III. RECOMMENDATIONS FOR TREATMENT

GENERAL RECOMMENDATIONS FOR THE HIGHLAND LIGHT

Significance

According to the 1987 National Register nomination forms for the "Lighthouses of Massachusetts Thematic Group Nomination":

> Highland Light Station possesses integrity of location, design, setting, materials and workmanship as well as important associations with the development of aids to navigation in Massachusetts. Dating from the mid-nineteenth century, it is one of the better preserved complexes in the state, consisting of a tower, walkway, keeper's house and generator shed. It is also important as the site of the first lighthouse on Cape Cod. Additionally it exhibits many especially interesting individual features such as its elaborate wrought iron work [sic: interior metalwork mostly cast iron].

The thematic study as a whole designated the period of significance for Massachusetts lighthouses as 1679 to 1940, with architecture, engineering, maritime history, and transportation being the attributes for significant context.

The Highland Light complex needs to be relocated in order to survive, because of erosion. Nevertheless, it is also necessary to maintain the structures' contextual relationship to the themes of architecture, engineering, maritime history, and transportation. It has thus been decided to relocate the complex's structures into the adjacent Truro Highlands National Register District, and to rehabilitate them. While the lighthouse complex will be a separate site from the district, its relocation there will certainly impact the district. The choice of rehabilitation as the treatment for the complex will provide a balance between the variety of goals involved: the concern to minimize the impact on the district, the desire to maintain the lighthouse complex's own integrity, and the need to adaptively use some parts of the complex.

Relocation and rehabilitation will retain integrity of design, materials, workmanship, and association to the development of aids to navigation. Integrity of setting will be retained partially, because the relocation site will be only approximately 650 feet from its current site. Integrity of location will technically be lost. However, the National Register bulletin "Guidelines for Evaluating and Documenting Historic Aids to Navigation" indicates that necessary relocation of an aid does not automatically obliterate its integrity of location:

> Relocation of an aid during its active career if the move enhanced or *continued its function* is not a significant loss of integrity. . . . Aids to

> navigation relocated to serve new purposes after being decommissioned suffer a serious loss of integrity of location, but are not automatically precluded from listing.[1]

In the case of Highland Light, the function of the Tower and beacon as an aid to navigation will continue after relocation under U.S. Coast Guard jurisdiction, even though the Keeper's Dwelling will be assigned a new use and will be maintained by the National Park Service.

The Highland Light Tower, the Keeper's Dwelling, and the two connectors between them have been in continual use since their construction in 1856 and 1857. The extant dwelling was occupied solely by lighthouse attendants until 1987, when the beacon was automated. After that time, there was no longer a need for housing specifically for light keepers, nor was there any need for direct access from the dwelling to the tower. The dwelling therefore remained in use as housing, but for Coast Guard families; the doorway between the two connectors was blocked. This was the first change in the use of the connector in 130 years.

After the buildings are moved, the Tower will continue in its uninterrupted historic use as an aid to navigation for the foreseeable future. The Keeper's Dwelling will provide space for the interpretation of the lighthouse and surrounding site.

Character-Defining Features

The Tower with its "lantern house" is the most significant character-defining feature of the Highland Light Station. It is not only the most prominent feature at the site, but is also the most important one, because of its role as an aid to navigation. The Tower itself retains a great deal of integrity from its original period of construction, due primarily to its permanent construction materials. The characteristic of the light—its flashing signal—dates to around the turn of this century.

Other important exterior features include the relationship and form of all four interconnecting structures, their directional siting, and the vista provided by the approach along Highland Road to the site. This open vista is enhanced by the architectural integrity of the structures, including the fenestration of the west, most prominent elevation.

Significant interior features of the Tower are the decks and means of communication between the decks (stairway openings and stairways), and the beacon. The upper three decks and the two stairways between them are original. The lower stairway (from the First Level to the Weight Deck,

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[1] National Register Bulletin No. 34, "Guidelines for Evaluating and Documenting Historic Aids to Navigation," p. 8.

including the Half Deck) dates to the first decade of the 20th century; it replaced the original stairway, which wound around a center pole.

The Connector at the Keeper's Dwelling and the Tower Connector also retain a great deal of exterior integrity, based on their more permanent construction materials. However, the very recent (1987) blockage of the doorway between them has obstructed the historic internal circulation between the structures.

The only primary character-defining feature in the Keeper's Dwelling is its footprint, which is original. While a small amount of original trim remains (around one basement window on the main block's west elevation), the dwelling's present appearance dates mostly to a major remodeling performed around the turn of the 20th century. Features from that period include the form and basic floor plan of the dwelling, as well as some trim elements. However, even this work has been too badly fragmented by later alterations to be considered "character-defining."

Summary of Significant Periods of Alteration

A summary of significant dates in the life of the extant structures is as follows:

1856: Wood-frame Keeper's Dwelling constructed, sided with vertical board-and-batten siding, painted a brick-red color, and roofed with wood shingles.

1857: Brick Tower, wood-frame Assistant Keepers' Dwelling, and three brick connectors erected. Lantern fitted with a first-order Fresnel lens. Connecting structures painted brick red (to match Keeper's Dwelling); Tower whitewashed.

1881: Siding of both dwellings changed to clapboard and painted white. Connecting structures painted white to match dwellings.

1900: Keeper's Dwelling enlarged by addition of second story to original ell, new main entrance created from a window at north end of west elevation, old main entrance at south end of west elevation converted to a window, other fenestration changed slightly, three roof dormers added, and room configuration changed in both stories.

1901: Porch added to Keeper's Dwelling ell; new Fresnel lens installed in Tower, and characteristic changed from fixed to flashing light.

1903: Lower Tower stair replaced and Half Deck added.

1906: Lantern lining and cowl replaced.

1909: Second-story bathroom added to Keeper's Dwelling, along with fourth dormer.

ca. 1930: Porch at Keeper's Dwelling ell replaced.

1932: Station electrified.

ca. 1935: Dwellings' siding changed to wood shingles; connecting structures painted white to match Tower.

1946: Fresnel lens replaced with Crouse-Hinds 36-inch, double-drum, rotating DCB-36 aerobeacon.

1961: Assistant Keeper's Dwelling and the covered brick passage connecting it to tower were demolished.

1963: New Assistant Keepers' dwelling (an unattached duplex structure) erected on grounds.

ca. 1970: Main entrance of Keeper's Dwelling returned to its original location at south end of west elevation, former doorway filled in and shingled over (original window not recreated).

