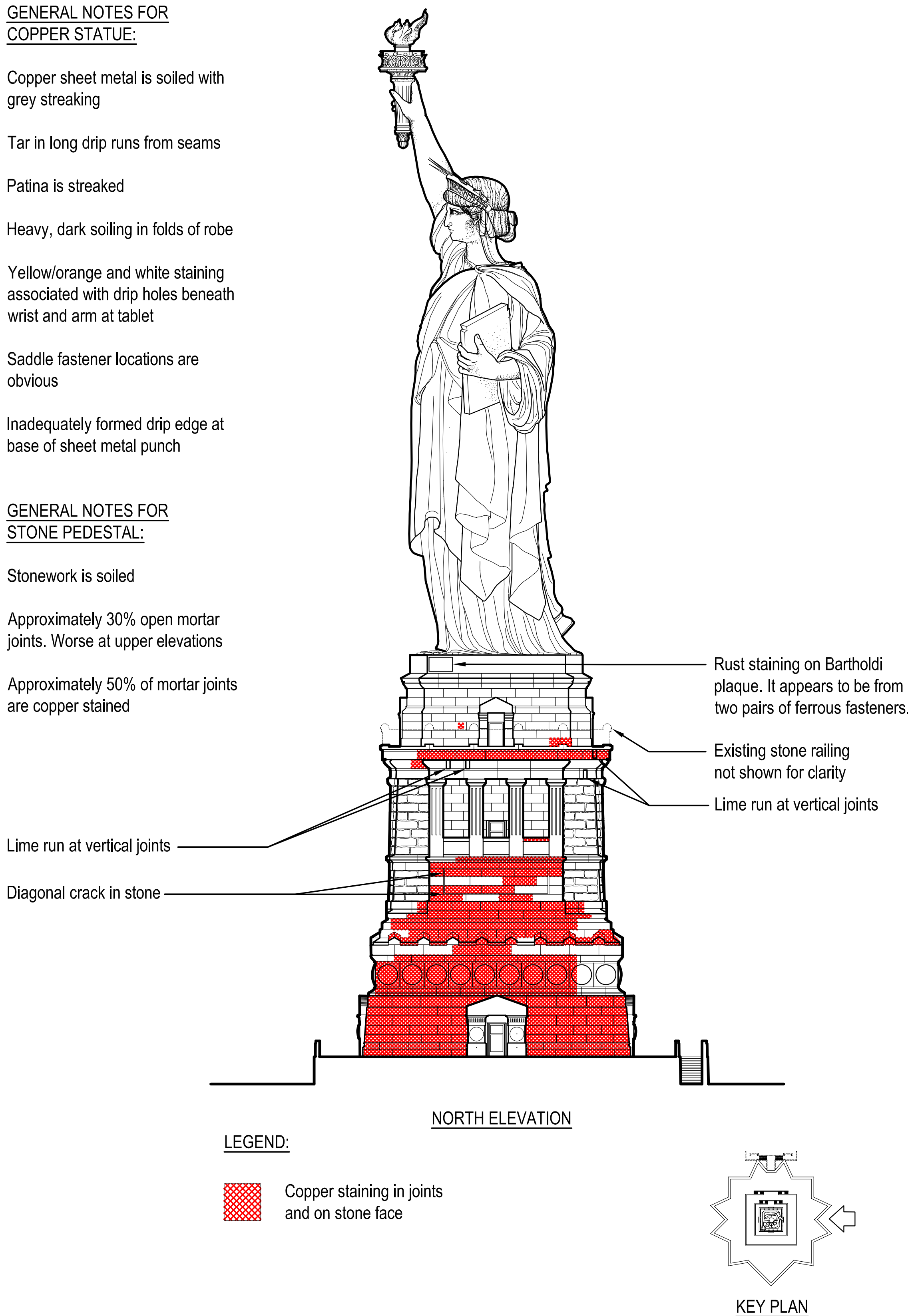


Figure 237. Existing Conditions - North Elevation

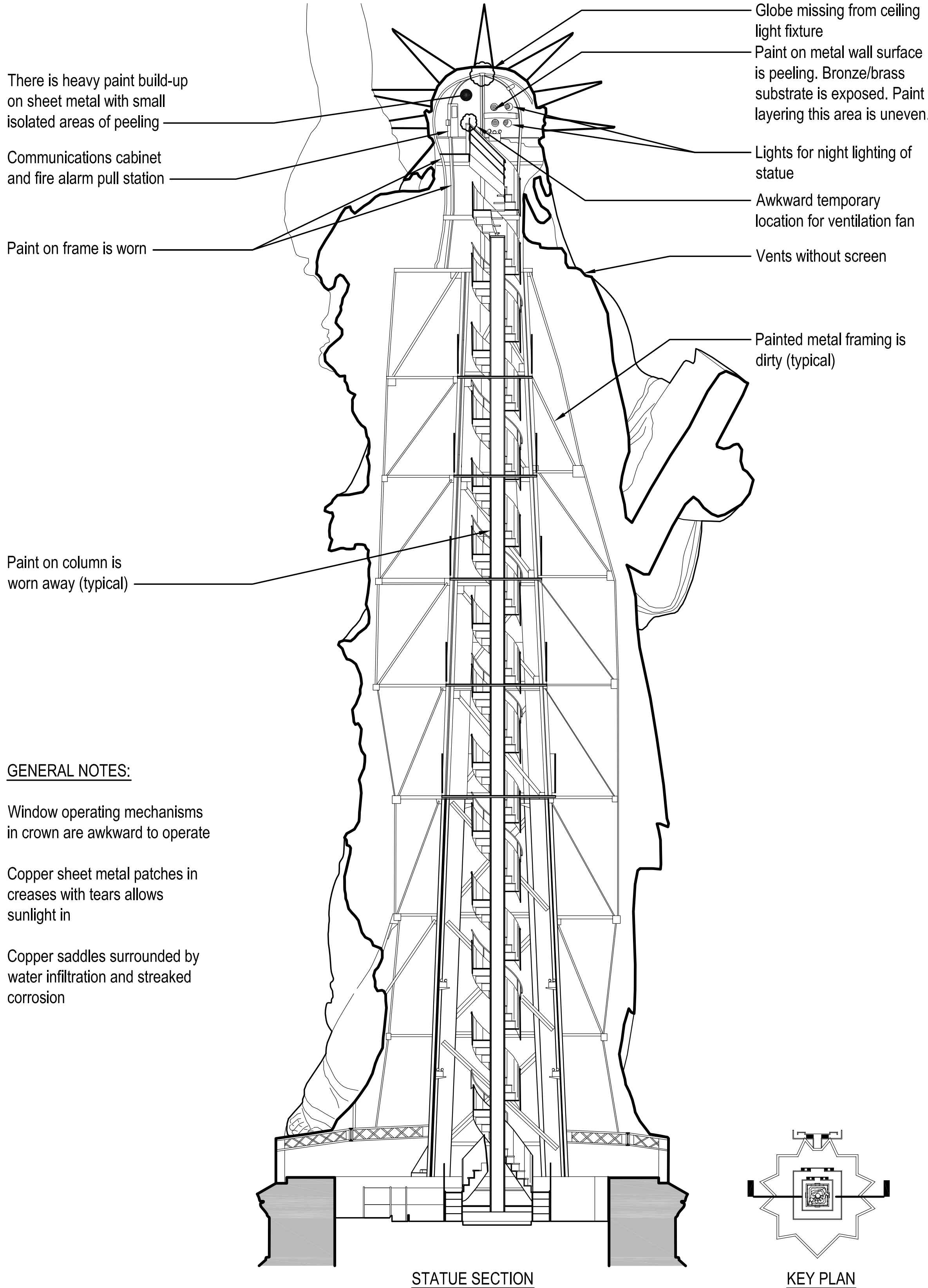


Figure 238. Existing Conditions - Statue Interior

APPENDIX A

SELECTED DRAWINGS: 1984-1986

"Restoration of the Statue of Liberty"
Prepared for the French-American Committee For Restoration of the Statue of Liberty, Inc.
(Swanke Hayden Connell Architects and The Office of Thierry W. Despont)

National Park Service, Statue of Liberty National Monument Reference Library, 356-25902, A-101C

DEMOLITION

NEW WORK

Restoration of the

STATUE OF LIBERTY

Prepared for the

French-American Committee
For Restoration of the
Statue of Liberty, Inc.

French-American Consulting Team

France

Architect
G. Ph. Grandjean
Engineers-Advisers
J. Levron, J. Moutard, P. Tissier

U.S.A.

Architect
Swanke Hayden Connell Architects
Associate Architect
The Office of Thierry W. Despont

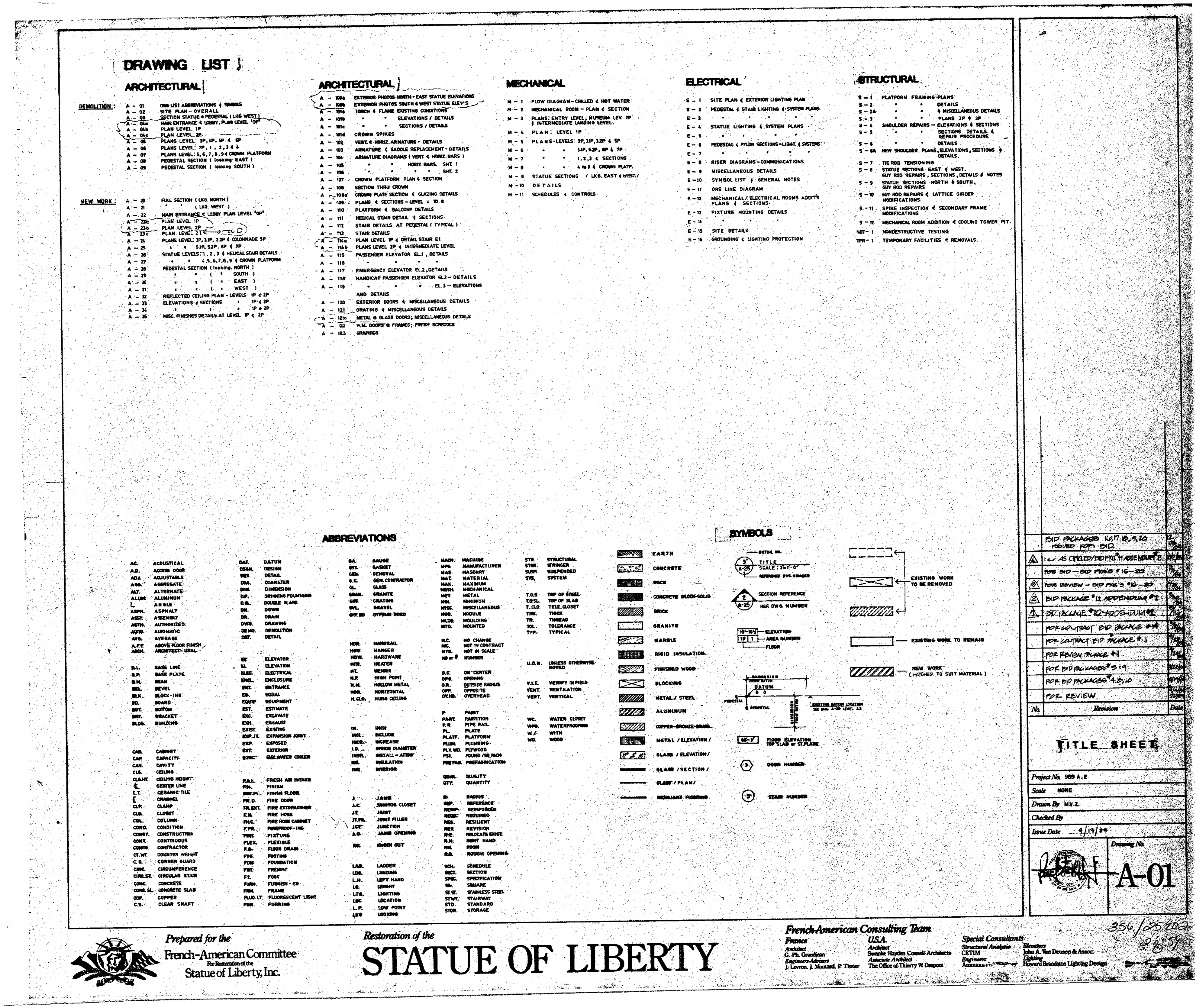
Special Consultants

Structural Analysis
CETIM
Engineers
Ammann and Whitney

Elevators
John A. Van Deusen & Assoc.
Lighting
Howard Brandston Lighting Design

Rec'd 12.28.84

356/25902
12 59



DRAWING LIST

ARCHITECTURAL

DEMOLITION:
A – 01 DWG LIST ABBREVIATIONS & SYMBOLS
A – 02 SITE PLAN – OVERALL
A – 03 SECTION STATUE & PEDESTAL (LKG WEST)
A – 04a MAIN ENTRANCE & LOBBY, PLAN LEVEL "OP"
A – 04b PLAN LEVEL 1P
A – 04c PLAN LEVEL 2P
A – 05 PLANS LEVEL: 3P, 4P, 5P & 6P
A – 06 PLANS LEVEL: 7P, 1, 2, 3 & 4
A – 07 PLANS LEVEL: 5, 6, 7, 8, 9 & CROWN PLATFORM
A – 08 PEDESTAL SECTION (looking EAST)
A – 09 PEDESTAL SECTION (looking SOUTH)

NEW WORK:
A – 20 FULL SECTION (LKG. NORTH)
A – 21 " " (LKG. WEST)
A – 22 MAIN ENTRANCE & LOBBY PLAN LEVEL "OP"
A – 23a PLAN LEVEL 1P
A – 23b PLAN LEVEL 2P
A – 23c PLAN LEVEL 21
A – 24 PLANS LEVEL: 3P, 3.1P, 3.2P & COLONNADE 5P
A – 25 " " 5.1P, 5.2P, 6P & 7P
A – 26 STATUE LEVELS: 1, 2, 3 & HELICAL STAIR DETAILS
A – 27 " " 4, 5, 6, 7, 8, 9 & CROWN PLATFORM
A – 28 PEDESTAL SECTION (looking NORTH)
A – 29 " " (" SOUTH)
A – 30 " " (" EAST)
A – 31 " " (" WEST)
A – 32 REFLECTED CEILING PLAN – LEVELS 1P & 2P
A – 33 ELEVATIONS & SECTIONS " 1P & 2P
A – 34 " " " 1P & 2P
A – 35 MISC. FINISHES DETAILS AT LEVEL 1P & 2P

ARCHITECTURAL

A – 100a EXTERIOR PHOTOS NORTH - EAST STATUE ELEVATIONS
A – 100b EXTERIOR PHOTOS SOUTH & WEST STATUE ELEV'S
A – 101a TORCH & FLAME EXISTING CONDITIONS
A – 101b " " ELEVATIONS / DETAILS
A – 101c " " SECTIONS / DETAILS
A – 101d CROWN SPIKES
A – 102 VERT. & HORIZ. ARMATURE – DETAILS
A – 103 ARMATURE & SADDLE REPLACEMENT – DETAILS
A – 104 ARMATURE DIAGRAMS (VERT. & HORIZ. BARS)
A – 105 " " HORIZ. BARS. SHT. 1
A – 106 " " " " SHT. 2
A – 107 CROWN PLATFORM PLAN & SECTION
A – 108 SECTION THRU CROWN
A – 108a CROWN PLATE SECTION & GLAZING DETAILS
A – 109 PLANS & SECTIONS – LEVEL 4 TO 8
A – 110 PLATFORM & BALCONY DETAILS
A – 111 HELICAL STAIR DETAIL & SECTIONS
A – 112 STAIR DETAILS AT PEDESTAL (TYPICAL)
A – 113 STAIR DETAILS
A – 114a PLAN LEVEL 1P & DETAIL STAIR E1
A – 114b PLANS LEVEL 2P & INTERMEDIATE LEVEL
A – 115 PASSENGER ELEVATOR EL.1, DETAILS
A – 116 " " " "
A – 117 EMERGENCY ELEVATOR EL.2, DETAILS
A – 118 HANDICAP PASSENGER ELEVATOR EL.3 – DETAILS
A – 119 " " " EL.3 – ELEVATIONS AND DETAILS
A – 120 EXTERIOR DOORS & MISCELLANEOUS DETAILS
A – 121 GRATING & MISCELLANEOUS DETAILS
A – 121a METAL & GLASS DOORS; MISCELLANEOUS DETAILS
A – 122 H.M. DOORS & FRAMES; FINISH SCHEDULE
A – 123 GRAPHICS

MECHANICAL

M – 1 FLOW DIAGRAM – CHILLED & HOT WATER
M – 2 MECHANICAL ROOM – PLAN & SECTION
M – 3 PLANS: ENTRY LEVEL, MUSEUM LEV. 2P & INTERMEDIATE LANDING LEVEL.
M – 4 PLAN: LEVEL 1P
M – 5 PLANS-LEVELS: 3P, 3.1P, 3.2P & 5P
M – 6 " " 5.1P, 5.2P, 6P & 7P
M – 7 " " 1, 2, 3 & SECTIONS
M – 8 " " 4 to 9 & CROWN PLATF.
M – 9 STATUE SECTIONS / LKG. EAST & WEST./
M – 10 DETAILS
M – 11 SCHEDULES & CONTROLS.

ELECTRICAL

E – 1 SITE PLAN & EXTERIOR LIGHTING PLAN
E – 2 PEDESTAL & STAIR LIGHTING & SYSTEM PLANS
E – 3 " " " "
E – 4 STATUE LIGHTING & SYSTEM PLANS
E – 5 " " " "
E – 6 PEDESTAL & PYLON SECTIONS – LIGHT. & SYSTEMS
E – 7 " " " " "
E – 8 RISER DIAGRAMS – COMMUNICATIONS
E – 9 MISCELLANEOUS DETAILS
E – 10 SYMBOL LIST & GENERAL NOTES
E – 11 ONE LINE DIAGRAM
E – 12 MECHANICAL / ELECTRICAL ROOMS ADDIT'S PLANS & SECTIONS.
E – 13 FIXTURE MOUNTING DETAILS
E – 14 " " "
E – 15 SITE DETAILS
E – 16 GROUNDING & LIGHTING PROTECTION

STRUCTURAL

S – 1 PLATFORM FRAMING PLANS
S – 2 " " DETAILS
S – 2A " " & MISCELLANEOUS DETAILS
S – 3 " " PLANS 2P & 3P
S – 4 SHOULDER REPAIRS – ELEVATIONS & SECTIONS
S – 5 " " SECTIONS DETAILS & REPAIR PROCEDURE
S – 6 " " DETAILS
S – 6A NEW SHOULDER PLANS, ELEVATIONS, SECTIONS & DETAILS.
S – 7 TIE ROD TENSIONING
S – 8 STATUE SECTIONS EAST & WEST. GUY ROD REPAIRS, SECTIONS, DETAILS & NOTES
S – 9 STATUE SECTIONS NORTH & SOUTH, GUY ROD REPAIRS
S – 10 GUY ROD REPAIRS & LATTICE GIRDER MODIFICATIONS.
S – 11 SPIKE INSPECTION & SECONDARY FRAME MODIFICATIONS
S – 12 MECHANICAL ROOM ADDITION & COOLING TOWER PIT.
NDT – 1 NONDESTRUCTIVE TESTING.
TFR – 1 TEMPORARY FACILITIES & REMOVALS.

ABBREVIATIONS

SYMBOLS

EXISTING WORK TO BE REMOVED

EXISTING WORK TO REMAIN

NEW WORK (HATCHED TO SUIT MATERIAL)

TITLE SHEET

Project No. 989 A.E

Scale NONE

Drawn By M.V.Z.

Checked By

Issue Date 4/13/84

Drawing No. A-01

Prepared for the French-American Committee for Restoration of the Statue of Liberty, Inc.