1987: Crouse-Hinds aerobeacon replaced with Crouse-Hinds DCB-224 rotating beacon during lighthouse automation; passage between Tower and Keeper's Dwelling blocked off; window opening on east elevation Tower Connector bricked in; window opening on west elevation of Tower Connector enlarged for plate-glass window; Tower window double-hung sashes replaced with glass blocks.

1987/92: Much exterior wood trim replaced.

ca. 1992: Majority of interior fabric at first-story level and some fabric at second-story level in Keeper's Dwelling replaced or covered with new material. All windows and most doors replaced.

Basic Treatment Recommendations

Exterior Recommendations

General Remarks

Most of the treatment recommendations are related to doorway and window openings. However, other important issues should be recognized at the outset of the relocation process. In all cases, historic photographs should supplement physical evidence in order to reproduce sympathetic replacement materials.

Foundations

The Keeper's Dwelling should be placed upon either a partial or full basement when it is relocated to its new site. A basement would increase air circulation and therefore help limit moisture problems. It would also provide the best location for utility-related equipment.

If a slab foundation of poured concrete is chosen instead, the exterior foundation walls above grade should be faced with brick. The bulkhead cover should be retained to give the appearance of a full basement, but it could cover a false opening.

Walls

The unpainted wood shingles on the exterior walls of the Keeper's Dwelling should be retained, and repaired or replaced as necessary. All wooden exterior trim elements should be repaired or replaced as specified in the previous section "Conditions Assessment and Repair Recommendations."

Porches

The steps to the wraparound porch at the Keeper's Dwelling ell should be moved from their current location at the west end of the porch's north side to their original location at the north end of the porch's west side. (The original steps did not have a railing.) Porch trim that has been replaced with incompatible material throughout the years should be replaced with elements more consistent with the majority of remaining elements. The painted plywood of the porch ceiling replaced a plaster ceiling circa 1950. Two options are available for this exterior installation: either the plywood should be replaced in kind and painted, or an exterior plaster (insulation finish system) should be installed to simulate the earlier plaster. The latter would probably be easier to maintain.

The storm porch that protects the main doorway on the primary, west elevation of the Keeper's Dwelling was added after 1981, based on photographs found in the National Register survey. This covering clearly affects the appearance of the facade and should be removed.

Doorways

The historic doorway pattern of the Keeper's Dwelling should be recreated. This will require reopening two doorways that have been closed with plywood, and hanging new doors there. One of these openings is in the east elevation of the Connector at the Keeper's Dwelling; the other is in the west elevation of the same structure. The design of the new doors should be based on historic photographs of the west elevation, which show a typical 19th-century door here (with two long recessed panels above two shorter recessed panels). Figure 27 provides a clear depiction of this style of door, albeit on the Assistant Keepers' Dwelling.

Also, the cement-block entry that serves as the current entrance to the tower should be removed, as should the interior door now in the doorway between the entry and the Tower Connector. A new exterior door of typical 19th-century style should be hung here instead.

Windows

The current fenestration pattern of the Keeper's Dwelling is mostly historic and should be retained. One original window opening (at the north end of the main block's west elevation), which was closed circa 1900, will need to be reopened. Evidence for the placement and size of this opening will be found in the wall cavity.

All window openings should be fitted with wood frames and double-hung, six-over-six wood sashes. A system of exterior storm sashes also should be designed based on the proposed HVAC system. If air-conditioning is not part of the utilities design, then the storm sashes need to be operative, with screen inserts for summer ventilation. The use of storm sashes (or other transparent window protection, preferably glass) is absolutely necessary because of the high winds and blowing sands inherent to the area.

The 1987 plate-glass window in the west elevation of the Tower Connector should be removed. The opening should then be reduced to its original smaller size through the installation of replacement bricks. The new opening should be fitted with a wood frame and double-hung, six-over-six sashes, similar to those that existed prior to the 1987 alteration.

The original window opening in the east elevation of the Tower Connector, which was bricked up in 1987, could also be reopened and fitted with a wood frame and sashes. This elevation does not face the main approach that will be taken by visitors to the lighthouse, but it does face the ocean and therefore those visitors returning from a proposed lookout near the bluff's edge. However, lighting-apparatus equipment currently hangs on the interior side of the connector's east wall. Thus, while it would be advisable to reopen this window for interpretive reasons, the final decision should be based on operational considerations for the beacon.

The glass blocks in the three window openings in the tower should be removed and replaced with wood frames and double-hung, six-over-six sashes. A system of ventilation should be devised whereby two or three lights per window admit air but not blowing sand.

Finishes

If a slab foundation is chosen for the Keeper's Dwelling, the brick-faced exterior foundation walls above grade should be painted a shade of white matching the number 10YR 9/1 in the Munsell color notation system (see app. B). The exterior walls of the brick connecting structures should be repainted white, matching Munsell 10YR 9/1. The exterior of the brick tower should be repainted white, matching Munsell 10YR 9/1. All wooden exterior trim should be painted white, matching Munsell 10YR 9/1.

Interior Recommendations

General Remarks

The treatment for the tower interior (other than maintenance or repair) should be minimal and decided jointly by the Coast Guard and National Park Service, based on its future exposure to the public. Since the tower will remain as an unmanned aid to navigation, it will require space for supporting equipment. It is recommended that the Tower Connector adjacent to the tower be retained in its current use as an equipment room.

Walls

The existing plasterboard on the walls and ceilings of the Keeper's Dwelling, first and second stories, should be retained. New plasterboard may be used to replace the old plywood paneling in the two south chambers, although care should be taken to save earlier fabric under the paneling.

The wall separating the two connectors (i.e., the wall between Rooms 108 and 110) should be removed, to recreate the original circulation pattern between the dwelling and tower. The single passageway thus formed could be used in the interpretive program.

Doorways and Windows

The circa-1992 doorway and window surrounds on the first story of the Keeper's Dwelling consist of dark-stained stock wood moldings. These should be removed and replaced with flat-board trim approximately 4 inches wide.

Finishes

All of the interior trim in the dwelling and connectors, and the interior window trim in the tower, should be painted a white color matching Munsell 10YR 9/1.

CODE CONSIDERATIONS AND RECOMMENDATIONS

Introduction

The structures of the Highland Light Station will continue in service after their relocation. The Tower will be used in its historic capacity as a major aid to navigation. Therefore, although the light station will be owned and managed by the National Park Service, the U.S. Coast Guard will control access to the Lantern level of the Tower. The Tower would therefore not be generally accessible to the public, but its history and use could be interpreted elsewhere on the site.