Restoration of the STATUE OF LIBERTY

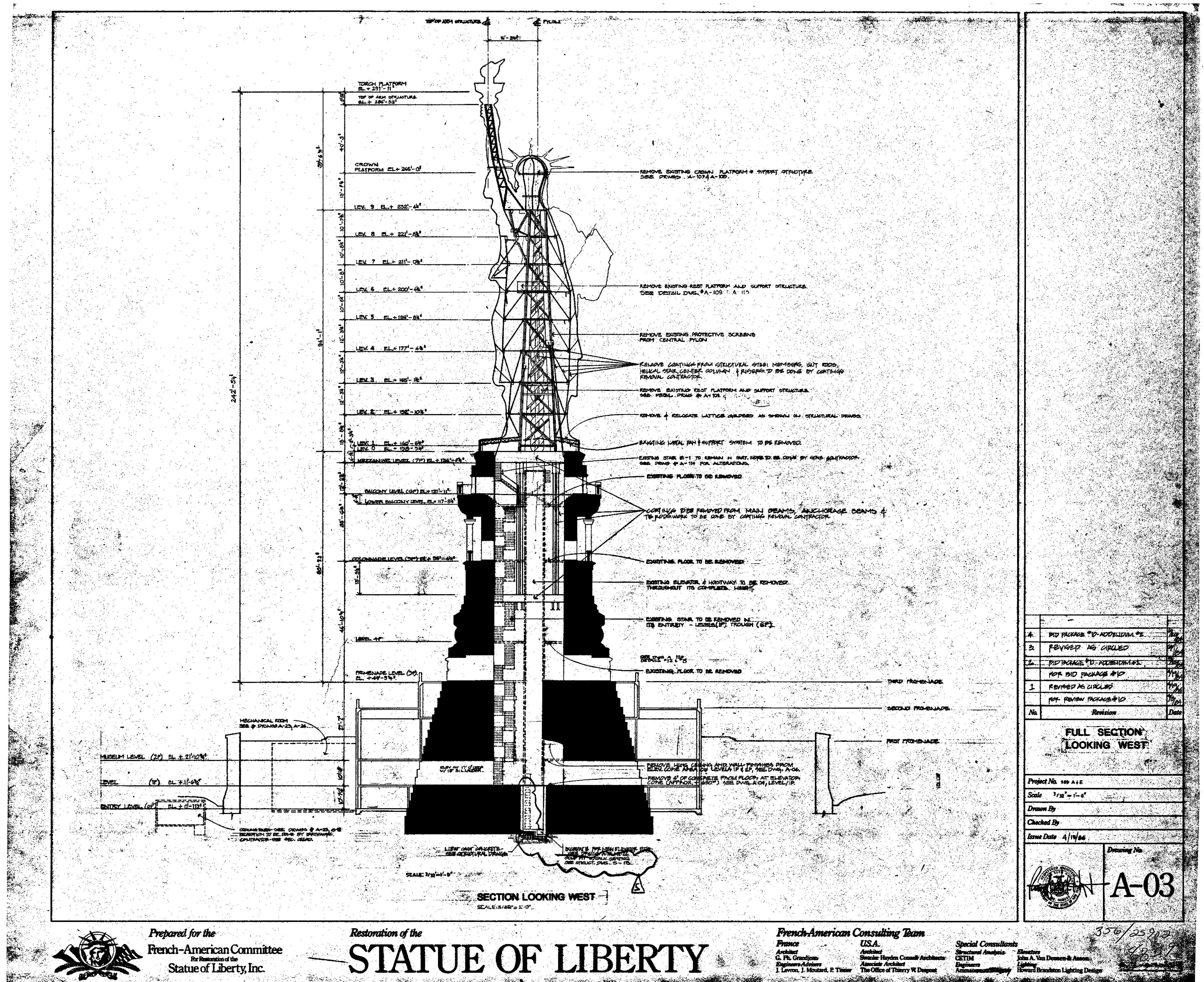
French-American Consulting Team

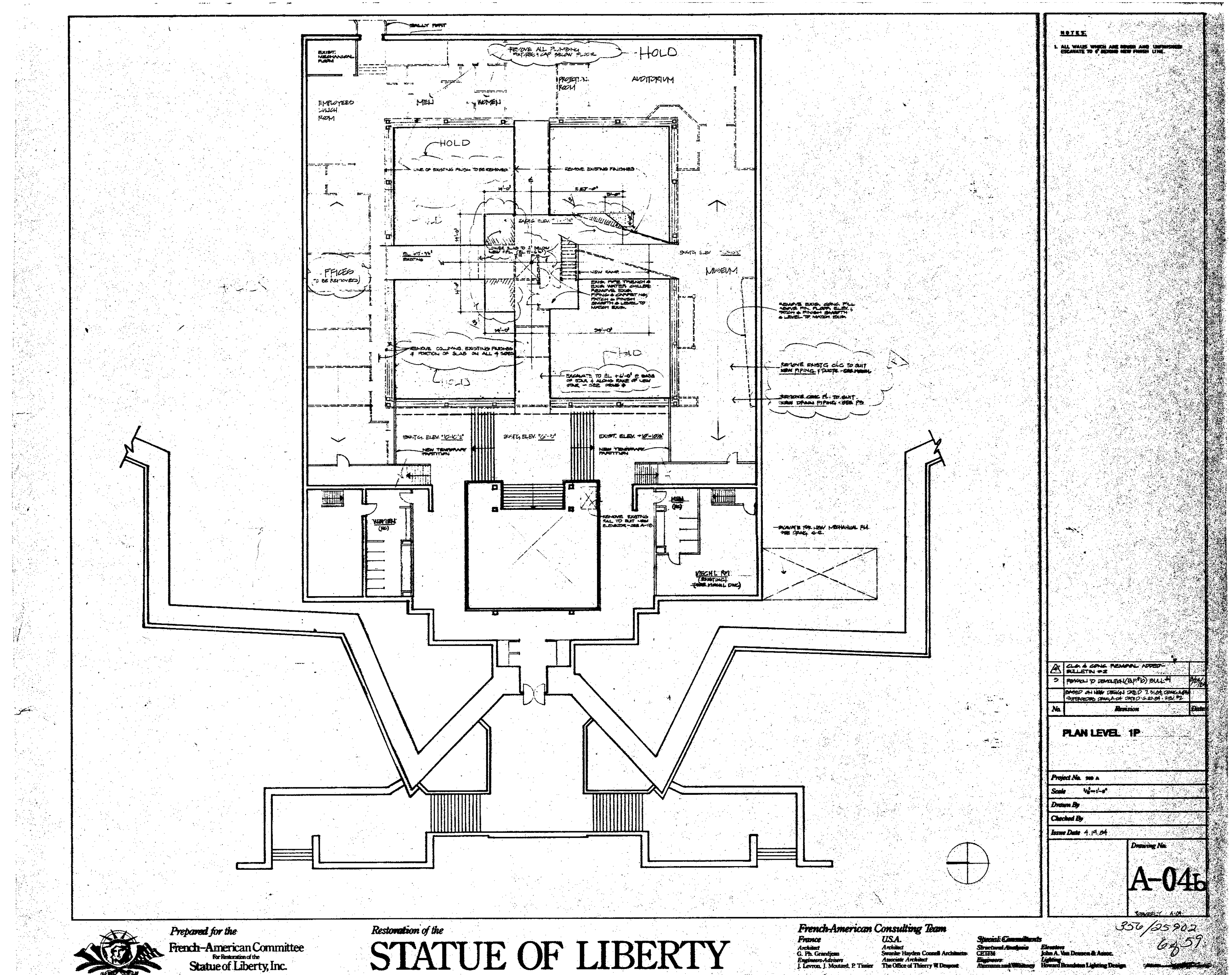
France: Architect G. Ph. Grandjean; Engineers-Advisers J. Levron, J. Moutard, P. Tissier

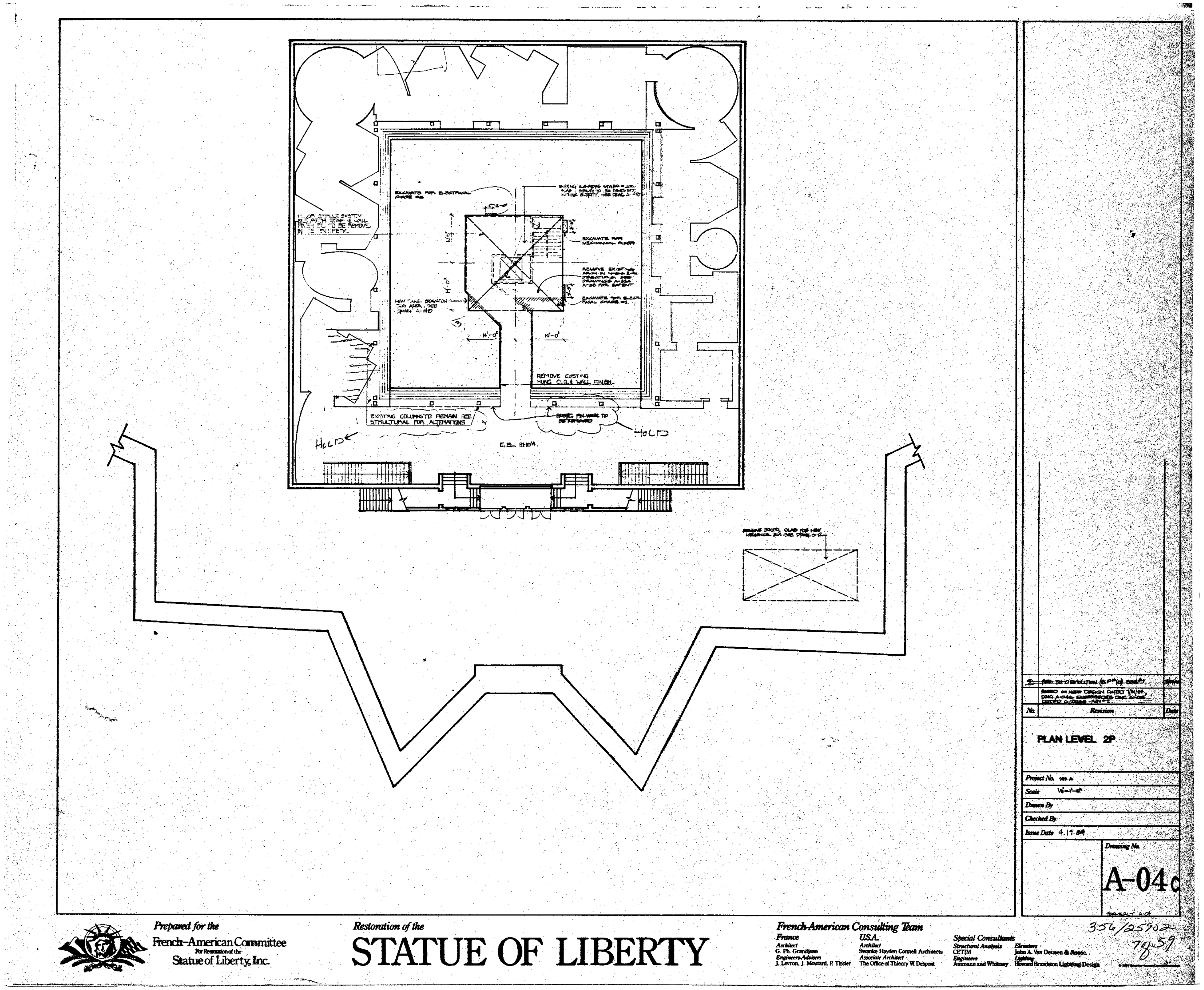
U.S.A.: Architect Swanke Hayden Connell Architects; Associate Architect The Office of Thierry W. Despont

Special Consultants: Structural Analysis CETIM; Engineers Ammann & Whitney; Elevators John A. Van Deusen & Assoc.; Lighting Howard Brandston Lighting Design

356/25902


SECTION LOOKING WEST
FULL SECTION LOOKING WEST
A-03
Prepared for the
French-American Committee
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team


HOLD
AUDITORIUM
MEN
WOMEN
EMPLOYEES LUNCH ROOM
HOLD
OFFICES (TO BE REMOVED)
MUSEUM
HOLD
HOLD
NOTES
PLAN LEVEL 1P
Project No.
Scale
Drawn By
Checked By
Issue Date
Drawing No.
A-046
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team


REMOVE EXISTING
HUNG CLG & WALL FINISH
EXISTING COLUMNS TO REMAIN SEE
STRUCTURAL FOR ALTERATIONS
HOLD
HOLD
PLAN LEVEL 2P
No.
Revision
Date
Project No.
Scale
Drawn By
Checked By
Issue Date 4.17.84
Drawing No.
A-04c
356/25902
7859
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
France
Architect
G. Ph. Grandjean
Engineers-Advisers
J. Levron, J. Moutard, P. Tissier
U.S.A.
Architect
Swanke Hayden Connell Architects
Associate Architect
The Office of Thierry W. Despont
Special Consultants
Structural Analysis
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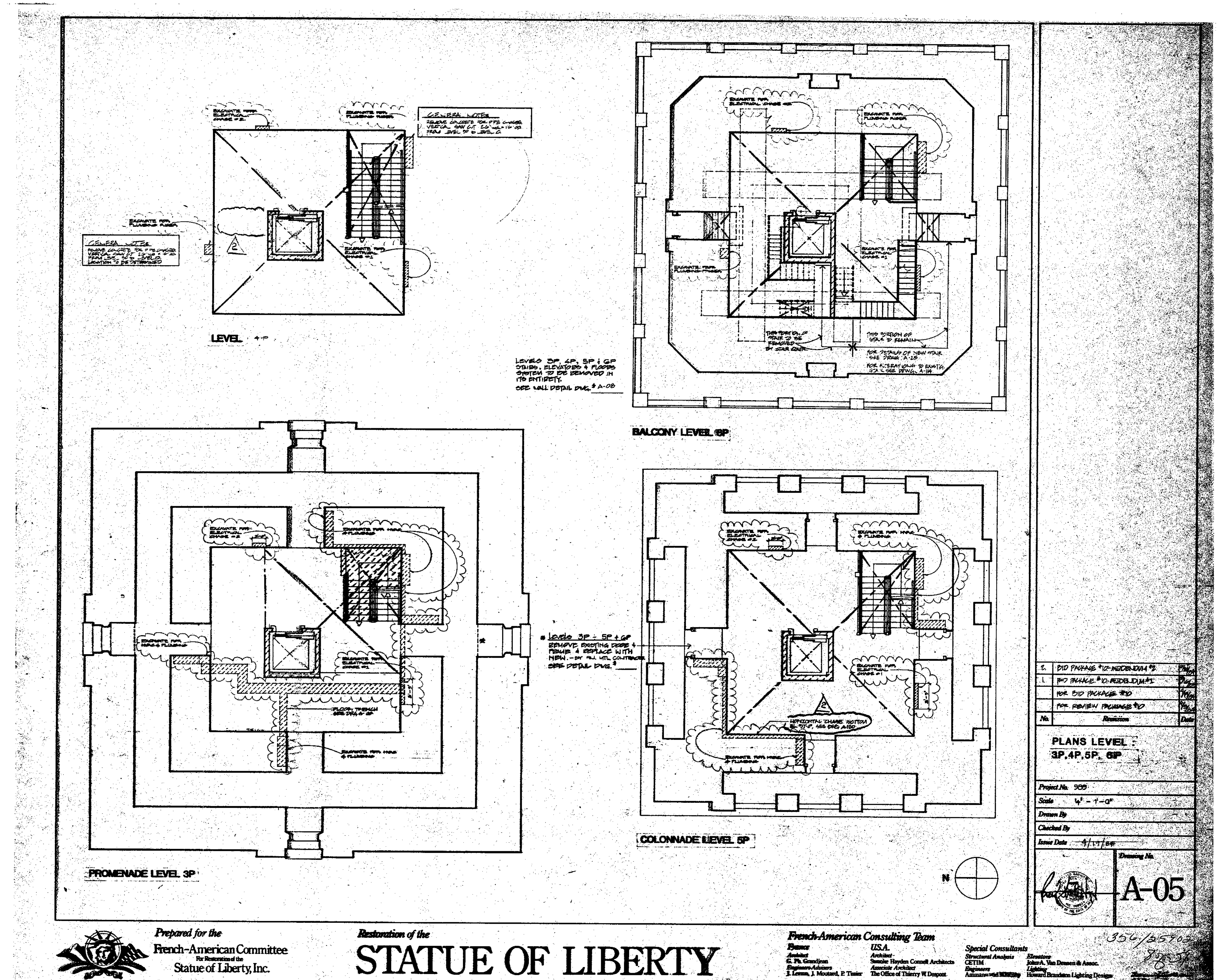
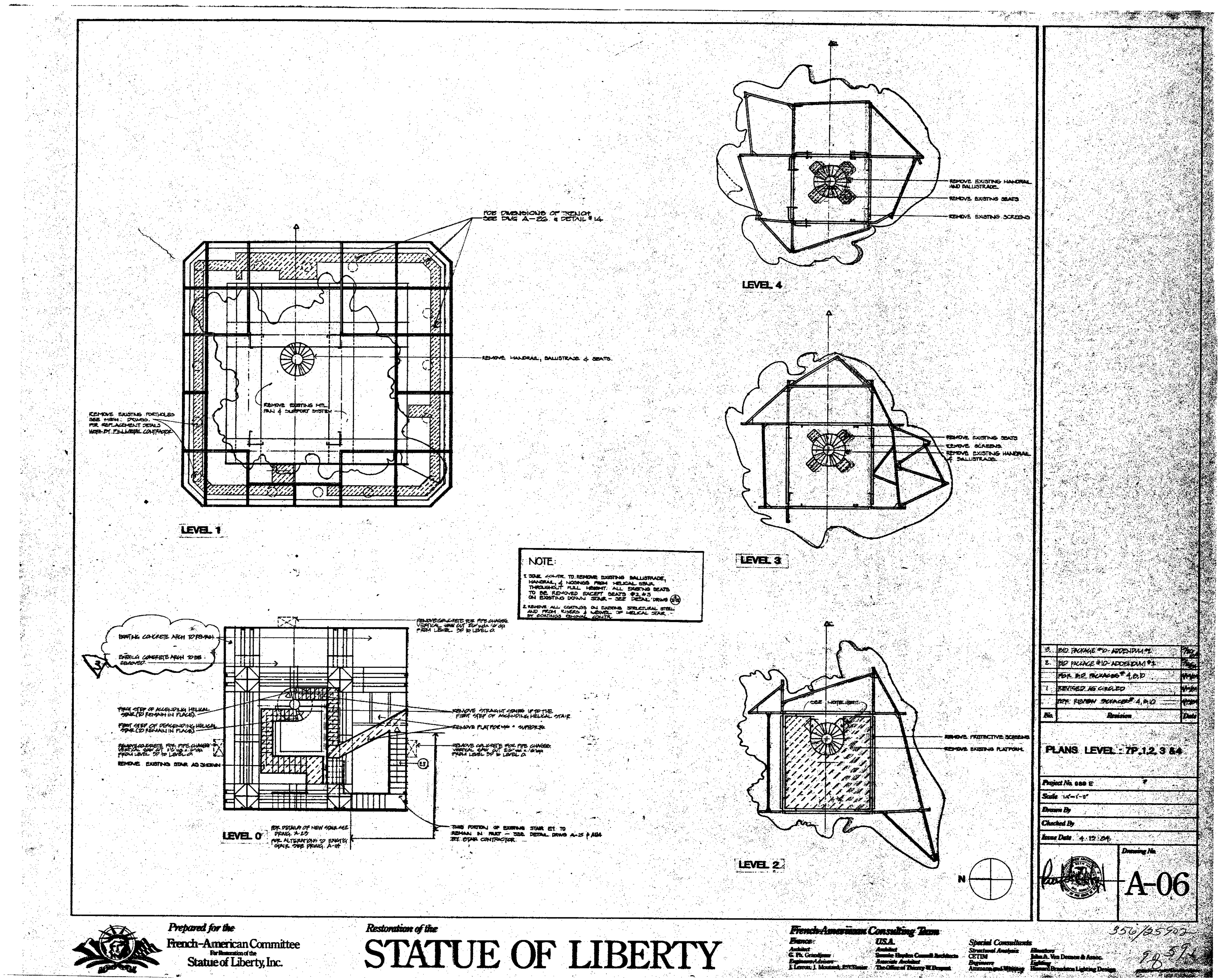
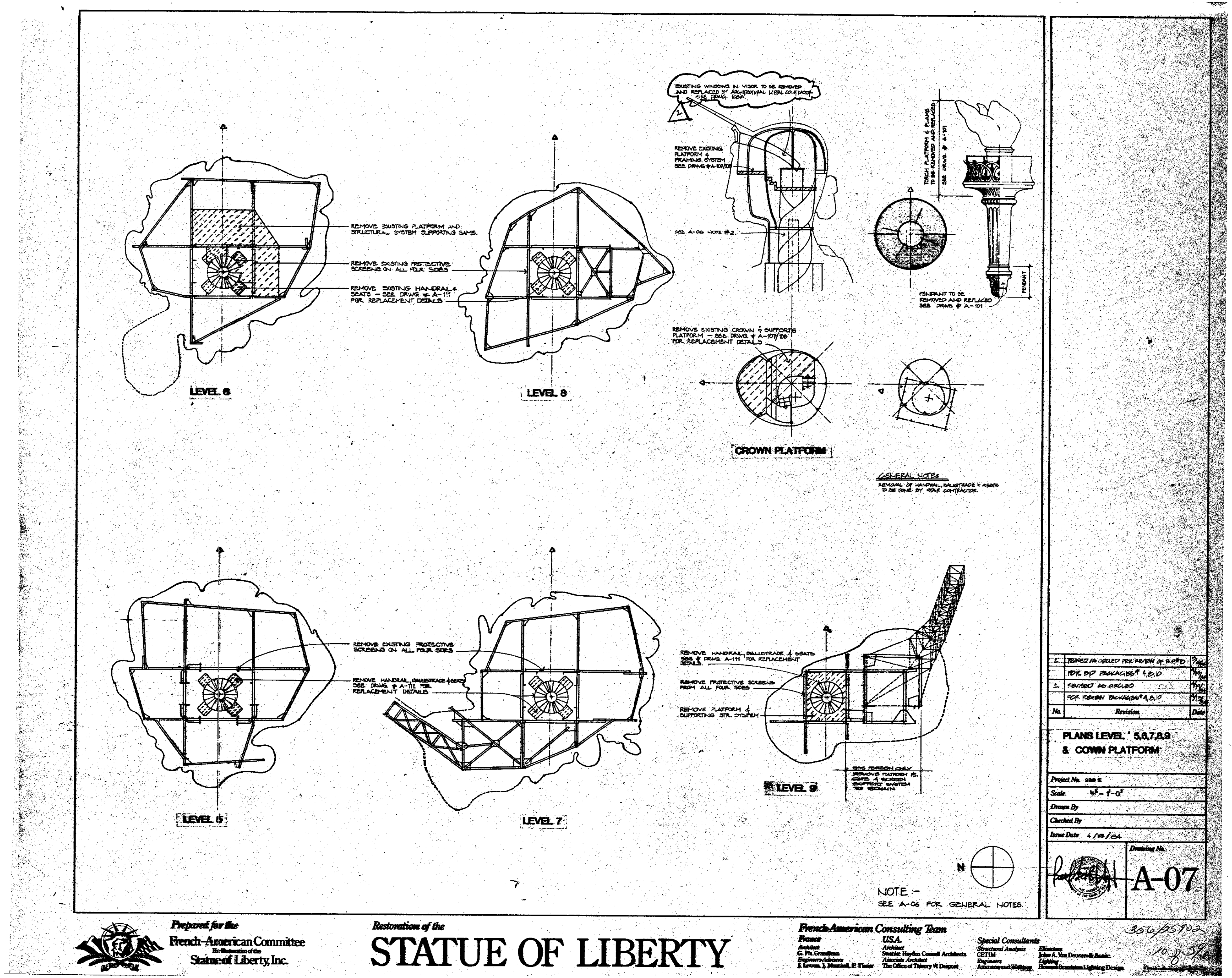
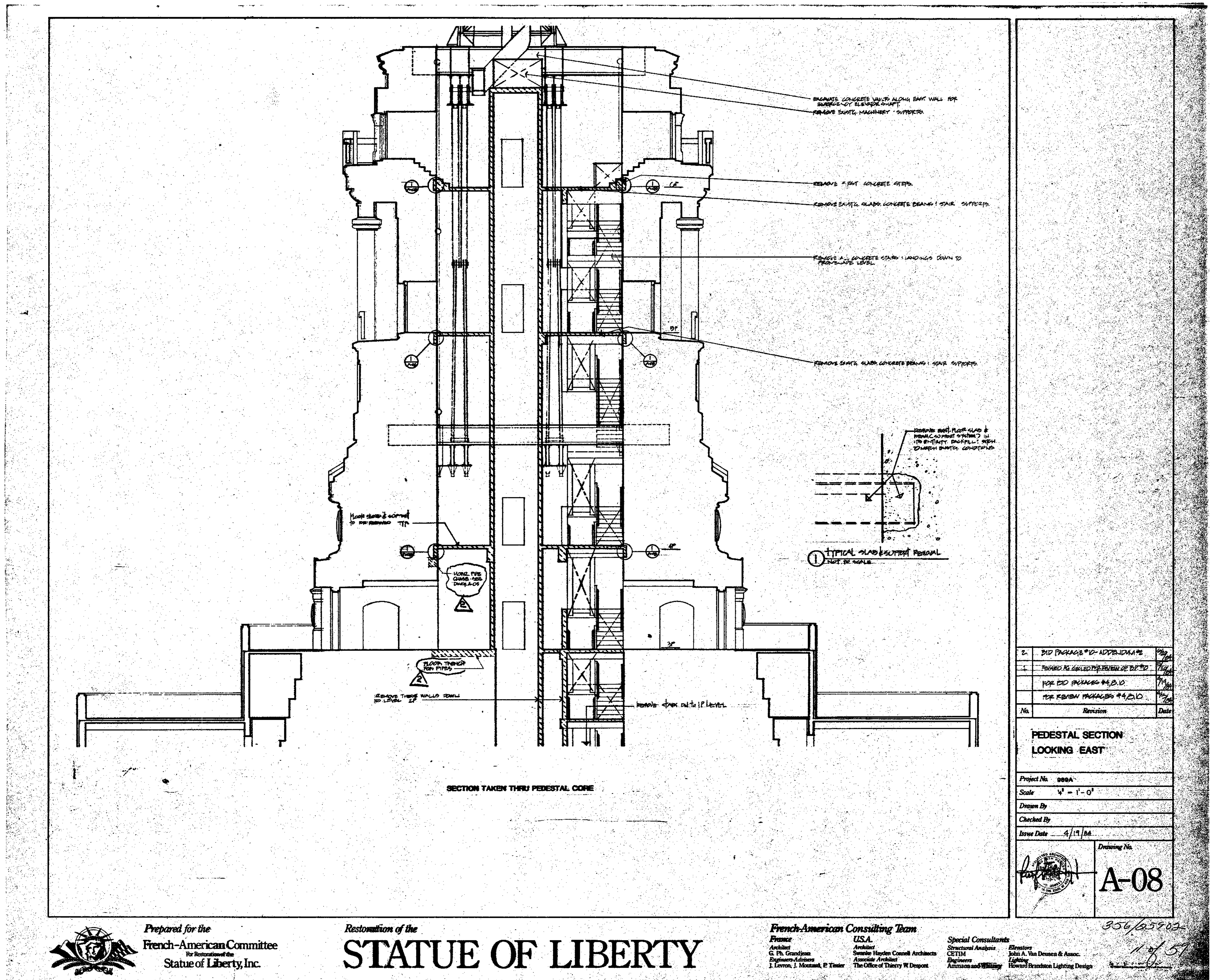
Ammann and Whitney
Elevators
John A. Van Deusen & Assoc.
Lighting
Howard Brandston Lighting Design


LEVEL 4P
BALCONY LEVEL 6P
PROMENADE LEVEL 3P
COLONNADE LEVEL 5P
PLANS LEVEL
3P,4P,5P, 6P
Project No. 989
Scale 1/8" = 1'-0"
Drawn By
Checked By
A-05
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
Special Consultants


LEVEL 4
LEVEL 3
LEVEL 2
LEVEL 1
LEVEL 0
NOTE:
REMOVE HANDRAIL, BALLUSTRADE & SEATS.
REMOVE EXISTING SEATS
REMOVE EXISTING SCREENS
REMOVE PROTECTIVE SCREENS
REMOVE EXISTING PLATFORM.
N
3. BID PACKAGE #10-ADDENDUM #2
2. BID PACKAGE #10-ADDENDUM #1
FOR BID PACKAGES # 4,8,10
1 REVISED AS CIRCLED
FOR REVIEW PACKAGES # 4,8,10
No.
Revision
Date
PLANS LEVEL - 7P,1,2, 3 &4
Project No. 989 E
Scale 1/4"=1'-0"
Drawn By
Checked By
Issue Date 4 · 12 · 84
Drawing No.
A-06
356/25902
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
France:
U.S.A.
Special Consultants


REMOVE EXISTING PLATFORM AND STRUCTURAL SYSTEM SUPPORTING SAME.
REMOVE EXISTING PROTECTIVE SCREENS ON ALL FOUR SIDES
LEVEL 6
LEVEL 8
CROWN PLATFORM
GENERAL NOTES
LEVEL 5
LEVEL 7
LEVEL 9
PLANS LEVEL 5,6,7,8,9
& COWN PLATFORM
Project No.
Scale
Drawn By
Checked By
Issue Date
Drawing No.
A-07
NOTE :-
SEE A-06 FOR GENERAL NOTES.
Prepared for the
French-American Committee
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
France
U.S.A.
Special Consultants


SECTION TAKEN THRU PEDESTAL CORE
TYPICAL SLAB & SUPPORT REMOVAL
NOT TO SCALE
2. BID PACKAGE #10 - ADDENDUM #2
FOR BID PACKAGES #4,8,10
FOR REVIEW PACKAGES #4,8,10
No.
Revision
Date
PEDESTAL SECTION
LOOKING EAST
Project No. 989A
Scale 1/4" = 1'-0"
Drawn By
Checked By
Issue Date 4/19/84
Drawing No.
A-08
356/85902
11 of 59
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
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Architect
G. Ph. Grandjean
Engineers-Advisers
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Associate Architect
The Office of Thierry W Despont
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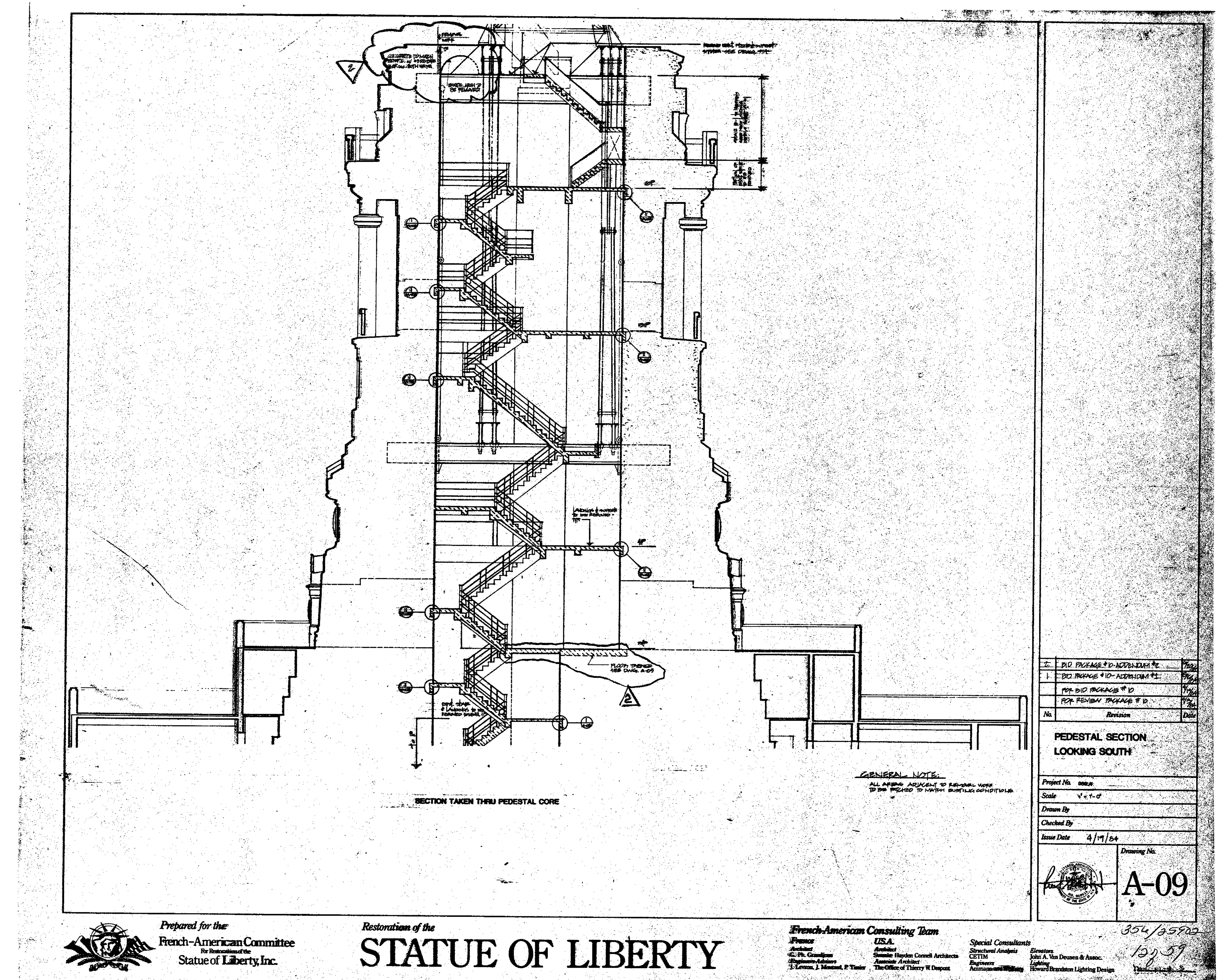
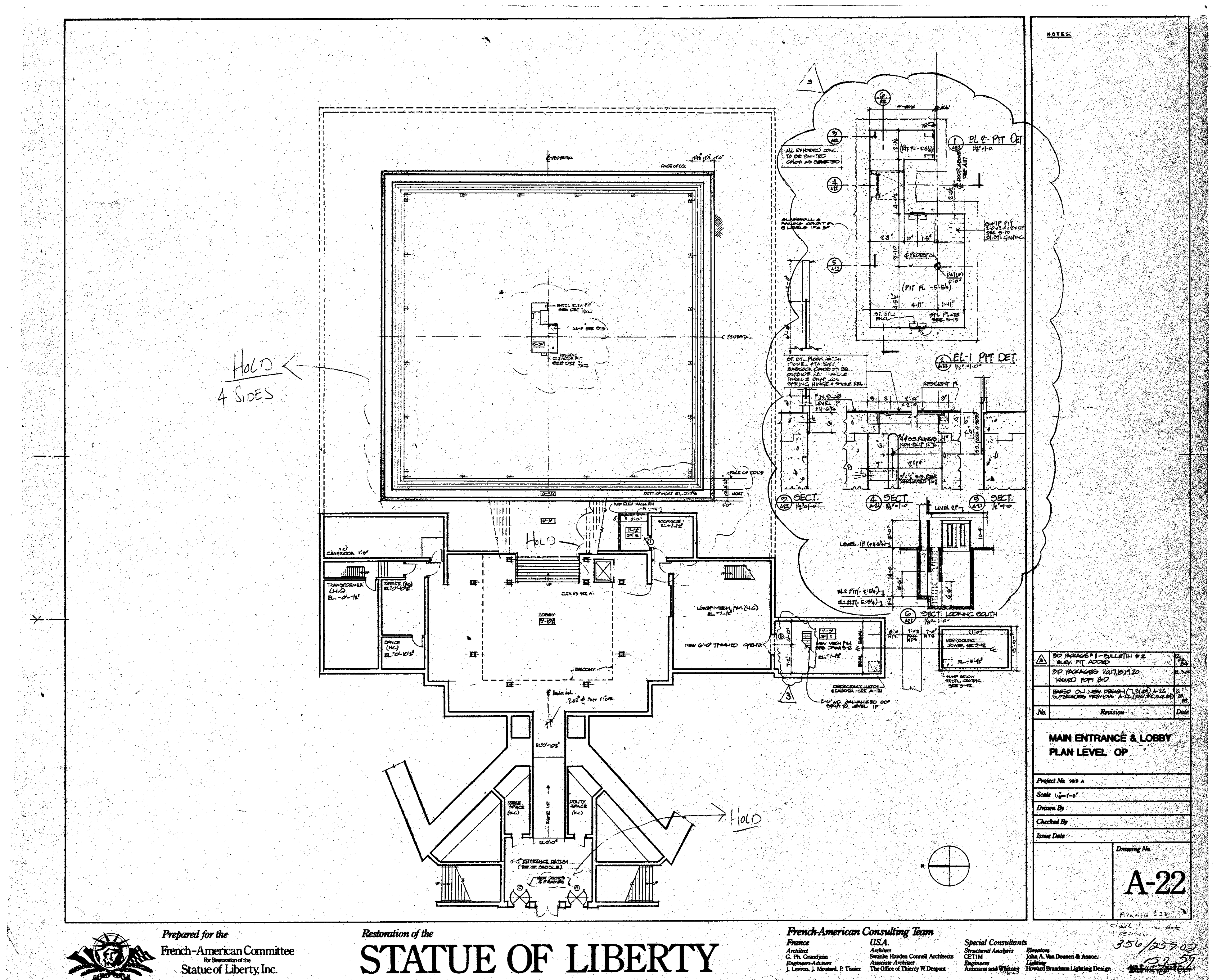
Structural Analysis
CETIM
Engineers
Ammann and Whitney
Elevators
John A. Van Deusen & Assoc.
Lighting
Howard Brandston Lighting Design


SECTION TAKEN THRU PEDESTAL CORE
GENERAL NOTE:
BID PACKAGE #10-ADDENDUM #2
BID PACKAGE #10-ADDENDUM #1
FOR BID PACKAGE #10
FOR REVIEW PACKAGE #10
No.
Revision
Date
PEDESTAL SECTION
LOOKING SOUTH
Project No.
Scale
Drawn By
Checked By
Issue Date 4/19/84
Drawing No.
A-09
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
France
U.S.A.
Special Consultants
Elevators
John A. Van Deusen & Assoc.
Lighting
Howard Brandston Lighting Design
354/25902
12759


NOTES:
HOLD
4 SIDES
HOLD
HOLD
EL-2 PIT DET.
EL-1 PIT DET.
SECT.
SECT. LOOKING SOUTH
LOBBY
No.
Revision
Date
MAIN ENTRANCE & LOBBY
PLAN LEVEL OP
Project No.
Scale
Drawn By
Checked By
Issue Date
Drawing No.
A-22
Prepared for the
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For Restoration of the
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STATUE OF LIBERTY
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France
Architect
G. Ph. Grandjean
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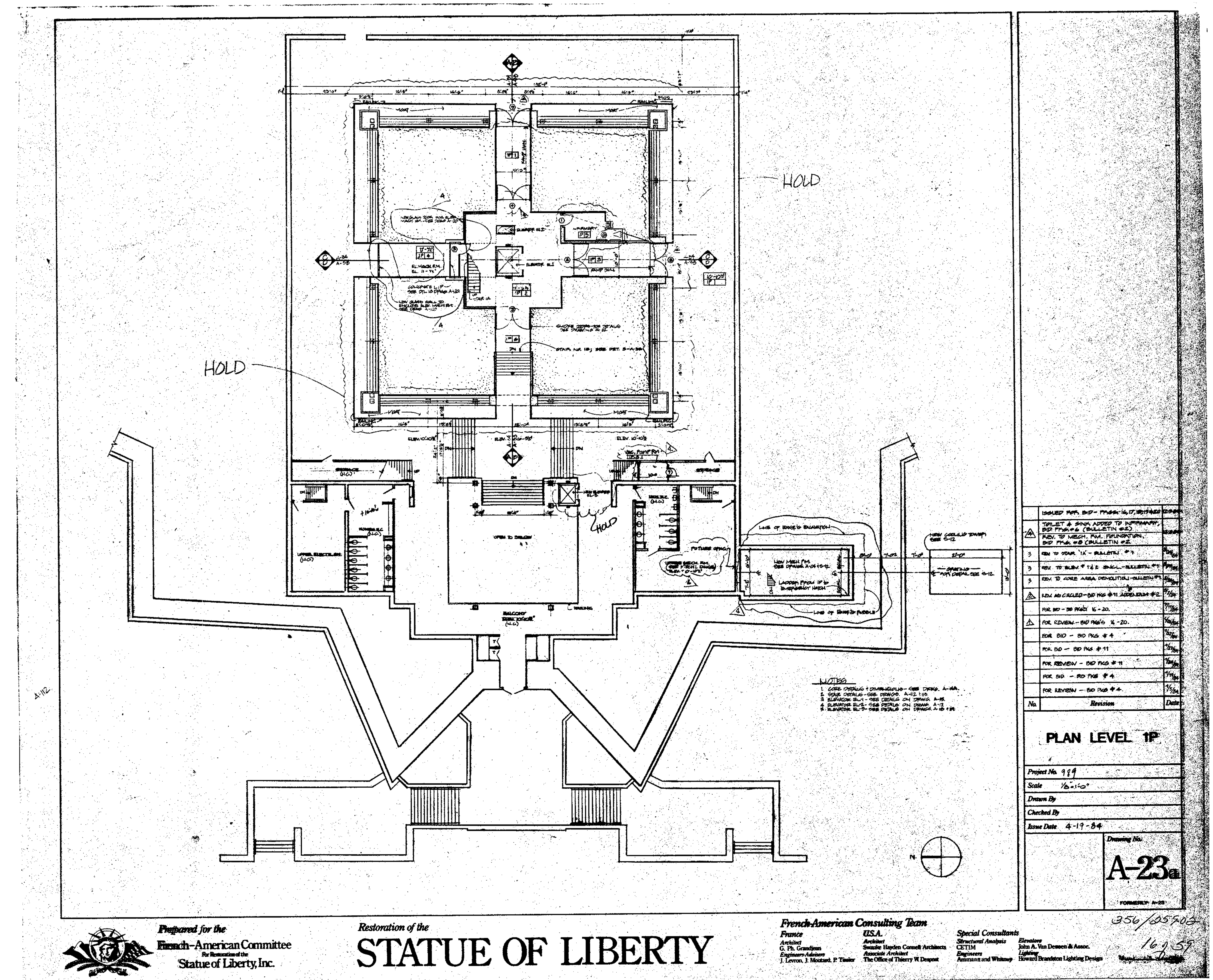
Howard Brandston Lighting Design