However, as stated previously, the Keeper's Dwelling has not been needed as housing for light keepers since automation in 1987. Several options for the reuse of the dwelling after its relocation have been identified. All of these would be impacted by local, state, and federal codes and ordinances. Referenced codes are the Uniform Building Code, 1988 ed.; the NFPA 101 Life Safety Code, 1988 ed.; and the Uniform Federal Accessibility Standards, 1988 ed.

Residential Use

Should the Keeper's Dwelling be used as a residence, lead abatement would be required under the following circumstance: if the dwelling were to be inhabited by a family with children under seven years of age, and if the dwelling was the only available residence to that family. Most of the painted finishes in the dwelling are recent and thus lead-free. However, two areas are known to contain lead paint—the stair hall and the second story. Not coincidentally, these are the areas that retain their historic fabric.

Interpretive Use

If the dwelling were to be used for interpretive purposes open to the public, two major categories of compliance must be considered. These are barrier-free access and life-safety provisions. (Barrier-free access may also be necessary for housing, again in the event that no other already-accessible housing is available.)

A plan for full compliance with barrier-free and life-safety requirements should be devised and submitted to the appropriate local, state, and federal agencies for consideration and approval. Certain allowances are granted to historic properties in the interest of saving valuable historic material without significantly compromising barrier-free considerations.

Barrier-Free Access

Entrance

The only entrance suitable for modification for handicapped access is the doorway in the ell's west wall, leading from the porch into the north vestibule. The main entrance on the west elevation of the dwelling could not take the visual impact of the necessary wheelchair ramp; the ell's south-wall doorway cannot be enlarged enough, due to insufficient width between walls, to make it accessible. Therefore, handicapped access into the Keeper's Dwelling should be routed up onto the porch, through the ell's west-wall doorway, into the north vestibule, and then into the room currently used as a kitchen.

This approach will require the construction of a wheelchair ramp along the north side of the porch, with a landing adjacent to and level with the porch floor. The location of the ramp at the north elevation minimizes its visual impact on visitors approaching from the west, as well as providing a partially covered approach to the entrance. Currently, the first story of the dwelling is approximately 2 feet above grade. Assuming a 26-inch differential between grade and the porch floor, a switchback ramp (1:12 slope) of two 13-foot runs terminates at a landing at the location of the existing porch steps. (However, the opportunity to reduce this differential, and thus the ramp length, should be considered during the relocation process.)

The material used for the new work should be compatible with the historic fabric. The wood decking used for the ramp surface could be integrated with the existing flooring. Painted metal pipe rails would satisfy the required point loading, as well as present a lighter appearance than wood railings. A wood frame with diagonal wood trellis installed at the base of the ramp (between finished grade and porch floor level) would match the base depicted in the historical photographs from the 1930's (e.g. fig 28).

The construction of such a ramp will require the relocation of the porch steps, from the west end of the north side of the porch, to the north end of the west side (their original location). As stated in the preceding section, this work is already planned. The ramp will also require some reworking of the porch skirt details. Figure 160 shows the proposed ramp and the relocated porch steps.

Once access has been provided to the porch, the ell's west-wall doorway will need to be modified. First, it should be widened to accommodate a 3-foot-wide door. Second, a platform should be built outside it, with a sloping section down to the porch floor (see figure 160). This is needed to help deal with the 3-inch difference between the current floor levels of the north vestibule and the kitchen. A maximum of three-quarters of an inch difference between adjacent floor levels

is allowed by code. Removing thresholds and beveling floor edges, at both the west-wall exterior doorway and the doorway from the vestibule to the kitchen, will reduce the 3-inch difference by half. The remaining 1 1/2-inch discrepancy must be addressed by building up the floor of the vestibule. The exterior platform is thus necessary to bridge the gap between the new, higher vestibule floor and that of the porch outside. The platform would have to extend 4 feet out from the doorway, for maneuvering clearance. The sloping section would have to extend out 30 inches from the platform, terminating 3-4 feet from the top of the ramp. (At a slope of 1:20, this section would not be considered a ramp).

The current door in the doorway between the vestibule and the kitchen has insufficient room to swing freely, according to code. Only the relocation of walls would solve this problem. Alternatively, the door could remain open during operational hours, if the west-elevation doorway on the main block were to be used as the primary entrance.

It is unlikely that the second story of the dwelling would be opened to public access. First, an elevator would be needed to provide handicapped access there. Second, as will be stated subsequently, the life-safety codes require two means of egress per story. Doorways and egress passages must meet specific minimum requirements for width, turning capacity, and door size and access. Given the limited area on the second story, it is infeasible to pursue public access there.

If the connecting structures are to be included in the interpretive program, the grade at one of the connectors' doorways should be level with its respective threshold, to accommodate wheelchair-bound visitors. Currently, the grade is level with three of the four doorways in the connectors: the west doorway of the Tower Connector, and both doorways of the Connector at the Keeper's Dwelling. (The built-up grade at the east doorway of the Tower Connector is 8 inches above the floor.) Therefore, public access from grade could be accomplished with minimum effort.

Toilet Facilities

Wheelchair access to toilet facilities within the dwelling would also be needed. The existing first-story half-bath is inadequate in size to accommodate an accessible toilet. A new toilet room would have to be built, with appropriate clearances and fixtures. Approved door hardware and rated doors at specified locations would be included.

Life-Safety Issues

The other major group of code requirements pertain to life-safety issues. Two means of egress would be required per story, as well as approved door hardware and rated doors at specified locations. Other life-safety equipment must include appropriate exit signage, smoke alarms, and fire extinguishers.

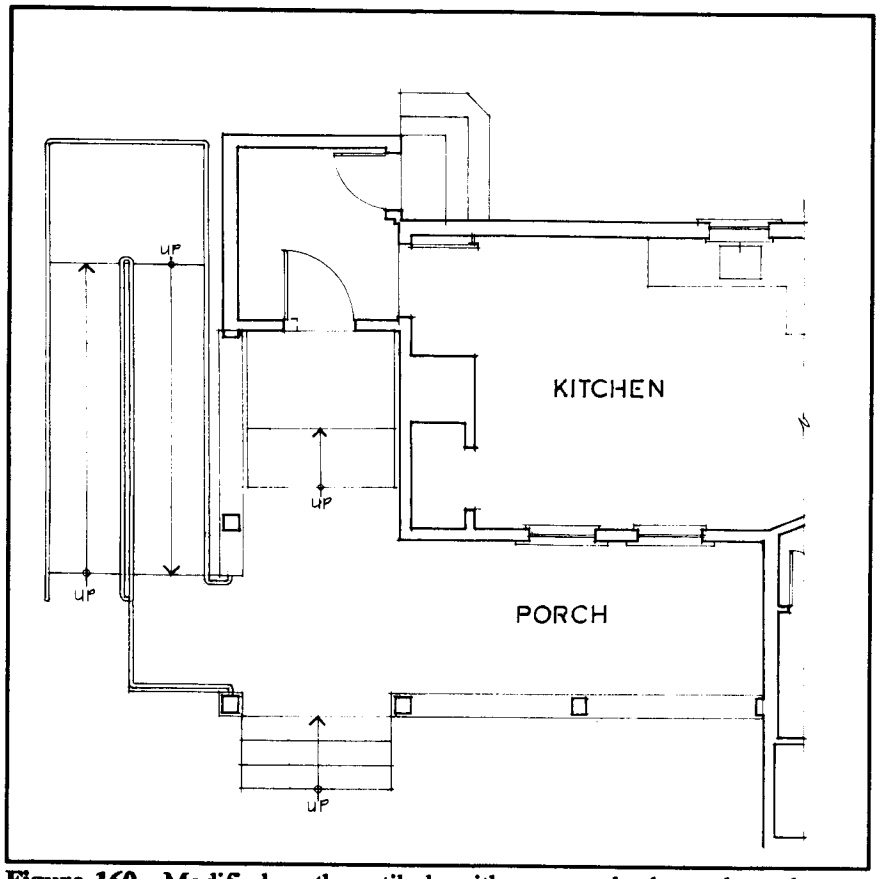
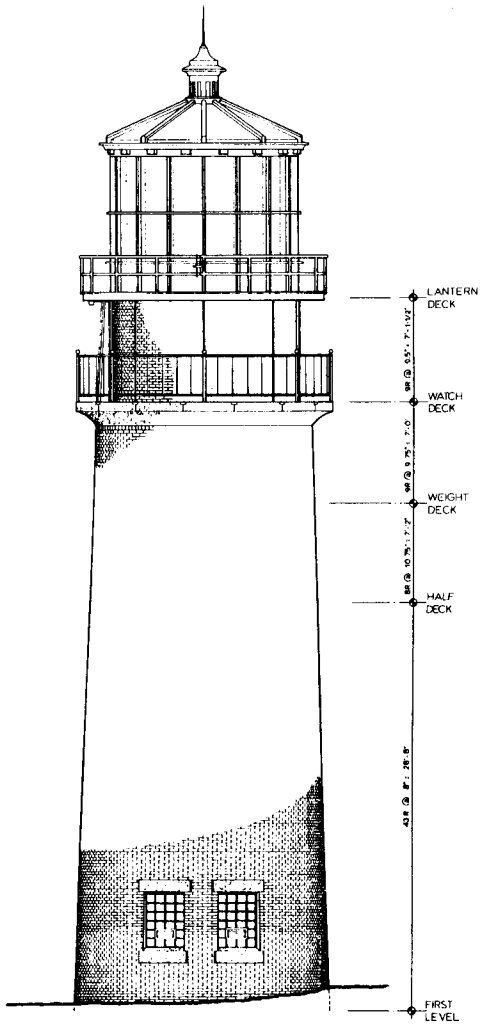


Figure 160. Modified north vestibule with ramp and relocated porch steps (refer to Appendix A).

IV. APPENDICES

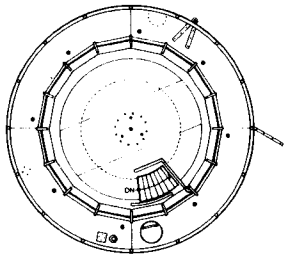
APPENDIX A.

HIGHLAND LIGHT STATION DRAWINGS, 1994

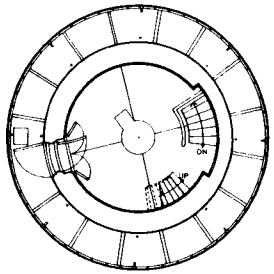


SOUTH ELEVATION

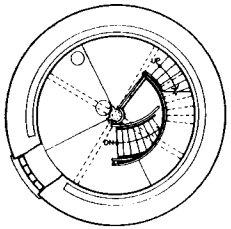
0 1 2 4
1/4" = 1'-0"



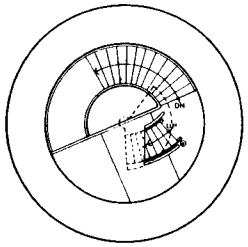
LANTERN DECK 4 & GALLERY



WATCH DECK 3 & GALLERY



WEIGHT DECK 2



HALF DECK 1

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EAST ELEVATION

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1/4" = 1'-0"

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WEST ELEVATION

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1/4" = 1'-0"

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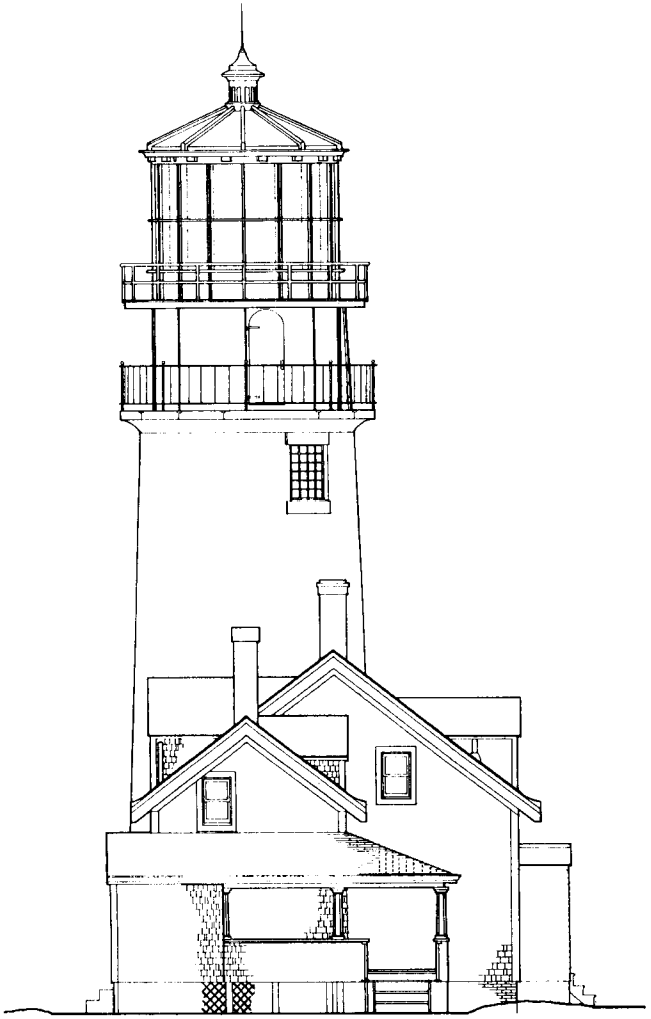