HOLD
HOLD
NOTES
PLAN LEVEL 1P
Project No. 989
Scale
Drawn By
Checked By
Issue Date 4-19-84
Drawing No.
A-23a
No.
Revision
Date
Prepared for the
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France
U.S.A.
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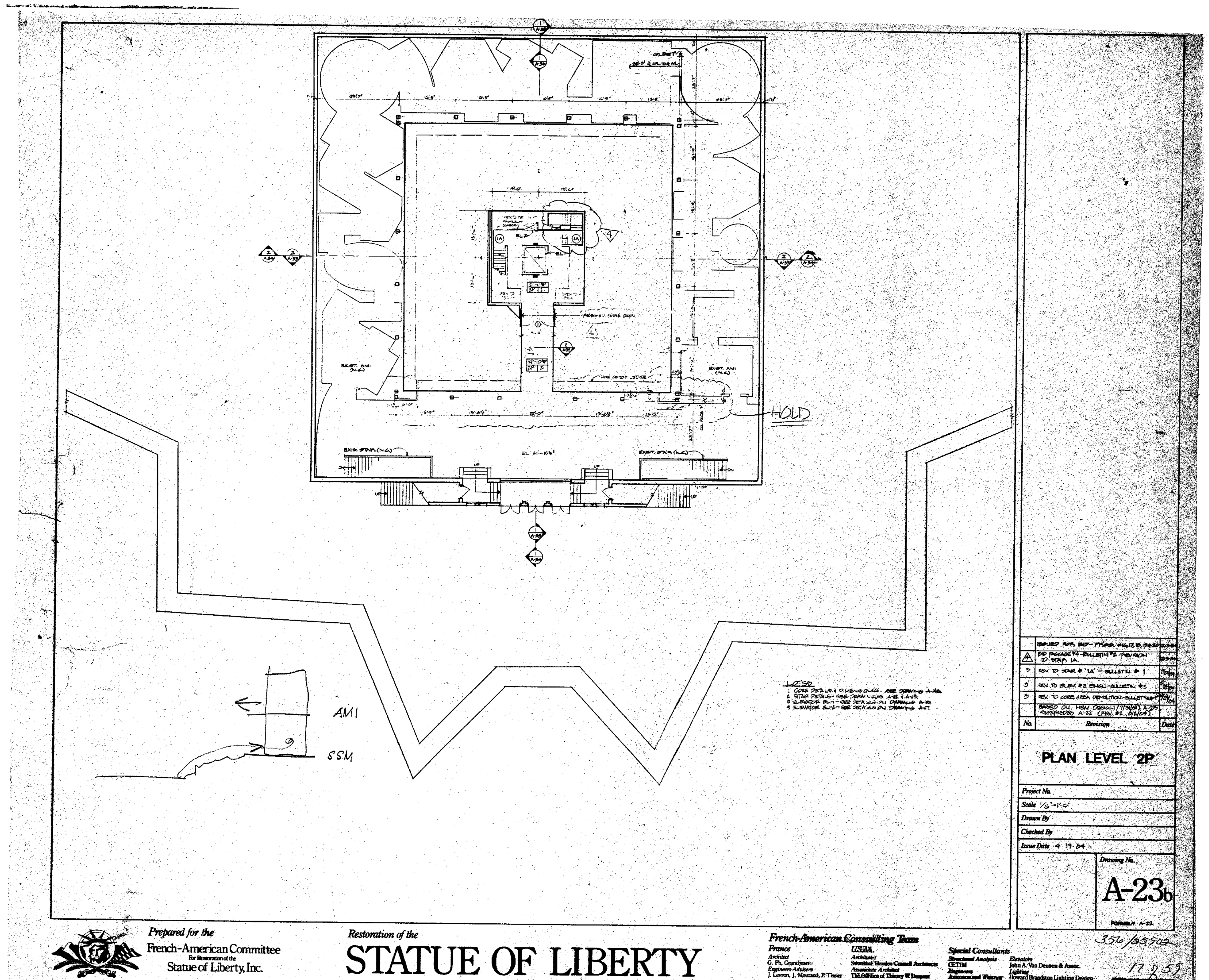
HOLD
AMI
SSM
PLAN LEVEL 2P
Project No.
Scale
Drawn By
Checked By
Issue Date
Drawing No.
A-23b
Prepared for the
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Restoration of the
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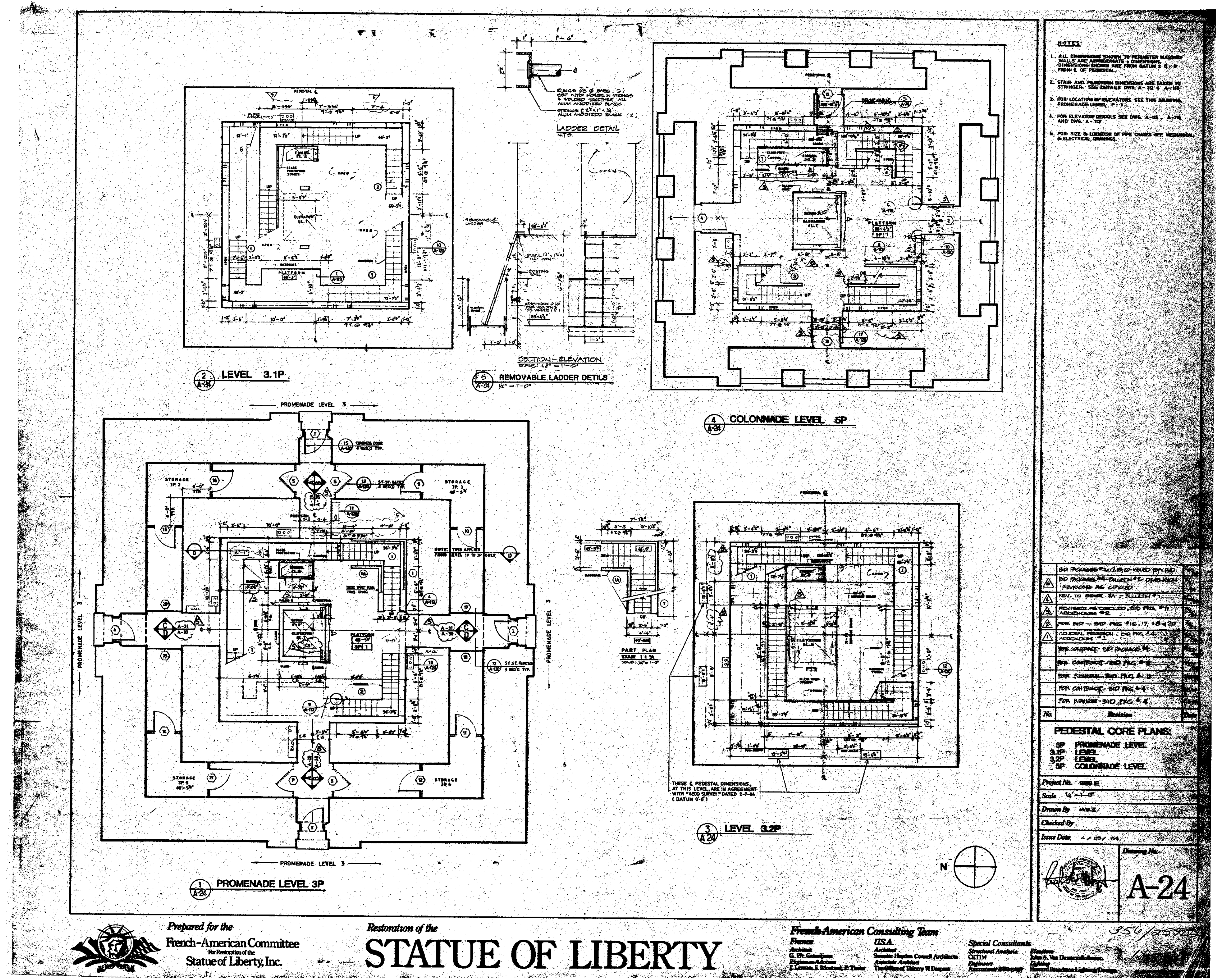
France
USA
Special Consultants



LEVEL 3.1P
REMOVABLE LADDER DETILS
LADDER DETAIL
SECTION - ELEVATION
COLONNADE LEVEL 5P
PROMENADE LEVEL 3
PROMENADE LEVEL 3P
LEVEL 3.2P
PART PLAN
N
PEDESTAL CORE PLANS:
3P PROMENADE LEVEL
3.1P LEVEL
3.2P LEVEL
5P COLONNADE LEVEL
No.
Revision
Project No.
Scale
Drawn By
Checked By
Issue Date
Drawing No.
A-24
Prepared for the
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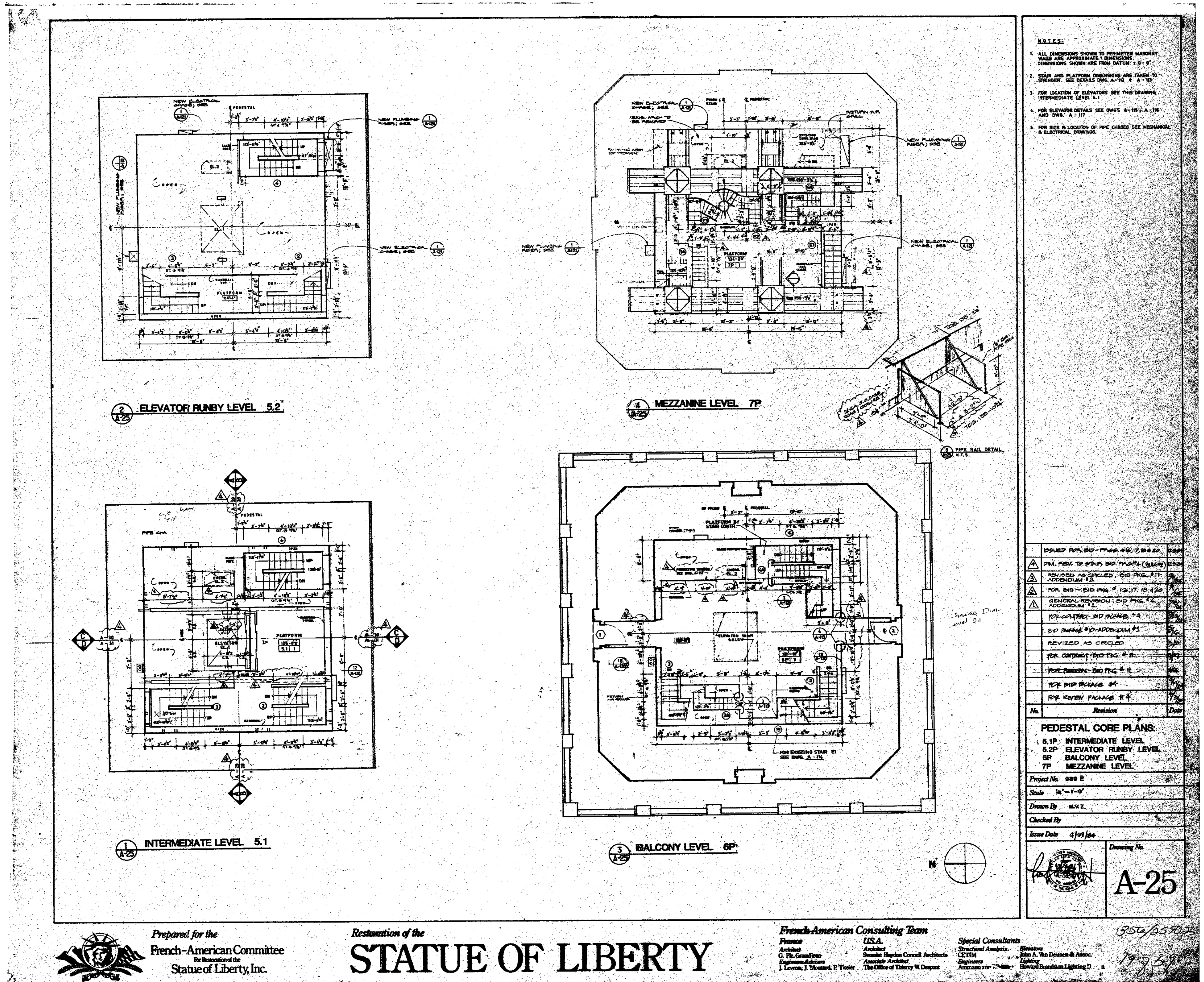
U.S.A.
Special Consultants


ELEVATOR RUNBY LEVEL 5.2
MEZZANINE LEVEL 7P
INTERMEDIATE LEVEL 5.1
BALCONY LEVEL 6P
PIPE RAIL DETAIL
NOTES:
REVIZED AS CIRCLED
FOR REVIEW PACKAGE #4
No.
Revision
Date
PEDESTAL CORE PLANS:
5.1P INTERMEDIATE LEVEL
5.2P ELEVATOR RUNBY LEVEL
6P BALCONY LEVEL
7P MEZZANINE LEVEL
Project No. 989 E
Drawn By M.V.Z.
Checked By
Issue Date 4/19/84
Drawing No.
A-25
Prepared for the
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Restoration of the
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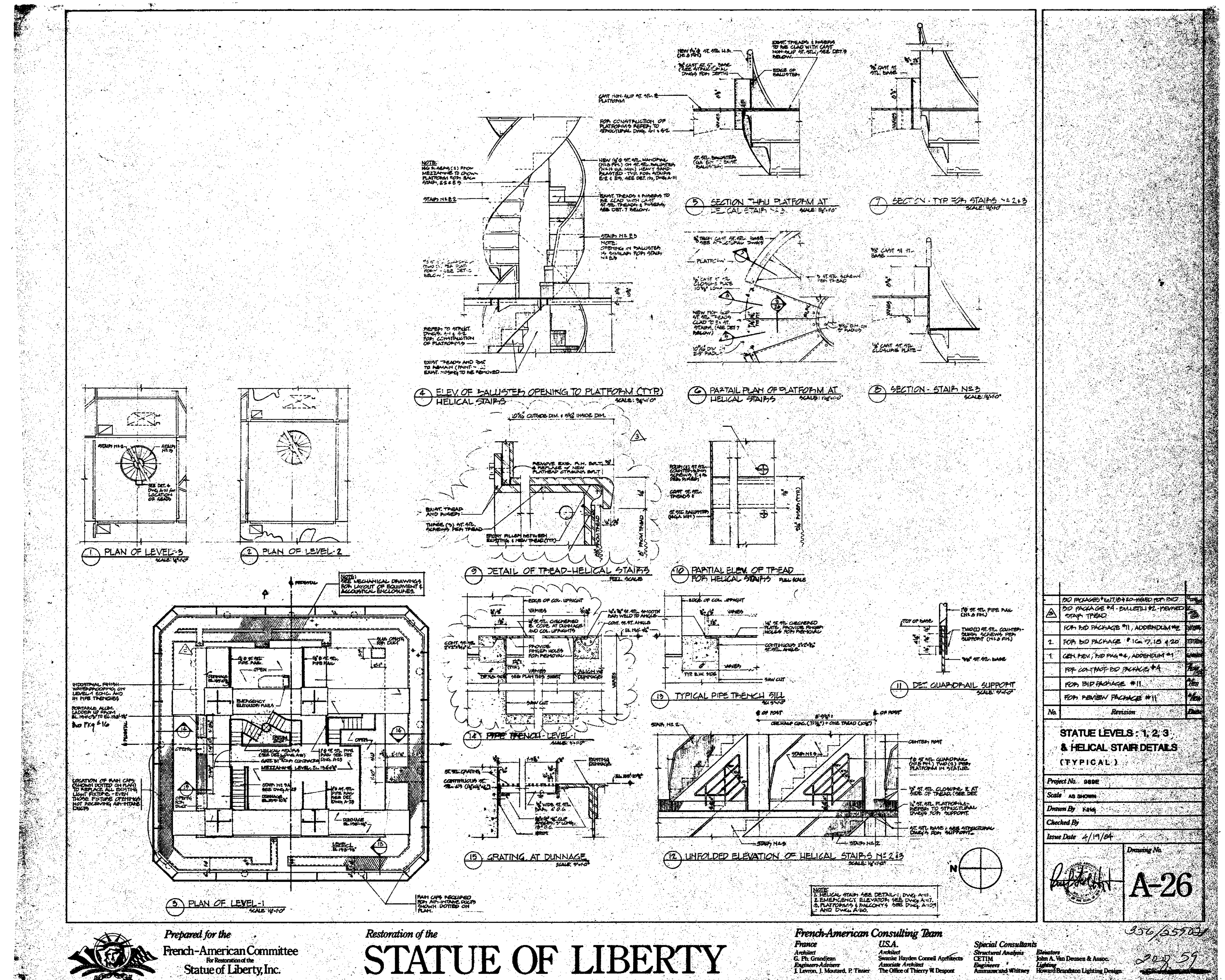
French-American Consulting Team
France
U.S.A.
Special Consultants
Elevators
John A. Van Deusen & Assoc.
Lighting



ELEV OF BALUSTER OPENING TO PLATFORM (TYP) HELICAL STAIRS
PARTIAL PLAN OF PLATFORM AT HELICAL STAIRS
SECTION - STAIR No 3
PLAN OF LEVEL-3
PLAN OF LEVEL-2
DETAIL OF TREAD-HELICAL STAIRS
PARTIAL ELEV OF TREAD FOR HELICAL STAIRS
TYPICAL PIPE TRENCH SILL
DET. GUARDRAIL SUPPORT
PIPE TRENCH - LEVEL-1
GRATING AT DUNNAGE
UNFOLDED ELEVATION OF HELICAL STAIRS No 2 & 3
PLAN OF LEVEL-1
STATUE LEVELS : 1, 2, 3
& HELICAL STAIR DETAILS
(TYPICAL)
A-26
Prepared for the
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For Restoration of the
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Restoration of the
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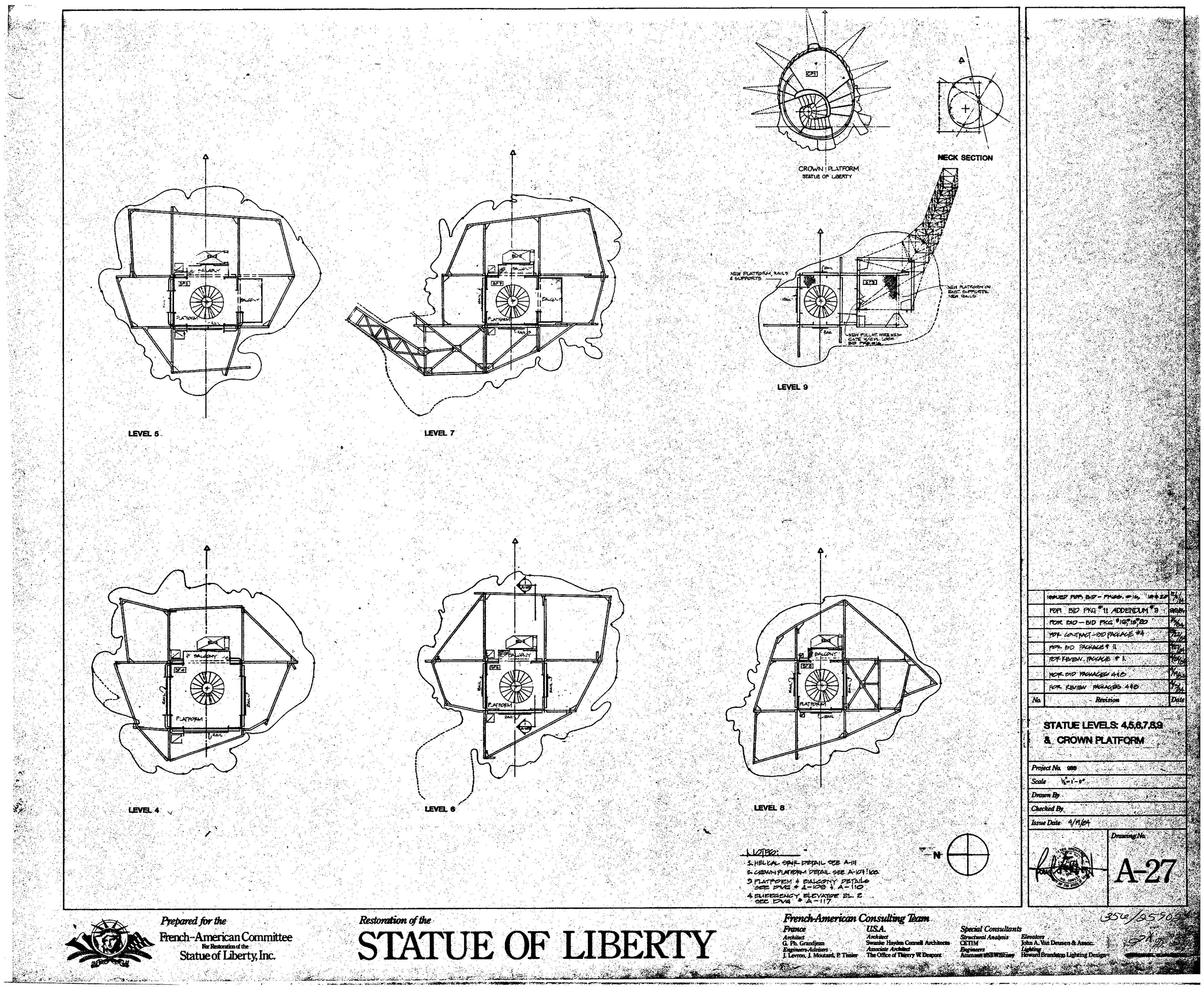
CROWN PLATFORM
STATUE OF LIBERTY
NECK SECTION
LEVEL 5
LEVEL 7
LEVEL 9
LEVEL 4
LEVEL 6
LEVEL 8
No.
Revision
Date
STATUE LEVELS: 4,5,6,7,8,9
& CROWN PLATFORM
Project No.
Scale
Drawn By
Checked By
Issue Date
Drawing No.
A-27
Prepared for the
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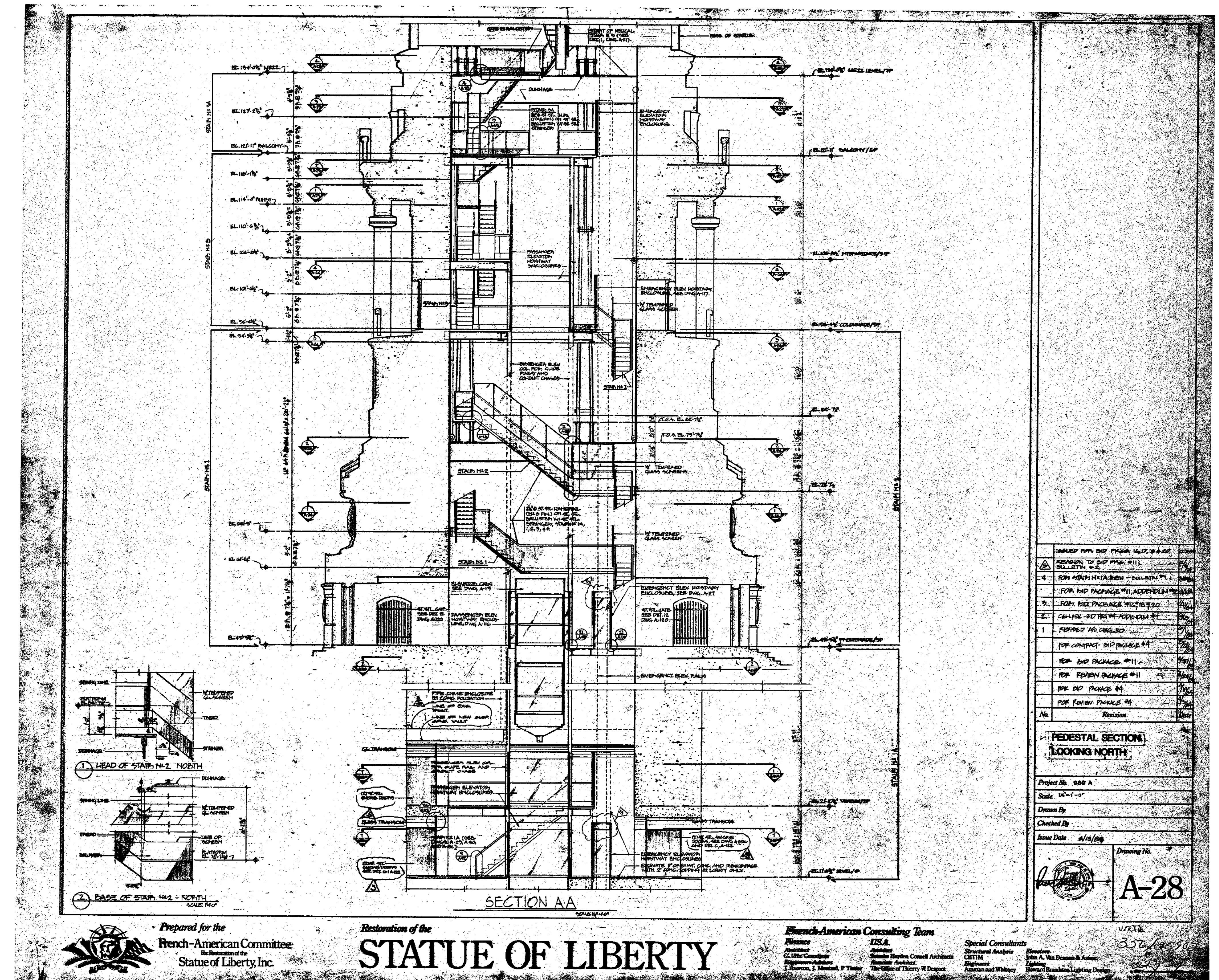
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
France
U.S.A.
Special Consultants


SECTION A-A
HEAD OF STAIR No 2 - NORTH
BASE OF STAIR No 2 - NORTH
PEDESTAL SECTION
LOOKING NORTH
A-28
Prepared for the
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For Restoration of the
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Restoration of the
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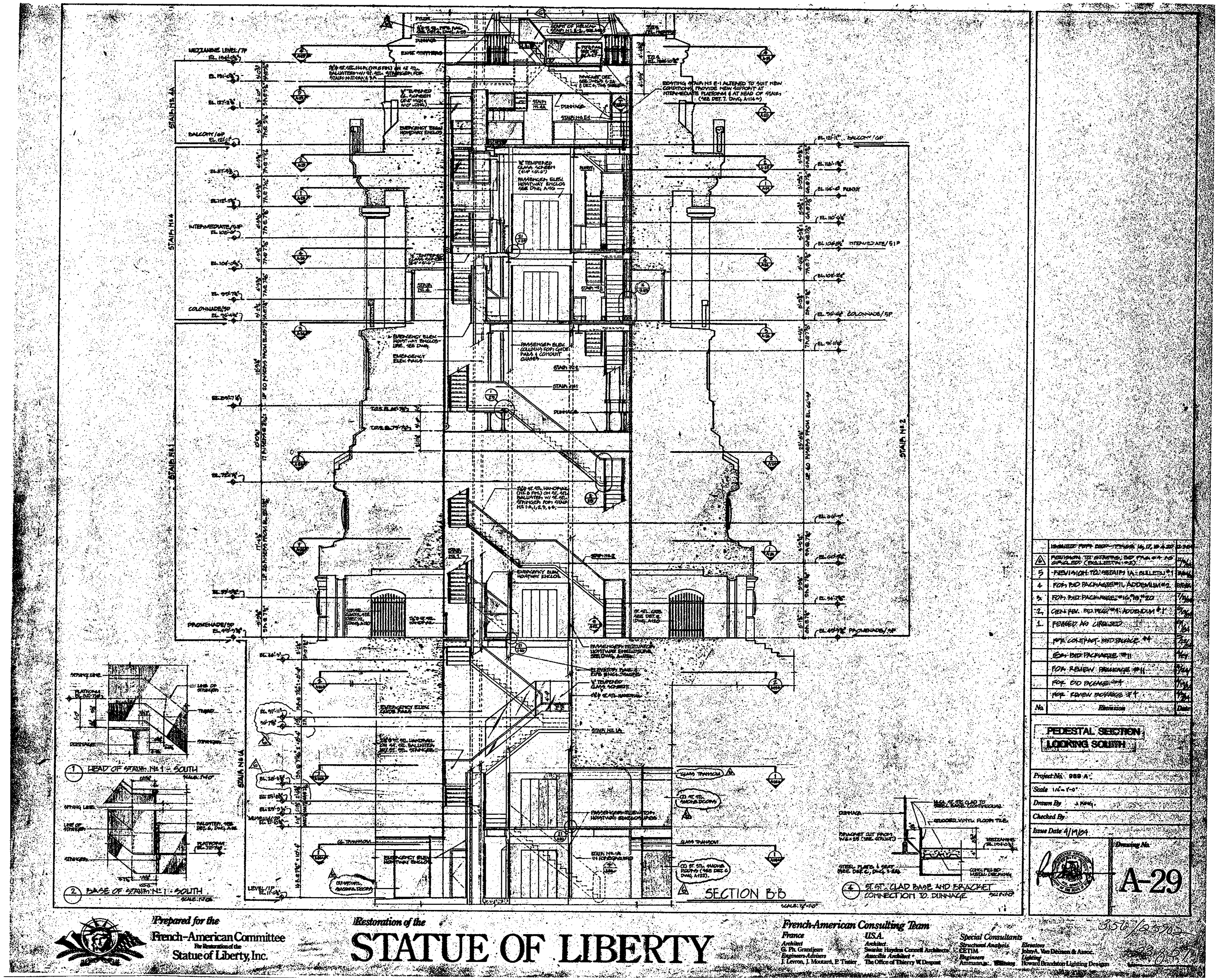

PEDESTAL SECTION
LOOKING SOUTH
A-29
SECTION B-B
HEAD OF STAIR No 1 - SOUTH
BASE OF STAIR No 1 - SOUTH
Prepared for the
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For Restoration of the
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Restoration of the
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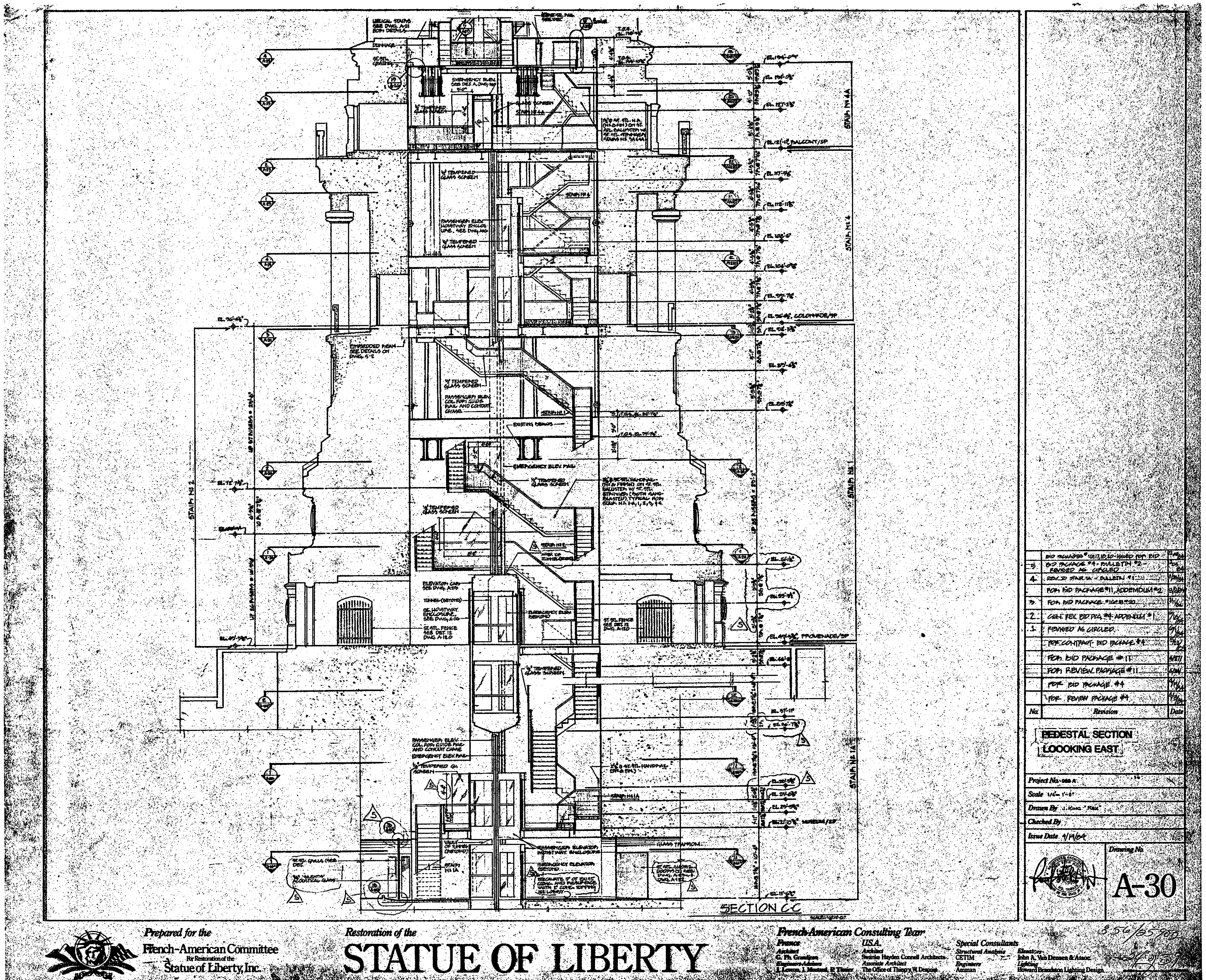
PEDESTAL SECTION
LOOOKING EAST
A-30
SECTION CC
Prepared for the
French-American Committee
For Restoration of the
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Restoration of the
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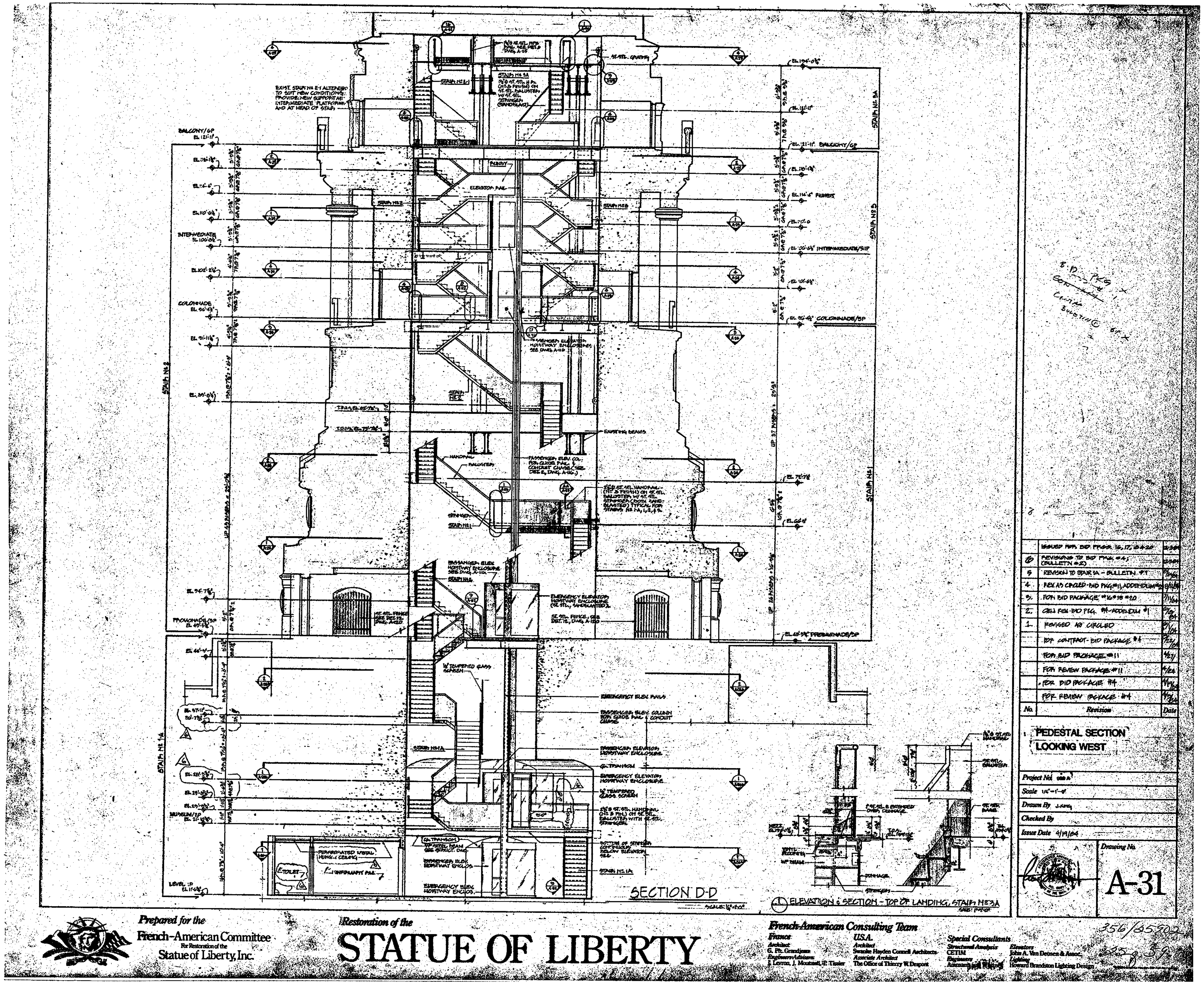
PEDESTAL SECTION
LOOKING WEST
SECTION D-D
A-31
Prepared for the
French-American Committee
For Restoration of the
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Restoration of the
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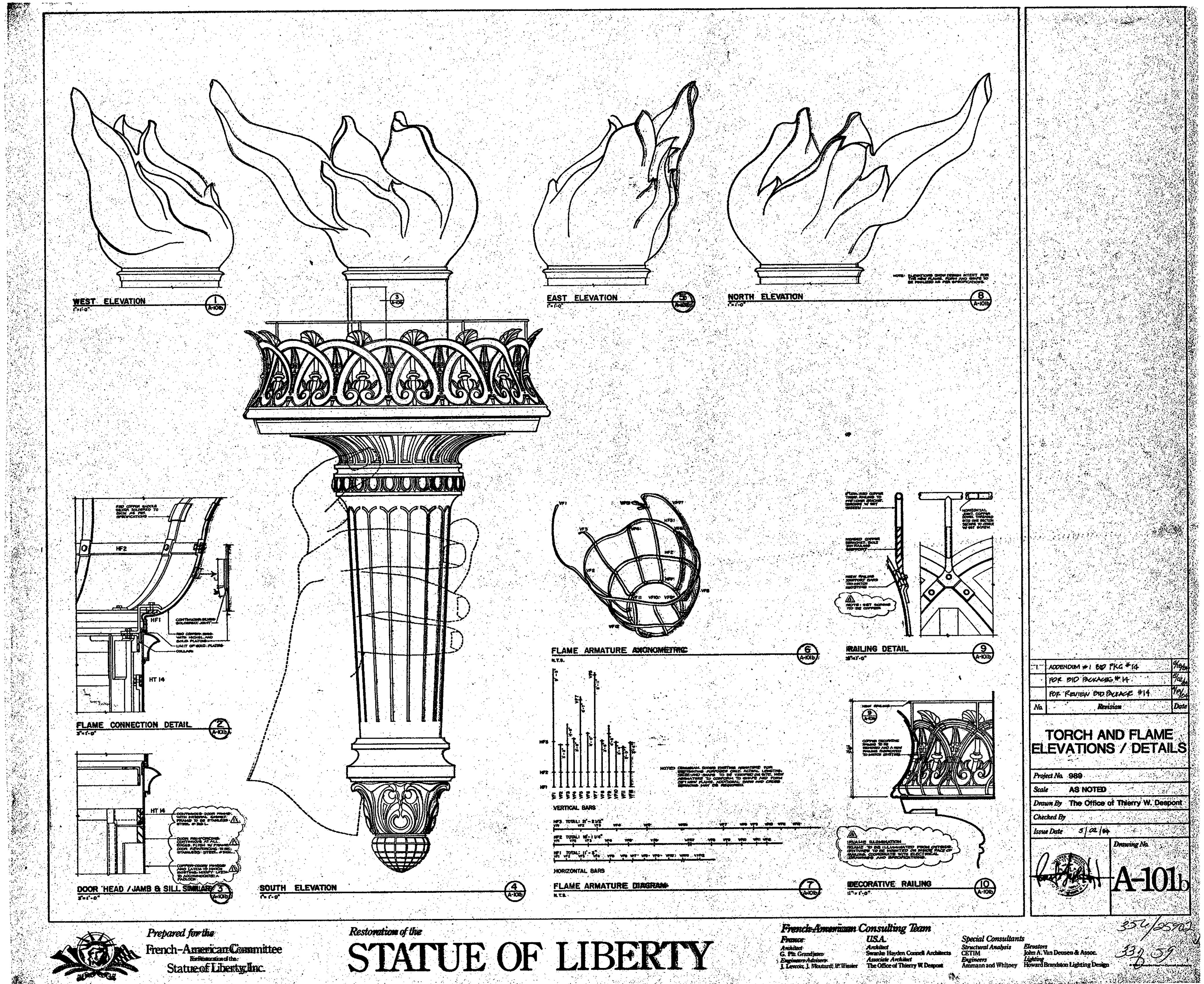
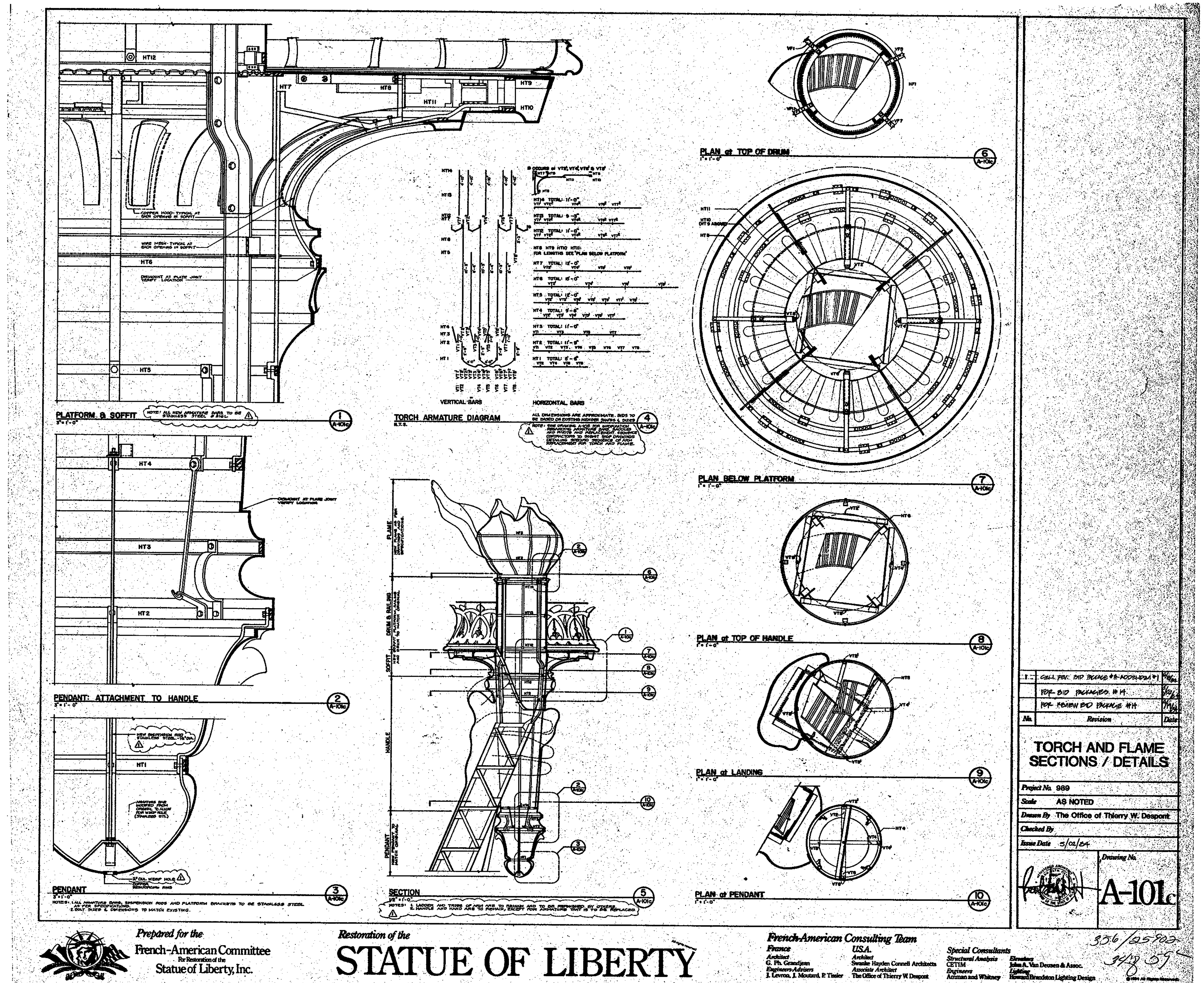


WEST ELEVATION
EAST ELEVATION
NORTH ELEVATION
FLAME CONNECTION DETAIL
DOOR HEAD / JAMB & SILL SIMILAR
SOUTH ELEVATION
FLAME ARMATURE AXONOMETRIC
FLAME ARMATURE DIAGRAM
VERTICAL BARS
HORIZONTAL BARS
RAILING DETAIL
DECORATIVE RAILING
Revision
TORCH AND FLAME ELEVATIONS / DETAILS
Project No. 989
Scale AS NOTED
Drawn By The Office of Thierry W. Despont
Checked By
Issue Date 5/02/84
Drawing No.
A-101b
Prepared for the French-American Committee for Restoration of the Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
France
U.S.A.
Special Consultants