NORTH ELEVATION

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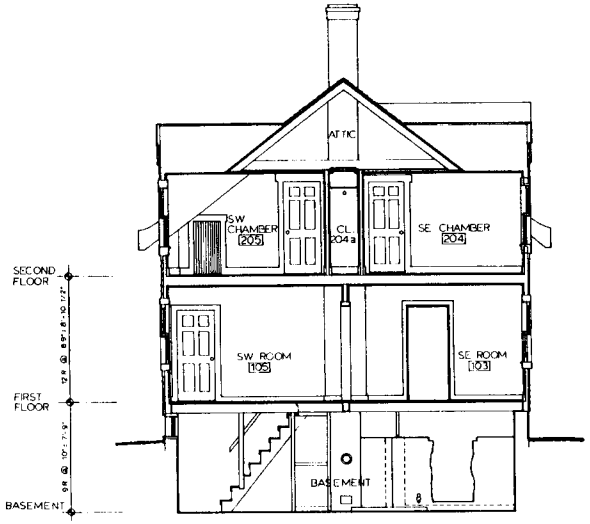
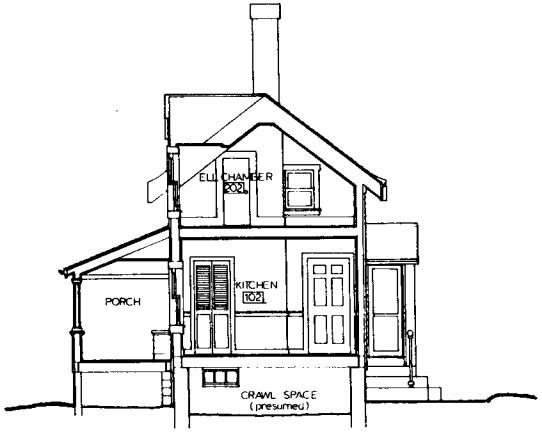


SECTION A-A



SECTION B-B

SOUTH ELEVATION

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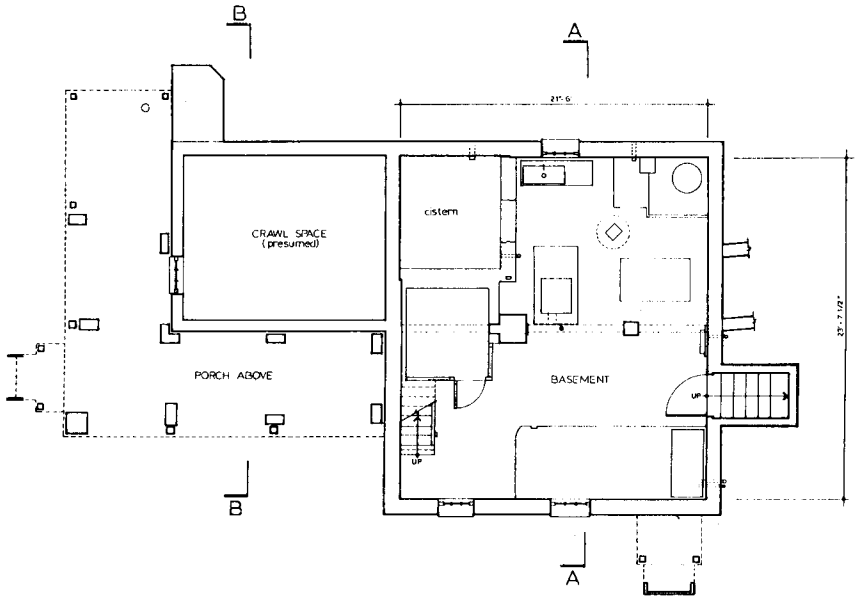
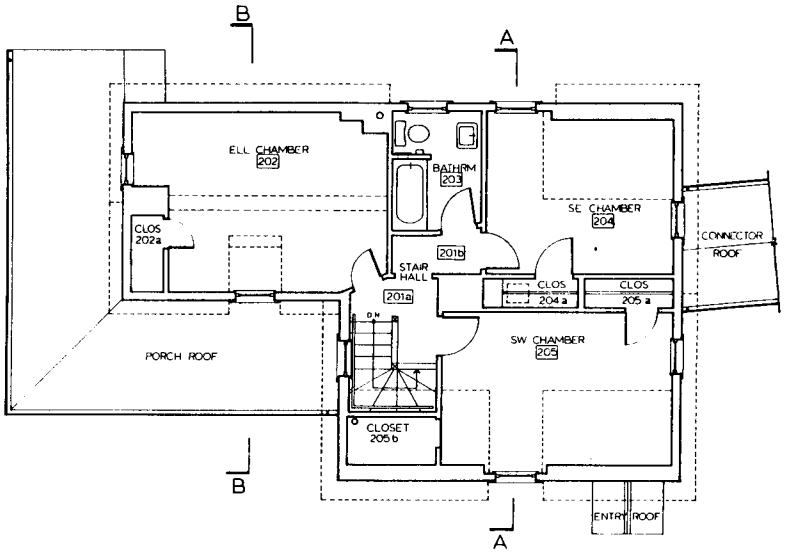