PLATFORM & SOFFIT
TORCH ARMATURE DIAGRAM
VERTICAL BARS
HORIZONTAL BARS
PLAN at TOP OF DRUM
PLAN BELOW PLATFORM
PLAN at TOP OF HANDLE
PLAN at LANDING
PLAN at PENDANT
PENDANT: ATTACHMENT TO HANDLE
PENDANT
SECTION
FLAME
DRUM & RAILING
SOFFIT
HANDLE
PENDANT
TORCH AND FLAME
SECTIONS / DETAILS
Project No. 989
Scale AS NOTED
Drawn By The Office of Thierry W. Despont
Checked By
Issue Date 5/02/84
Drawing No.
A-101c
No.
Revision
Date
Prepared for the
French-American Committee
For Restoration of the
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Restoration of the
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France
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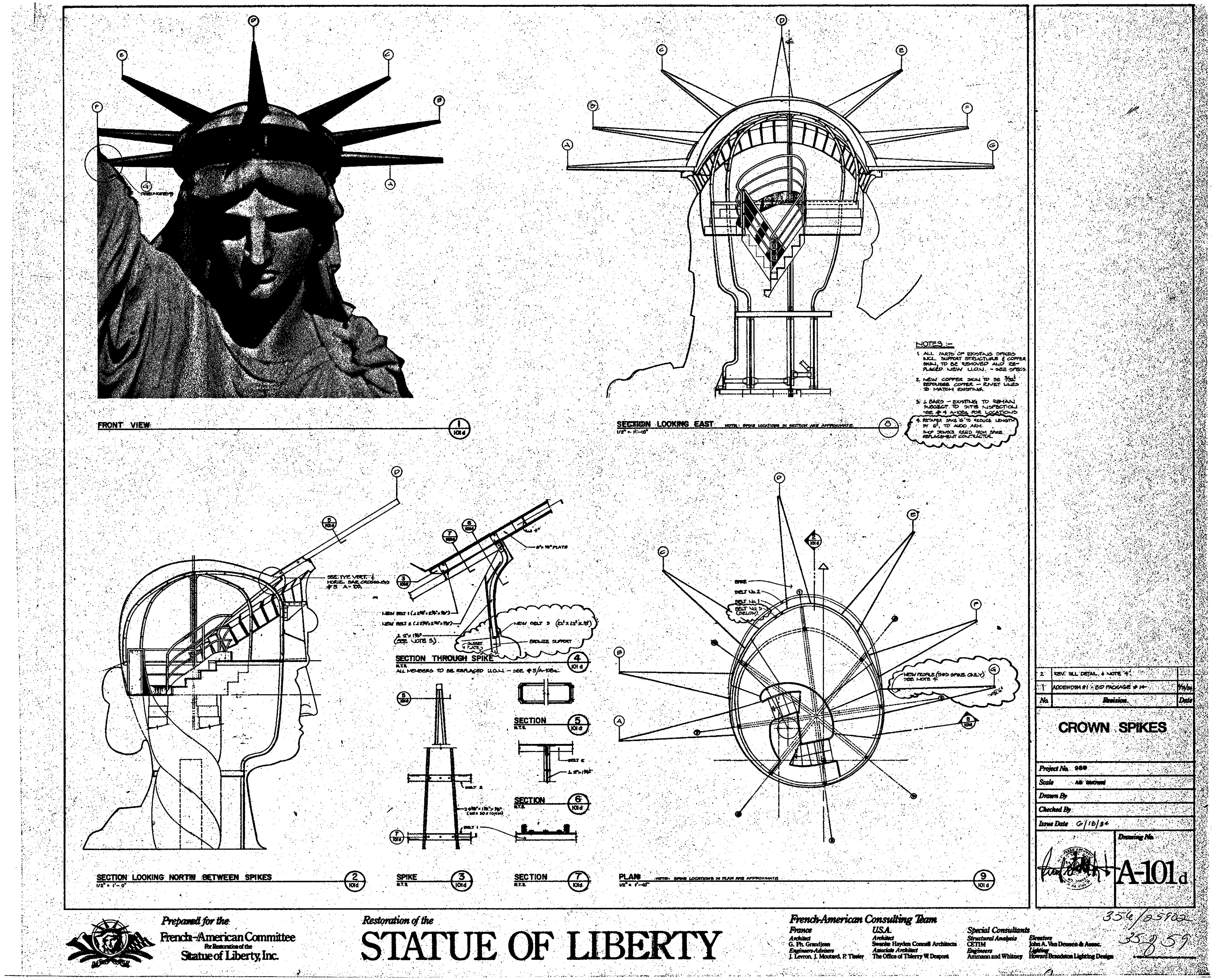
John A. Van Deusen & Assoc.
Lighting
Howard Brandston Lighting Design


FRONT VIEW
SECTION LOOKING EAST
NOTES :-
1. ALL PARTS OF EXISTING SPIKES INCL. SUPPORT STRUCTURE & COPPER SKIN, TO BE REMOVED AND RE-PLACED NEW U.O.N. - SEE SPECS.
2. NEW COPPER SKIN TO BE 3/32" REPOUSSE COPPER - RIVET LINES TO MATCH EXISTING.
3. L BARS - EXISTING TO REMAIN SUBJECT TO SITE INSPECTION SEE # 4 A-108A FOR LOCATIONS
4. RETAPER SPIKE 'G' TO REDUCE LENGTH BY 6", TO AVOID ARM.
SHOP DRWG'S REQ'D FROM SPIKE REPLACEMENT CONTRACTOR.
SECTION THROUGH SPIKE
ALL MEMBERS TO BE REPLACED U.O.N. - SEE #5/A-108a
SECTION LOOKING NORTH BETWEEN SPIKES
SPIKE
SECTION
PLAN
CROWN SPIKES
No.
Revision
Date
Project No.
Scale
Drawn By
Checked By
Issue Date 6/10/84
Drawing No.
A-101d
356/25902
35859
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
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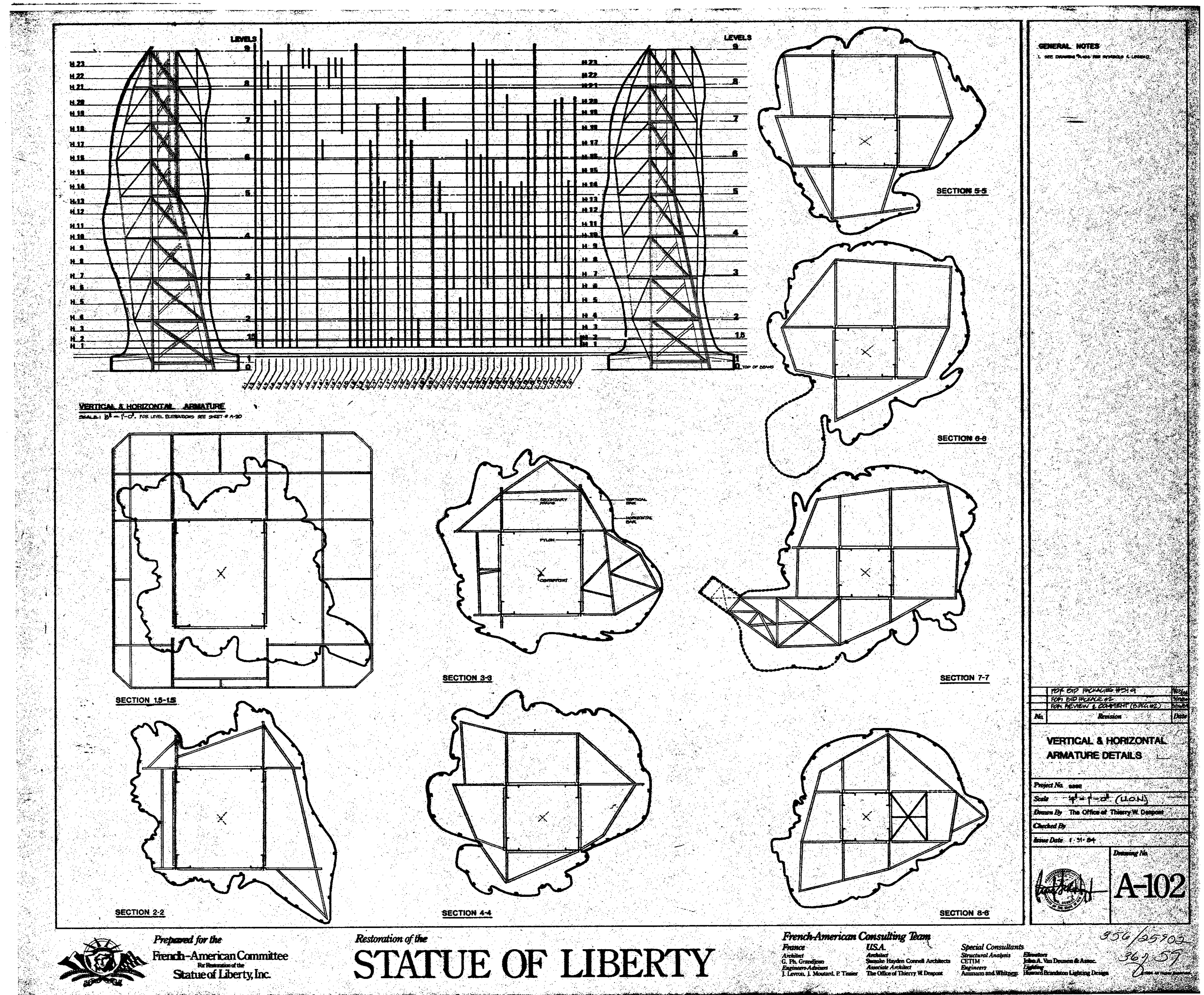
Lighting
Howard Brandston Lighting Design


LEVELS
VERTICAL & HORIZONTAL ARMATURE
SECTION 5-5
SECTION 6-6
SECTION 7-7
SECTION 1.5-1.5
SECTION 3-3
SECTION 2-2
SECTION 4-4
SECTION 8-8
GENERAL NOTES
No.
Revision
Date
VERTICAL & HORIZONTAL ARMATURE DETAILS
Project No.
Scale
Drawn By The Office of Thierry W. Despont
Checked By
Issue Date 1-31-84
Drawing No.
A-102
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
France
Architect
G. Ph. Grandjean
Engineers-Advisers
J. Levron, J. Moutard, P. Tissier
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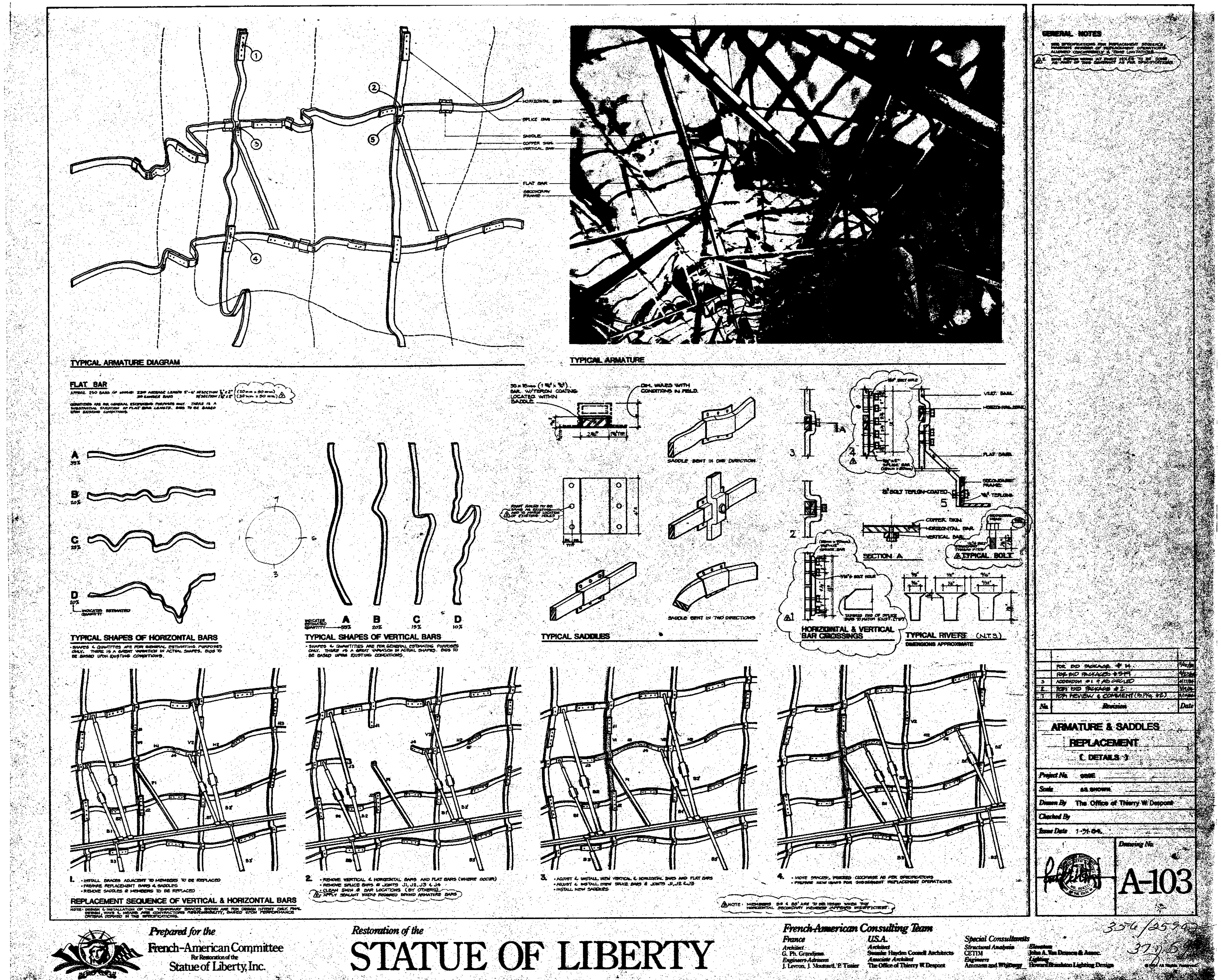
CETIM
Engineers
Ammann and Whitney
Elevators
John A. Van Deusen & Assoc.
Lighting
Howard Brandston Lighting Design
356/25902
367 59


GENERAL NOTES
TYPICAL ARMATURE DIAGRAM
TYPICAL ARMATURE
FLAT BAR
A
B
C
D
TYPICAL SHAPES OF HORIZONTAL BARS
TYPICAL SHAPES OF VERTICAL BARS
TYPICAL SADDLES
SECTION A
TYPICAL BOLT
HORIZONTAL & VERTICAL BAR CROSSINGS
TYPICAL RIVETS (N.T.S.)
DIMENSIONS APPROXIMATE
REPLACEMENT SEQUENCE OF VERTICAL & HORIZONTAL BARS
ARMATURE & SADDLES REPLACEMENT
(DETAILS)
Project No.
Scale AS SHOWN
Drawn By The Office of Thierry W Despont
Checked By
Issue Date 1-31-84
Drawing No.
A-103
Prepared for the
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For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
France
U.S.A.
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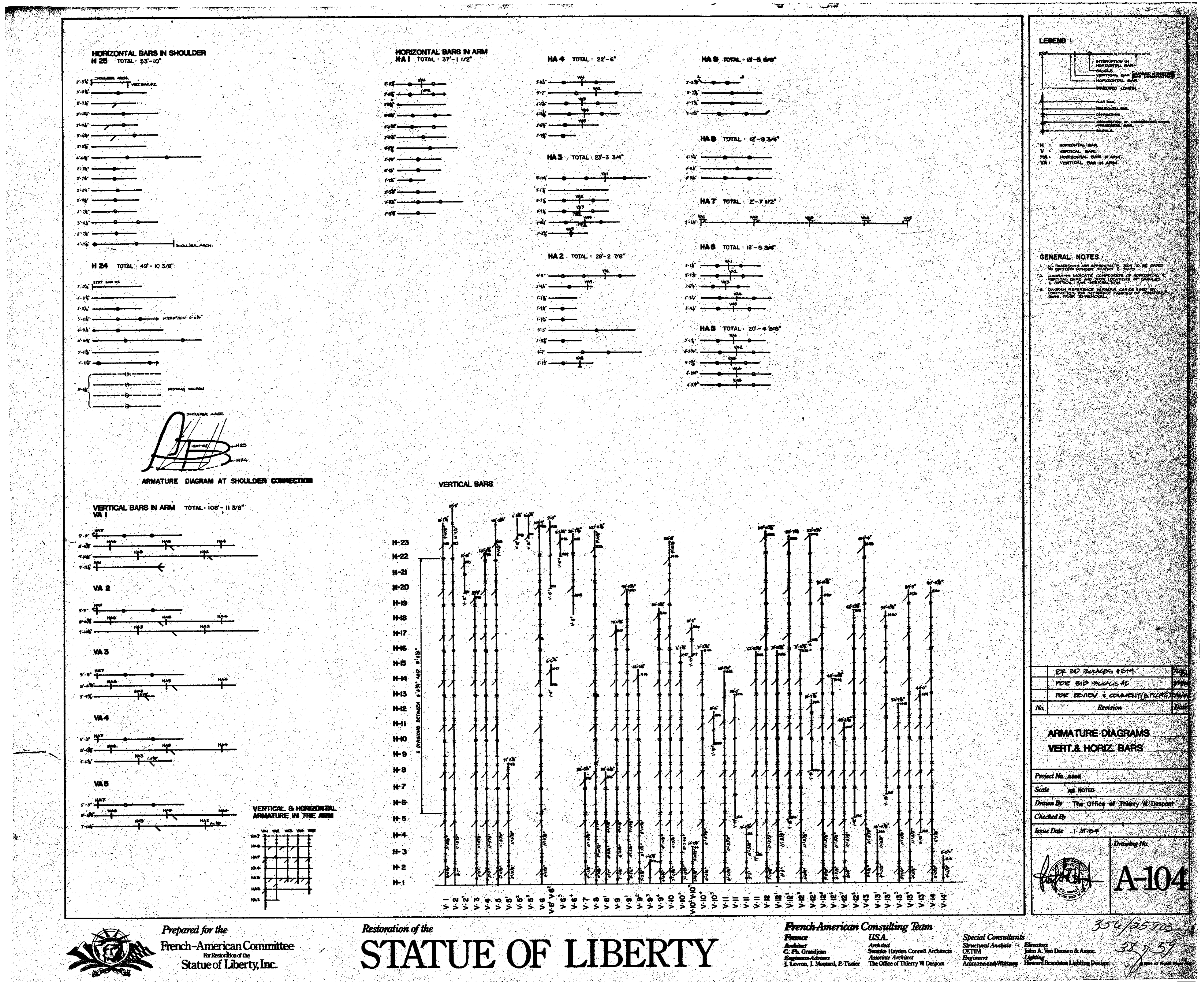