BASEMENT PLAN



SECOND FLOOR PLAN

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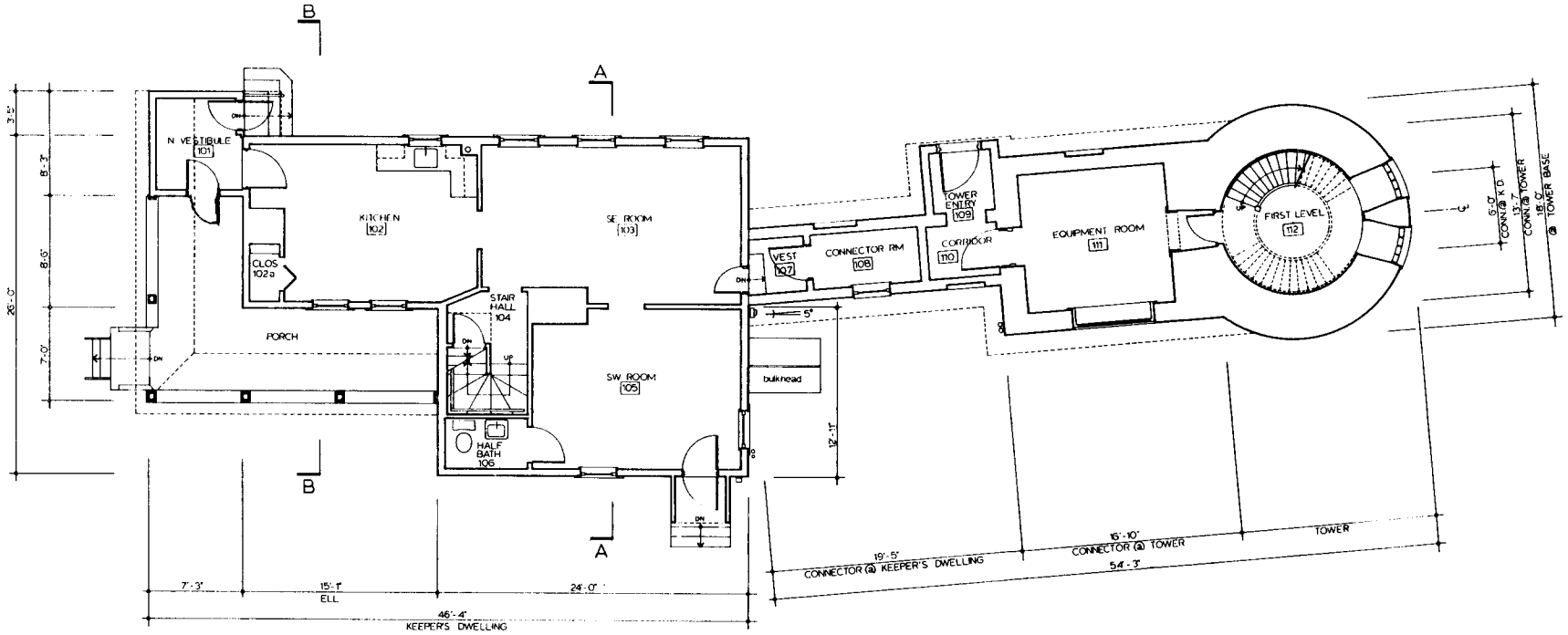

FIRST FLOOR / LEVEL PLAN

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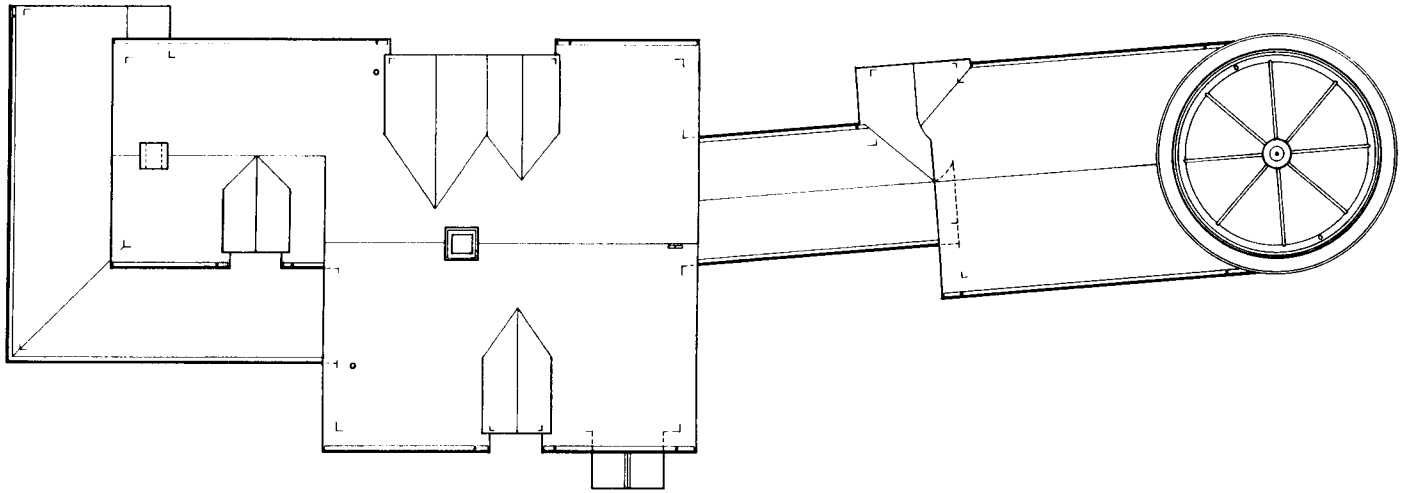

ROOF PLAN

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APPENDIX B.

PAINT ANALYSIS

PAINT ANALYSIS

Methodology

This paint analysis studied the four buildings involved in the Highland Light relocation project. These are the lighthouse, the Keeper's Dwelling, and the two small structures that connect the two main buildings. A total of 281 paint samples were removed from the exterior and interior of these structures. Each sample was removed using an X-acto knife and placed in a coin envelope labeled with its respective location. The samples were then brought to the Cultural Resources Center's laboratory, where they were assigned individual identification numbers. All numbers are prefaced by the notation "CACO HL" (for Cape Cod Highland Light), and all begin with the letter "P" (for paint sample). The numbers themselves run consecutively from P001 through P281.

Each sample was viewed through a Nikon stereozoom microscope using fiber-optic reflected lighting. Respective chromochronologies were recorded on individual sample cards and labeled with corresponding sample numbers. The majority of samples were also viewed under a trinocular Olympus BX50 microscope fitted with a narrow-band ultraviolet-light cube for fluorescing. The fluorescing chromochronologies were also recorded with the corresponding paint layers on the individual sample cards. The most representative samples were mounted in wax-filled petri dishes and labeled with their corresponding identification numbers. A minimal number of samples were microchemically tested under reflected light with hydrochloric acid (HCl) and sodium sulfide (Na_2S) to verify the presence of lime or lead, respectively, in paint stratigraphies.

The principle of comparative analysis was applied using the reflected- and ultraviolet-light chromochronologies. The UV chromochronologies were especially helpful for those samples that contained only white, off-white, and light cream-colored layers. These all appeared very similar under reflected light. However, ultraviolet-excited and -emitted light exposes a much wider spectrum of color, varying with the composition of the paint layer. Thus, the use of the UV chromochronologies permitted faster and more accurate comparisons.