HORIZONTAL BARS IN SHOULDER
HORIZONTAL BARS IN ARM
ARMATURE DIAGRAM AT SHOULDER CONNECTION
VERTICAL BARS IN ARM
VERTICAL BARS
VERTICAL & HORIZONTAL ARMATURE IN THE ARM
LEGEND
GENERAL NOTES
ARMATURE DIAGRAMS
VERT.& HORIZ. BARS
A-104
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
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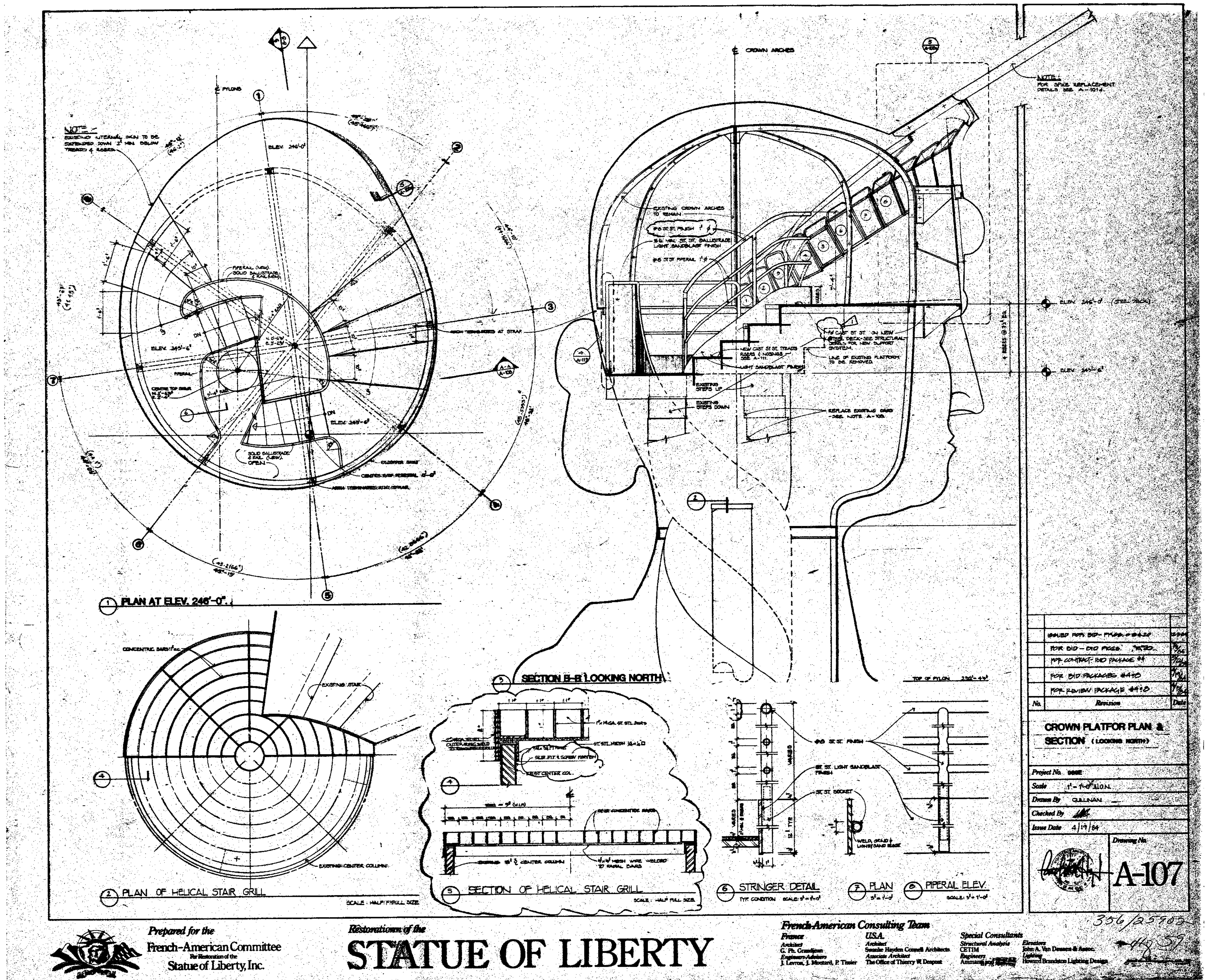
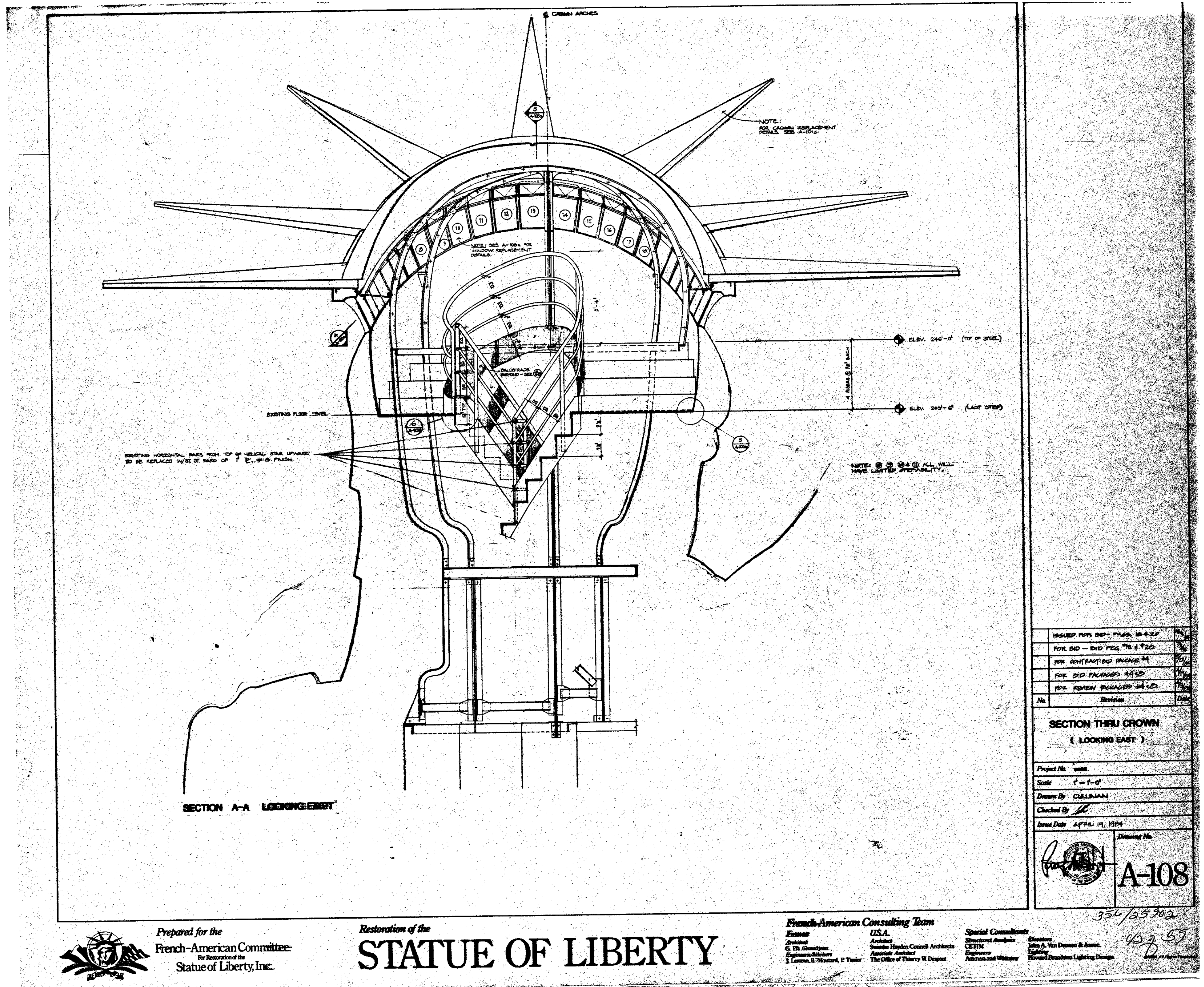
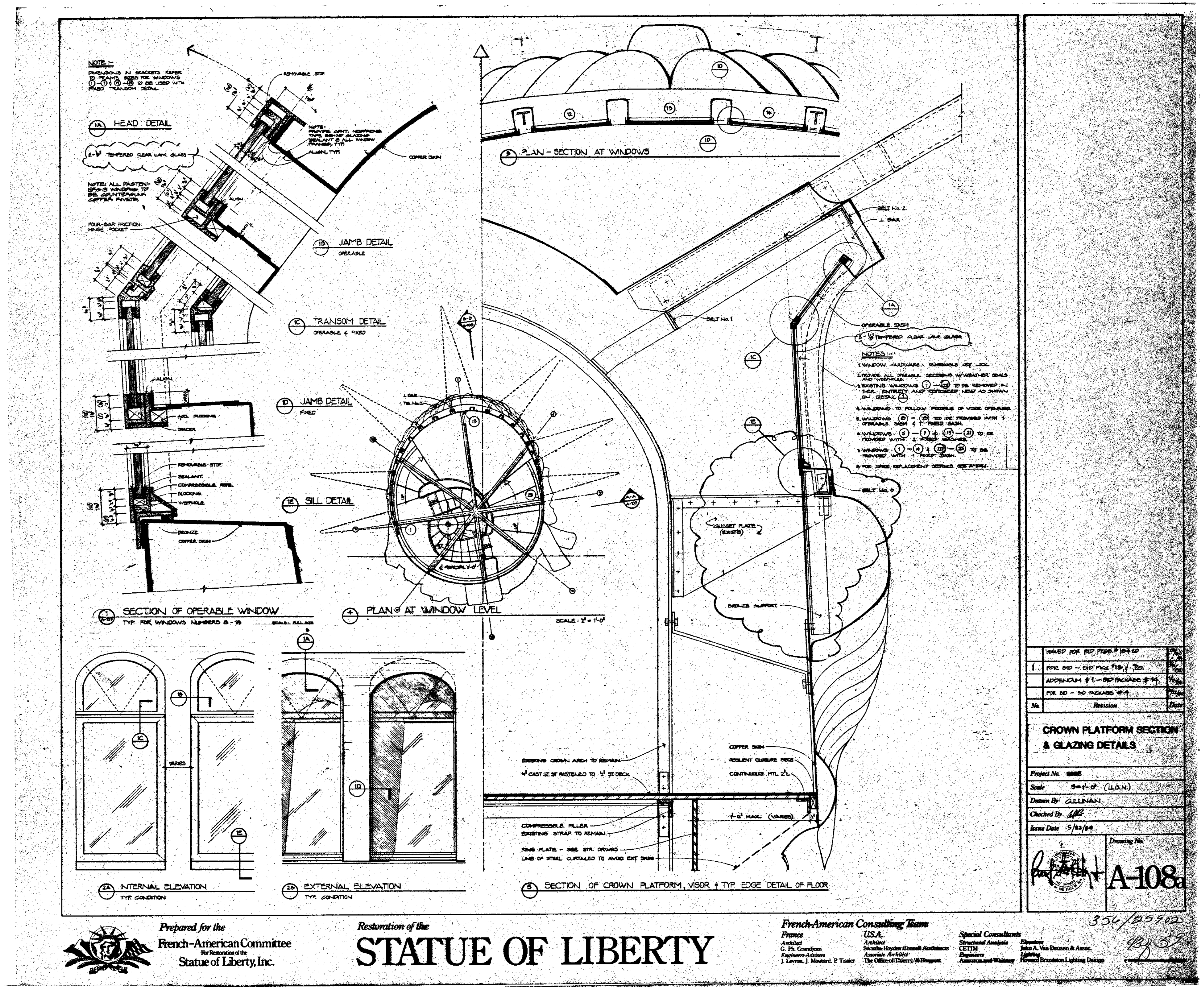
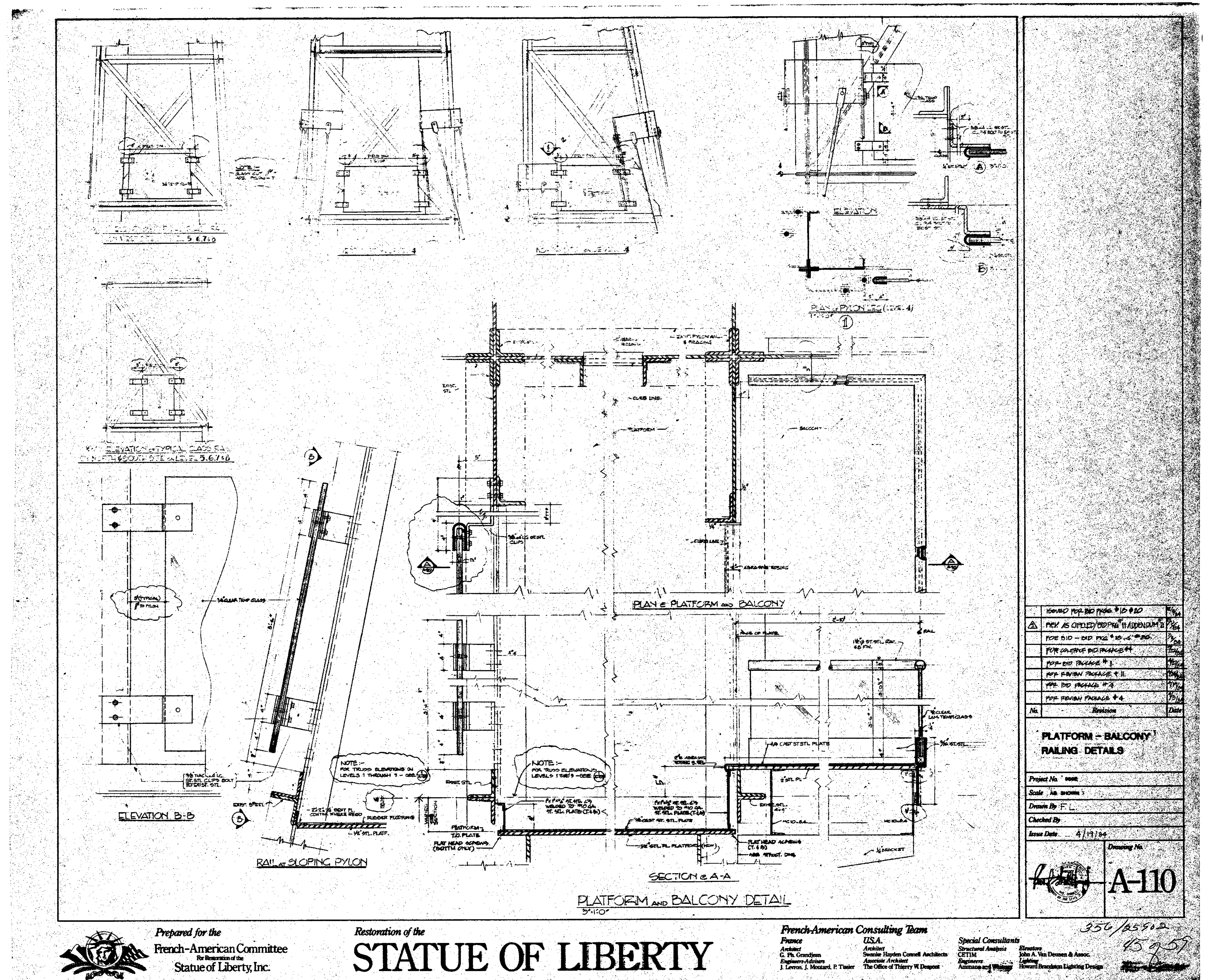


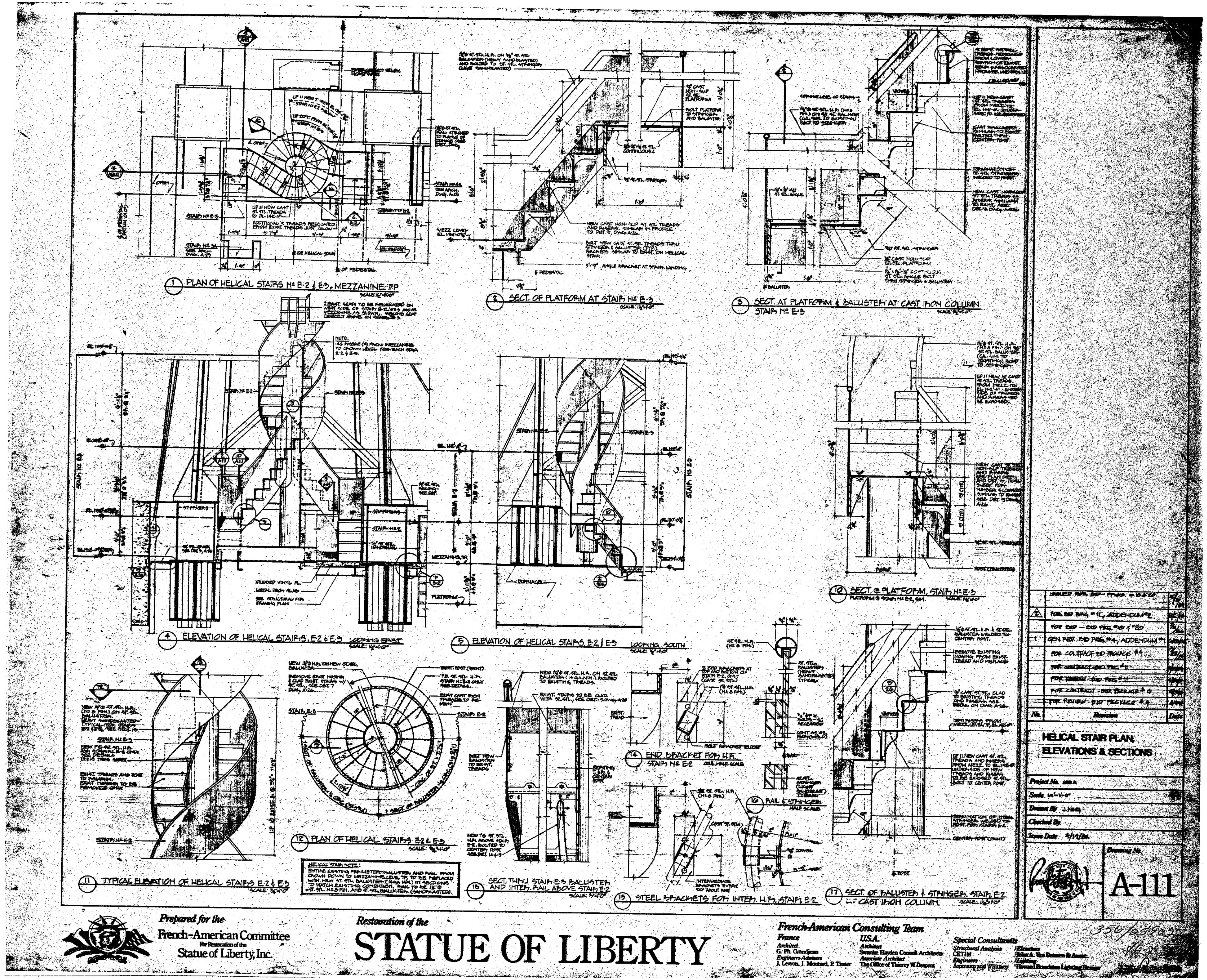
PLAN AT ELEV. 246'-0".
SECTION B-B LOOKING NORTH
PLAN OF HELICAL STAIR GRILL
SECTION OF HELICAL STAIR GRILL
STRINGER DETAIL
PLAN
PIPERAIL ELEV.
CROWN PLATFOR PLAN & SECTION (LOOKING NORTH)
A-107
Prepared for the
French-American Committee
for Restoration of the
Statue of Liberty, Inc.
Restorations of the
STATUE OF LIBERTY
French-American Consulting Team



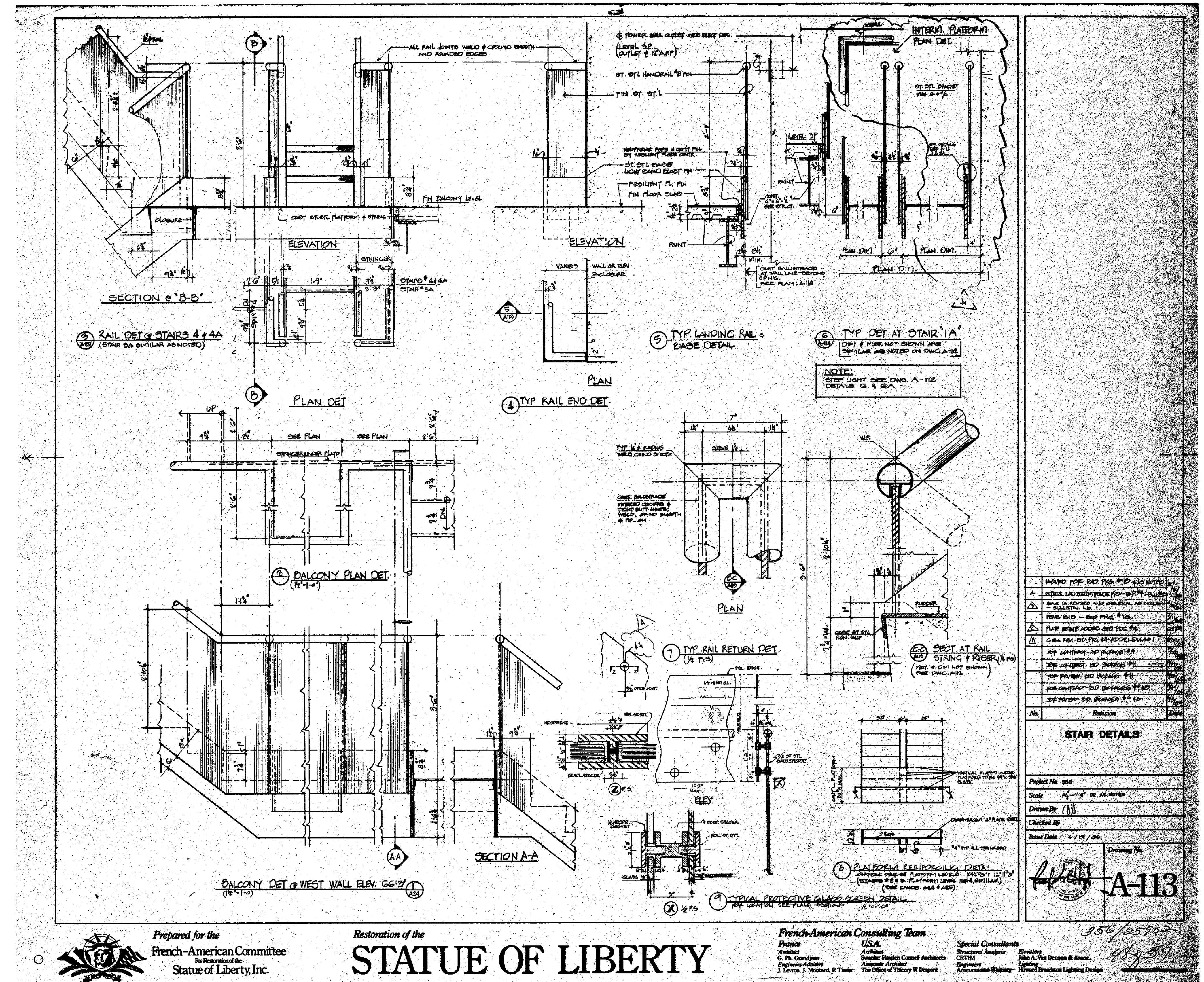
SECTION A-A LOOKING EAST
SECTION THRU CROWN
(LOOKING EAST)
A-108
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team

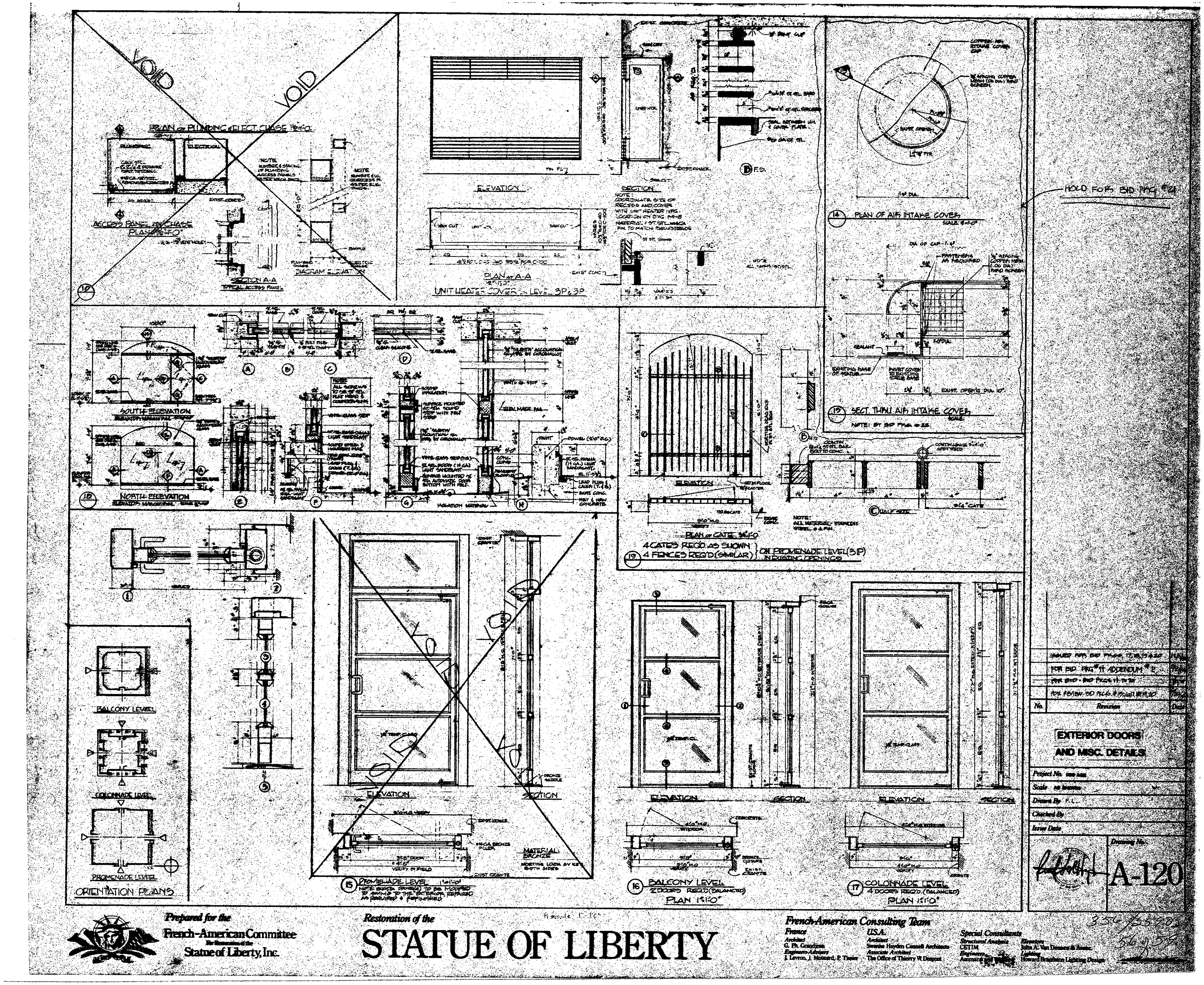

HEAD DETAIL
JAMB DETAIL
TRANSOM DETAIL
JAMB DETAIL
SILL DETAIL
SECTION OF OPERABLE WINDOW
PLAN @ AT WINDOW LEVEL
PLAN - SECTION AT WINDOWS
INTERNAL ELEVATION
EXTERNAL ELEVATION
SECTION OF CROWN PLATFORM, VISOR & TYP. EDGE DETAIL OF FLOOR
CROWN PLATFORM SECTION
& GLAZING DETAILS
A-108a
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team