The following discussion summarizes the results of the technical and comparative analyses of the paint samples. This process permitted the identification of dates when various pieces of building fabric were installed within the life of the structures, based on their painted histories. In cases where archival documentation and/or structural evidence provided specific dates for certain pieces of building fabric, these were found to agree with the dates obtained from the paint analysis.

It is important to note that the oils in paints tend to yellow in darkness, which occurs when they are covered by subsequent paint finishes. Therefore, although paint layers may appear to vary in color when viewed through the microscope, especially in the lighter range of whites, off-whites, and light creams, they may in fact have the same composition and have been the same color originally.

The following key provides abbreviations used in chromochronology charts in following pages:

Color Abbreviations Key

Abbreviation		
lt - light	ow - off-white	pk - pink
dk - dark	cr - cream	blk - black
brt - bright	yel - yellow	gry - gray
for - forest	or - orange	blu - blue
bk - brick	rd - red	grn - green
wh - white	gld - gold	brn - brown

Exterior Finishes

Little information about the age of extant exterior fabric of the light station structures can be obtained from the written documentation. Photographic documentation has provided the best evidence for identifying changes to the exterior. A comparison of both with the results of a physical examination indicates that the majority of brick and metal fabric is original to the 1856-57 construction. This includes the bricks used for the lighthouse Tower and the two connecting structures. Some of the bricks of the Keeper's Dwelling chimney also may be original. The metal lantern on top of the Tower appears to be the same one that was installed in the 1850's, but parts of it may have been modified.

Written documentation has established that the present form of the Keeper's Dwelling dates to that structure's 1900 renovation. Dormers were added to the main block, and the ell was raised to include a second story with dormers. If the porch at the northwest corner was not added at that time, it was added no more than a year or two later. Historic photographs show that the pedimented trim on the dwelling was changed when the building's clapboard siding was replaced with shingles circa 1930. The main doorway was moved twice during the life of the structure. The photographs taken between 1900 and circa 1970 show the doorway in its second location, to which it was moved in 1900. The latest archival photograph (fig. 36), taken circa 1970, shows the doorway moved back to its original position, at the south end of the west elevation. The hooded porch over this entry does not appear in any of the historical photographs, and was therefore added after figure 36 was taken.

Other photographs suggest that the board-and-batten bodies and wooden trim of both keepers' dwellings, and the brick connecting structures, were originally painted the same dark color. The Tower and brick foundation of the dwellings, on the other hand, were light-colored (probably whitewashed, as mentioned in some documentation). In 1881 when the dwellings were resided with clapboarding, all of the structures were painted the same color, probably white. The wooden trim of all of the station's buildings was painted in a contrasting color to the bodies of the structures at the end of the 19th century, as well as in the beginning of the 20th century. During this period, the bodies of the dwellings and connecting buildings were often painted in a different color than the Tower. The same evidence shows that the brick Tower was always painted white, or at least a very light color. The two small connecting brick buildings continued to have been painted the same color as the dwellings. After the dwellings were sided with shingles circa 1935, the connecting buildings appear to have been painted white to match the Tower.

Paint analysis has provided more specific information. While much of the early building fabric has been replaced, paint analysis helped date the extant fabric in a relative context. Where fabric could be dated through documentation, benchmarks dates were applied to other samples. One problem associated with exterior paint analysis at this site pertains to the environment: wind-blown sand has tended to abrade paint layers off of their substrates. As a result, some samples have fewer layers than they should have, and so could lead to incorrect conclusions. This problem was considered during the course of the analysis. One definite conclusion can be ascertained from paint analysis: the exterior was painted very frequently.

Two paint samples were difficult to read microscopically due to their deteriorated or eroded layers. The layers from sample P013 were so badly fractured that the sample could not be read. It had been removed from the raking eave trim on the east side of the concrete-block entry to the Tower. The second sample (P076) was taken from the beaded boarding of the west-wall doorway of the Keeper's Dwelling ell, leading from the porch to the north vestibule. The earliest layers were jumbled, but appeared to date no later than the seventh finish of the majority of paint samples found during the investigation.

Three samples (P104, P105, and P041) were removed from the framing elements of the basement windows. One sample (P063) was removed from the concrete stoop at the rear elevation of the dwelling's ell. All minimally related to each other and were initially hard to correlate to other samples.

Keeper's Dwelling - Foundation Level

DATES↓	P104 W elev., N basement window	P105 W elev., S basement window	P041 E. elev., center basement window	P063 E. elev., concrete steps to N vestibule
substrate	wood	wood	wood	concrete
1856	rd/brn rd/brn			
	rd/brn rd/brn			
1881?	wh lt cr lt cr			
	wh oil			
	wh oil			
	wh			
	gry (/grn?-faded)			
	gry (/grn?-faded) gry (/grn?-faded)			
	gry (/grn?-faded) gry (/grn?-(faded)			
	charcoal gry			

last finish bef. 1900 renovation	gry gry gry			
*exact number finishes unknown	*			
1958?				dk grn
				dk blu/grn
				gry/grn
		for grn		dk grn/blu
		for grn for grn		dk blk/grn
bet. 1966 and 1978	brt grn	for grn for grn	grn/blu (weathered)	dk blk/grn
	sage grn sage grn	sage grn		grn grn
	sage grn	sage grn		grn grn
	sage grn sage grn	sage grn sage grn		grn grn
1992?	sage grn			

None of the darker greens found in the above four samples match other green paint layers found in exterior trim samples under ultraviolet light. This reveals that different kinds of pigments were used in those other layers. No sage green layers were found in any other exterior samples. While gray paint was used before and after the turn of the 20th century to provide a contrasting trim color, the green layers found in samples other than P104 date to a later time period than the grays.

Sample P104 represents the only known surviving exterior wood fabric original to 1856. It was removed from a basement window frame at the north end of the west elevation of the Keeper's Dwelling main block—a window opening that was covered over by a entrance stoop from 1900 to after circa 1970. During those decades it was protected from the elements and trim-replacement campaigns. It proves that the original painted finish of the board-and-batten house was a dark brick-red color; confirms that the trim (probably along with the main body) was painted white when the siding was changed to clapboards; and suggests that the contrasting trim colors used at the end of the 19th century were grays.