ELEVATION B-B
RAIL at SLOPING PYLON
PLAN @ PLATFORM AND BALCONY
SECTION @ A-A
PLATFORM AND BALCONY DETAIL
PLATFORM - BALCONY RAILING DETAILS
A-110
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team



SECT. OF PLATFORM AT STAIR No E-3
ELEVATION OF HELICAL STAIRS, E-2 & E-3
ELEVATION OF HELICAL STAIRS, E-2 & E-3 LOOKING SOUTH
SECT. @ PLATFORM, STAIR No E-3
TYPICAL ELEVATION OF HELICAL STAIRS E-2 & E-3
PLAN OF HELICAL STAIRS E-2 & E-3
STEEL BRACKETS FOR INTER. H.R., STAIR E-2
HELICAL STAIR PLAN, ELEVATIONS & SECTIONS
A-111
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team


SECTION @ 'B-B'
RAIL DET @ STAIRS 4 & 4A
ELEVATION
PLAN DET
BALCONY PLAN DET.
TYP. RAIL END DET.
PLAN
TYP. LANDING RAIL & BASE DETAIL
TYP. DET. AT STAIR 'IA'
NOTE:
TYP. RAIL RETURN DET.
SECT. AT RAIL STRING & RISER
SECTION A-A
BALCONY DET @ WEST WALL ELEV. 66'-3"
ELEV
PLATFORM REINFORCING DETAIL
TYPICAL PROTECTIVE GLASS SCREEN DETAIL
STAIR DETAILS
A-113
Prepared for the
French-American Committee
For Restoration of the
Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team



EXTERIOR DOORS AND MISC. DETAILS
A-120
Prepared for the French-American Committee Statue of Liberty, Inc.
Restoration of the
STATUE OF LIBERTY
French-American Consulting Team
ELEVATION
SECTION
VOID
ORIENTATION PLANS
BALCONY LEVEL
COLONNADE LEVEL
PROMENADE LEVEL
SOUTH ELEVATION
NORTH ELEVATION
PLAN OF AIR INTAKE COVER
SECT. THRU AIR INTAKE COVER
HOLD FOR BID PKG #4
4 GATES REQ'D AS SHOWN
4 FENCES REQ'D (SIMILAR)
ON PROMENADE LEVEL (3P) IN EXISTING OPENINGS
UNIT HEATER COVER LEVEL 3P

APPENDIX B

MECHANICAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION SYSTEMS OVERVIEW REPORT

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STATUE OF LIBERTY
NEW YORK, NY

MEP/FP Overview Report
Dated: May 2011

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1. INTRODUCTION

1.1 Scope Summary

The scope of the report is to provide an overview of existing building mechanical, electrical, plumbing and fire protection systems. The report briefly describes existing system conditions based on visual observations from a walkthrough conducted on April 5th 2011.

2. EXECUTIVE SUMMARY

In general, the building systems at the Statue of Liberty appear to be in fair working condition. The main electric service components appear to be in good condition. The life-safety systems such as the sprinkler system, the fire pump and the fire alarm system also appear to be in good condition. However, the heating and cooling equipment is old; some components of the system such as chillers, and heating and cooling pumps, appear to be close to the end of their useful life. The existing pneumatic automatic temperature control system is leaking, and there are non-functional actuators on some equipment; new direct digital controls should be considered.

It appears, based on observation, that existing air distribution along the spiral stair within the statue leading up to the crown may not be very effective. The chiller plant and dual temperature air-handling units serving the spiral stair within the statue are old and close to the end of their useful life. It is possible to consider using low temperature air and new air distribution to improve comfort conditions. A new, more efficient chiller plant, new efficient air-handling equipment and air distribution system should be considered. Computerized simulation should be considered for studying and optimizing the air distribution system.

An active cooling system is recommended in the electrical room to dissipate heat generated by the transformers.

3. UTILITIES

3.1 The two utilities consist of water and electric service. In addition, there is onsite storage of #2 diesel fuel oil of about 20,000 gallons for heating and emergency generators.

3.1.1 Electric Service

The existing electric service consists of three service feeders; one feeder terminates in a 500kVA 4160 / 208V transformer bank “A”, one feeder terminates in a 500kVA 4160 / 480V transformer bank “B”, and the third feeder in a 225 kVA 4160/ 208V transformer. The power is distributed via switchboards and distribution panels. Each system is 3-phase 4–wire.

The transformer banks and switchboards all appear to be in good condition. There is no active cooling system to reject heat generated by the transformers. Large air circulators are used as a makeshift arrangement for ventilation of the electrical equipment.

There are service disconnects on the secondary feeder for each transformer / transformer bank in the switchgear room at level 1P. Note that there is not a single disconnect serving the entire building.

3.1.2 Water Service

There is six-inch combined domestic and sprinkler water service. The pipe at point of entry appears to be in good condition. There is no backflow prevention device on the water service; a likely violation of code.

3.1.3 Sanitary:

Plumbing drawings provided by the National Park Service indicate a six-inch sanitary sewer service exiting the building   This piping was not visible.

4. HEATING, VENTILATION AND AIR-CONDITIONING (HVAC) SYSTEMS

4.1 Existing Heating Plant

The existing heating system consists of eight Weil McLain oil-fired hot water boilers. The boilers appear to be in fair working condition and continue to function with maintenance. Each boiler is connected to the heating hot water distribution loop with a dedicated boiler pump. The boilers are staged to maintain the heating loop temperature. There are two heating hot water pumps, sized for run and standby operation to circulate heating hot water to air handlers, cabinet heaters and other terminal devices. The pumps are in working condition but show signs of wear and should be considered for replacement.

The heating system incorporates a shell-and-tube heat exchanger to generate heated glycol for distribution to dual temperature air-handling units (AH-3,4,5) at level 7P and to the cabinet heaters and terminal units subject to freezing conditions.

4.2 Existing Cooling Plant

Cooling is provided by two chilled-water systems, complete with chiller(s), cooling tower, chilled water and condenser water pumps.

One system, hereinafter referred to as the "museum system", serves the air handlers cooling the entry lobby and the museum. It consists of two Trane chillers and three chilled water pumps, with one pump arranged for standby operation. This equipment is located in the upper level machine room of level 1P. The cooling towers are located outdoors in a pit. The chillers are old but should continue to function with maintenance for an additional five to seven years.

The other system, hereinafter referred to as the "statue system", consists of one Trane chiller with dual reciprocating compressors. This equipment is located in the lower level machine room of level 1P. The cooling tower is located outdoors in a pit. Cooled glycol (50% solution) is circulated to dual temperature air handlers (AH-3, 4, 5) at level 7P for cooling around the stairs leading to the crown of the statue.

The "statue system" chiller is old and reportedly has one bad compressor. The chiller uses R-22 refrigerant. Production of R-22 refrigerant was phased out in 2010, and only recycled R-22 is currently available and is banned for use beginning in 2015. The chiller may have have to be retrofitted to accept other refrigerant or replaced with a new chiller by 2015. The condenser water pump used in this system also appears to be old. It is recommended that both the chiller and the condenser water pump be replaced.

4.3 Heating and Cooling System

The heating and cooling system is a forced-air system. It consists of heating and ventilation units, and air-conditioning units. The air-conditioning units located in fan rooms on levels 0p, 1P and 2P are part of a variable air volume (VAV) system serving the entry lobby and museum areas.

The dual temperature air-handling units located at level 7P are supplied with a heated glycol solution in winter and a chilled glycol solution in summer. Heated or dehumidified cool air is distributed near the base of the spiral stair up to the crown to provide human comfort. Reportedly, the interior of the statue gets very uncomfortable in the summer. The existing air distribution system utilizes linear bar grilles; it does not appear to be an effective and even way to distribute air. Low temperature air and better air distribution would improve comfort.

4.4 Automatic Temperature Controls

The existing automatic temperature control system is a pneumatic system. As is typical for a compressed air pneumatic system, there are leaks that lead to excessive cycling of the air compressors. A direct digital system of building management and temperature control should be considered.

5. PLUMBING

5.1 Water Service

The incoming domestic water service consists of a six-inch line piped into the utility room at level 0P. A three-inch domestic water connection is tapped into the incoming service. The incoming service is sized down to a four-inch line and provided with a service shut-off valve and a dry sprinkler valve for the fire suppression system.

Currently, there is no backflow prevention device on the domestic water service; this may be in violation of applicable codes. A backflow prevention device on potable water is recommended.

5.2 Domestic Hot Water

An electric, 120 gallon domestic hot water heater provides domestic hot water to the plumbing fixtures in the toilet rooms. The domestic hot water return circulation pump runs continuously instead of periodic cycling as would be typical industry practice.

5.3 Sanitary

The visible sanitary pipes appear to be in good condition from the exterior. The sanitary trap was not visible for inspection. There are reportedly no major issues with the sanitary system.

6. FIRE PROTECTION

6.1 Sprinklers

The fire suppression system consists of a dry-pipe sprinkler system. Sprinklers are provided throughout the pedestal and statue. Reportedly, the fire pump was installed as part of life-safety system upgrades in 2004.

7. ELECTRICAL, LIGHTING, AND FIRE ALARM SYSTEMS

7.1 Electrical Service and Power Distribution:

The existing electric service configuration is described under the utilities section above. Makeshift circulator fans are used to dissipate heat generated by the transformers in the transformer room. An active cooling system such as a split-system air conditioning unit is recommended to maintain temperature within recommended limits in the transformer room.

7.2 Emergency Power

There is a 60kVA, 277/480V, 3-phase, 4-wire emergency generator. The emergency generator powers two motor control centers “MCEA” and “MCEB”, control power for the Generator Room and Transformer Room exhaust duct dampers, and a 277/480V, 3-phase, 4-wire emergency distribution panel “EDPA”. The emergency distribution panel “EDPA” feeds an elevator control panel, select emergency lighting from the dimming system, and two 480/208V transformers “TX-A” and “TX-B”, which each feed 120/208V, 3-phase, 4-wire emergency distribution panelboards “EDPB” and “EDPC”. Emergency lighting and appliance panelboards, sound system circuits, the main telephone panel, and the emergency generator fire pump are all fed from panelboards “EDPB” and “EDPC”.

7.3 Lighting

The museum and the statue areas all appear to be well lit. The lighting levels are adequate. Flood lights are provided for exterior illumination of the pedestal and statue.

Some of the emergency lighting fixtures are old; replacement batteries may not be readily available. These emergency lighting fixtures should be replaced.

7.4 Fire Alarm System

The fire alarm system consists of a remotely monitored addressable fire alarm system. Fire alarm devices are located throughout the pedestal and statue. All devices appear to be in good condition. The fire alarm station located at level 1P (in the corridor behind the reception desk) is equipped with a monitoring workstation that displays all fire alarm zones and devices if in an alert condition.

END OF REPORT

Boilers in low level mechanical room

Control Air Compressor in low level mechanical room

Heating hot water heat exchanger for dual temperature air handlers

Chiller serving dual temperature air handlers (Statue System)

Air Handler AH-1in OP level Mech Room

Air Handler AH-1in OP level Mechanical Room

Fire Pump Room

Fire Pump

Fire and water service at point of entry.

Electric Service Room, 0P

Makeshift ventilation for Electric Service Room

Dual Temperature Air Handler at 7P serving statue

Air distribution around stair in statue

Cabinet Heater at 4P

Piping in “service tunnels” at 2.5P

APPENDIX C

SELECTED BIBLIOGRAPHY

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American Museum of Immigration, Administrative Files, Statue of Liberty National Monument.

American Museum of Immigration, Archival Collection, Statue of Liberty National Monument.

American Museum of Immigration, Museum Collections, Statue of Liberty National Monument.

Baboian, Robert, E. Blaine Cliver, and E. Lawrence Bellante, eds. *Statue of Liberty Restoration, Proceedings of the Statue of Liberty—Today for Tomorrow Conference.* Houston: National Association of Corrosion Engineers, 1990.

Baker, Paul R. *Richard Morris Hunt*. Cambridge: MIT Press, 1980.

Bartholdi, Frederic Auguste. *The Statue of Liberty Enlightening the World Described by the Sculptor Frederic Auguste Bartholdi.* New York: North American Review, 1885.

Berg, Shary Page. "Cultural Landscape Report for Liberty Island, State of Liberty National Monument, History, Analysis and Treatment Recommendations," Sept. 1999, Olmsted Center for Landscape Preservation, National Park Service, Boston.

Blanchet, Christian, and Bertrand Dard. *Statue of Liberty: The First Hundred Years.* New York: American Heritage, 1985.

Blumberg, Barbara. *Celebrating the Immigrant, An Administrative History of the Statue of Liberty National Monument, 1952-1982.* N. p.: U. S. Dept. of the Interior, National Park Service, North Atlantic Regional Office, Div. of Cultural Resources, 1985.

Burrows, Edwin G., and Mike Wallace. *Gotham: A History of New York to 1898.* New York: Oxford University Press, 1999.

Cotter, John. "Report on Archeological Observations at the American Museum of Immigration Foundation Area, 1962-1963." Statue of Liberty National Monument, Museum Collections.

Greenstein, Robert E., ed. "Summary Structural History of Fort Wood (Supplement)," April 1963. National Park Service Library, Statue of Liberty National Monument.

Griswold, William A., ed. "The Ground Beneath Her Feet: The Archeology of Liberty Island," c. 2003. National Park Service Library, Statue of Liberty National Monument.

Hallam, John Hallam. *The Diary of An Old Lawyer: Scenes Behind the Curtain.* Nashville, Tenn.: Southwestern Publishing House, 1895.

Harvie, David I. *Eiffel: The Genius Who Reinvented Himself*. Gloucestershire: Sutton Publishing, 2006.

Hayden, Richard Seth, and Thierry W. Despont. *Restoring the Statue of Liberty, Sculpture, Structure, Symbol.* New York: McGraw-Hill Book Co., 1986.

Holliman, Jennie. "The Statue of Liberty, Part II, The American People Receive the Statue of Liberty from the French." Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Holmes, Richard D. "Archeological Investigations for the Temporary Stairs and Security Fencing at the Statue of Liberty, Statue of Liberty National Monument, New York, New York," July 2004. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Hugins, Walter. "Statue of Liberty, National Memorial, Its Origin, Development and Administration," U.S. Department of the Interior, National Park Service, 1958. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Index to the Reports of the Chief of Engineers, U.S. Army, 1866-1912. Washington, D.C.: Government Printing Office, 1916.

Jackson, Kenneth T. ed. *The Encyclopedia of New York City*. New Haven and London: Yale University Press, 1995.

John G. Waite Associates, Architects. "Statue of Liberty National Monument: Liberty Island Threat, Risk, and Mitigation Options Study, Phase II: Island and Monument Egress Assessment," Aug. 26, 2002. Statue of Liberty National Monument.

John G. Waite Associates, Architects. "Fort Wood, Statue of Liberty National Monument, Historic Structure Report." 2009.

Kahn, Yasmin Sabina. *Enlightening the World: The Creation of the Statue of Liberty.* Ithaca: Cornell University Press, 2010.

Kobbé, Gustav. *New York and Its Environs.* New York: Harper & Brothers, 1891.

Kroll, Naomi. "Condition Survey, Construction History and Preservation Plan, Fort Wood, Statue of Liberty National Monument," March 2006. U.S. Dept. of the Interior, National Park Service, Northeast Region, Design, Construction and Facility Management Directorate, Architectural Preservation Division.

Levine, Benjamin. "History of Bedloe's Island." Master's thesis, New York University, 1952. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Levine, Benjamin, and Isabelle F. Story. *Statue of Liberty National Monument, Bedloe's Island, New York.* Washington, D.C.: National Park Service, 1954.

Liberty, The French-American Statue in American History. Cambridge: Harper and Row, 1986.

Liberty: The French-American Statue in Art and History. New York : Perennial Library, 1986.

"Liberty Island, Statue of Liberty National Monument, Cultural Landscapes Inventory," National Park Service, 1998, rev. 2000.

Means, Georgia S. "Bedloe's Island and Fort Wood." Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Mikel, W. "Completion Report, Repairs and Alterations to Statue of Liberty National Monument," June 19, 1939. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Moreno, Barry. *The Statue of Liberty Encyclopedia.* New York: Simon and Schuster, 2000.

Palmer, George A. "Recollections of the First NPS Superintendent of the Statue of Liberty—George A. Palmer," 1984. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Perrault, Carole L., electronic files. Statue of Liberty National Monument.

Perrault, Carole L. *The Statue of Liberty and Liberty Island: A Chronicle of the Physical Conditions and Appearance of the Island, 1871-1956.* Boston: U.S. Dept. of the Interior, National Park Service, North Atlantic Region, North Atlantic Preservation Center, Oct. 10, 1984.

Perrault, Carole Louise. *Statue of Liberty National Monument, Historic Resources Study, Construction History: Primary Source Material,* review draft. Lowell, Mass: U.S. Dept. of the Interior, National Park Service, Northeast Field Area, Northeast Cultural Resources Center, Building Conservation Branch, 1997.

Perrault, Carole Louise. *Statue of Liberty National Monument, Historic Resources Study, Construction History: The Site,* first review draft. Lowell, Mass: U.S. Dept. of the Interior, National Park Service, Northeast Field Area, Northeast Cultural Resources Center, Building Conservation Branch, 1997.

Perrault, Carole Louise. *Statue of Liberty National Monument, Historic Resources Study, Construction History: The Statue, Its Pedestal and Foundation,* review draft. Lowell, Mass: U.S. Dept. of the Interior, National Park Service, Northeast Field Area, Northeast Cultural Resources Center, Building Conservation Branch, 1997.

Perrault, Carole Louise. *Statue of Liberty National Monument, Historic Resources Study, Lighting History,* review draft. Lowell, Mass: U.S. Dept. of the Interior, National Park Service, Northeast Field Area, Northeast Cultural Resources Center, Building Conservation Branch, 1997.

Pitkin, Thomas M. "Prospectus for the American Museum of Immigration," U.S. Dept. of the Interior, National Park Service, preliminary draft, 1955. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Pitkin, Thomas M. "Summary Structural History of Fort Wood," Statue of Liberty National Monument, Aug. 1956. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Public Papers of Daniel D. Hopkins, Governor of New York, 1807-1817. New York and Albany: Wynkoop, Hallenbeck, Crawford Co., State Printers, 1898-1902.

Romigh, Philip S. "Historic Structure Report, Fort Wood, Architectural Data Section, Statue of Liberty National Monument, New York," U.S. Dept. of the Interior, National Park Service, Historic Preservation Team, Denver Service Center, Oct. 1973. Manuscript Collection, National Park Service Library, Statue of Liberty National Monument.

Statue of Liberty-Ellis Island Foundation, annual lists of approved projects, 1994-2007, Office of the Statue of Liberty-Ellis Island Foundation, New York, N.Y.

Statue of Liberty Guides and Brochures, National Park Service Library, Statue of Liberty National Monument.

Statue of Liberty National Monument and Ellis Island Maintenance Division, annual reports and construction files, Statue of Liberty National Monument.

Statue of Liberty Restoration Files, Statue of Liberty National Monument.

Stein, Susan R., ed. *The Architecture of Richard Morris Hunt.* Chicago and London: University of Chicago Press, 1986.

Trachtenberg, Marvin. *The Statue of Liberty.* New York: Viking Penguin, 1976.

U.S. Army, Corps of Engineers, Records of the Office of the Chief of Engineers, New York, New York District, Record Group 77, Entries 758, 762, 797. National Archives, Northeast Region, New York, N.Y.

U.S. Army, Corps of Engineers, Records of the Office of the Chief of Engineers, Washington, D.C., Record Group 77, Entries 6, 18, 117, 171, 221. National Archives, Washington, D.C.

U.S., Secretary of War. *Annual Reports.* Washington, D.C.: U.S. War Dept., 1825-1909.

U.S., Secretary of War, Record Group 107, Letters Received, microfilm M222. National Archives, Washington, D.C.

Stokes, I. N. Phelps. *The Iconography of Manhattan Island*. New York: R. H. Dodd, 1915-1928.

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