Sample P063 was removed from the concrete steps of the south-wall doorway to the vestibule of the Keeper's Dwelling ell. This sample contained eight different shades of green. A metal disk is implanted in the concrete, installed there by the U.S. Geodetic Survey organization in 1958. If the first coat of paint is contemporary to the installation of the concrete and implanted metal disk,

an average of four years can be computed between painting campaigns, which supports other calculations for general exterior painting campaigns at the site.

Samples P040 and P093 were removed from the brick foundation of the main block of the Keeper's Dwelling—from the east and west elevations, respectively. Sample P040 reflects at least six layers of whitewash immediately next to the brick substrate, followed by four finishes of paint. Sample P093 reflects those same later four (possibly five) finishes, but no whitewash layers, suggesting that they wore off in this location. Based on fragments of archival documentation, it was thought that the dwelling foundation was whitewashed for the majority of its history. While these samples do not prove this assumption, they lend support that the foundation was whitewashed at least during the earliest part of its history (corroborated by the earliest historic photographs), and possibly as late as the fifth or sixth from the last painting campaign. Records show that whitewash was being used on the site as late as 1952.

The number of observed finishes from other samples removed from masonry substrates varies widely. The sample with the largest number of finishes was removed from the Tower, from a section of spalled brick on the east side (P001). This sample reflected six or seven finishes, the first three of which are lime-based, probably a whitewash. The second finish was filled with sand. Whether this was an intentional coating or whether blowing sand impregnated the finish while it was being applied is unknown. Samples P005, from the north face of the Tower, and P020, from the north gable wall of the Tower Connector, only reflected three or four white-painted finishes. Three masonry samples showed only one or two finishes. These include P002, from the ground-level window sill of the Tower (paint over the concrete filler); P007, from the 1987 brick infill of the original east-wall window of the Tower Connector; and P022, from the brick east wall of the Connector at the Keeper's Dwelling. Usually a lack of paint layers is interpreted as representing newer material, as is clearly the case in samples P002 and P007. However, since photographs record that the structures were painted throughout their existence, one should recognize the severe impact of the blowing and blasting sand on exterior paint at this site. Sample P022 may represent this type of condition.

Photographic evidence shows that the circa-1900 porch was altered circa 1930. The ceiling of the porch was again altered after 1950, and all of the analyzed ceiling samples represent this period. The number of paint finishes in each porch ceiling sample confirms that this exterior element was painted every four years if the earliest date of ceiling fabric replacement was 1950.

Porch Ceiling Samples

DATES↓	P082 1/4 round	*P083 ceil. batten	P084 ceil. board	P087 1/4 round
	wood	wood	wood	wood
ca. 1950	lt grn lt grn	lt grn	lt grn	lt grn

	brt grn brt grn	brt grn	brt grn	brt grn
	grn/blu grn/blu	grn/blue	grn/blue	grn/blue
	grn/olive grn/olive	grn/olive	grn/olive	grn/olive
			gry: not complete	
	wh wh	wh wh	wh wh	wh wh
	lt cr (smooth)	wh?		
	ow wh			
	wh	wh		wh
	wh		wh	wh2?
	wh	wh?		wh
	wh	wh	wh	wh

Paint sample P077, removed from the porch's easternmost pilaster, retains the one of longest exterior stratigraphies. Historic photographs suggest that this porch was rebuilt circa 1930, at which time the extant columns and pilasters were installed. If the pilaster does date to circa 1930, and if the number of finishes on it have been correctly assessed, then the porch's wooden trim was painted every three years, a conclusion based on 23 painted finishes during the course of 64 years. Alternatively, if the pilaster dated to the 1900 renovation and was reused circa 1930, then the trim at the station would have been painted every four years on average. Unfortunately little of this sample is comparable to the porch ceiling samples, since ceilings tend to be painted less frequently than other elements, often in different kinds of paints, and the earliest ceiling colors do not correlate to any colors found in the pilaster sample. However, comparison to other samples suggests that the first painted finish reflected in sample P077 dates to 1900.

A comparison of P077 and the exterior sample from the Tower door leading from the Watch Deck to the Watch Gallery (P004) indicates that they are very similar in layering. However, this does not mean that the door dates to 1900. The door is evident in a photograph from 1886, and also in two photographs probably taken in the 1890's; it appears to be whitewashed in the last two images. No such early white layers were found in sample P004: either they wore off or were removed, or the door was replaced. Since the style of the door is correct for the original construction period, it is more likely that the layers wore off.

Another exterior sample that merits individual discussion was taken from the rail of the Watch Gallery (P003). Its base coat is the color of patinated copper. It was not possible to take part of the metal substrate with the sample. It is thus difficult to ascertain if only one layer of this color exists. However, the green color is followed by four layers of black paint. Documentation shows

that earlier paint layers were sand-blasted off the metalwork in 1987. The green primer appears to be an anti-corrosive layer, followed by finish coats of black paint (probably two or three).

The physical evidence indicates that few original exterior wooden elements remain. Only one such piece—the previously mentioned basement window frame—can be identified as original through paint analysis. The absence of early wood components is most likely due to severe environmental conditions and the need to replace weatherbeaten wood frequently. As shown by groupings of similar paint samples, the replacements seemed to occur during several periods on an "as-needed" basis, rather than during all-encompassing campaigns.

Representative Exterior Samples

DATE ↓	P077 Keeper's Dwelling ell, porch pilaster	P078 Keeper's Dwelling ell, N vestibule, W entry in paint ghost	P004 Tower, exterior face of Watch Gallery door	P088 Keeper's Dwelling, W elev. of main block, dormer gable trim	P080 Keeper's Dwelling ell, porch, interior fascia at wall	P026 Connector at Keeper's Dwelling, W elevation, cornice gutter
	wood	wood	wood	wood	wood	wood
1900	lt cr/ow lt cr/ow		lt cr lt cr		blk	
	ow				gray lt gry	
	wh wh	lt cr lt cr	wh wh		gray lt gry	
	ow oily (dirty)	ow *dirt	ow		dk gry dk gry	
	ow/lt cr ow/lt cr ow/lt cr	ow/lt cr ow			wh dk gry	
	ow ow	ow ow			lt gry	
ca. 1930	ow ow	wh wh	ow (dirty)		gry	
	ow ow	ow ow	ow		ow (thick)	
	ow	ow ow	ow		ow ow	
	ow ow	ow (oily) ow (oily)	lt cr ow		gry	
	ow ow *fract.	ow ow	ow	wh wh	ow	
	ow (smooth)		wh	wh	lt cr	
ca. 1950	lt cr lt cr	ow		lt cr lt cr	ow/lt cr	lt cr/ow lt cr/ow

	lt cr *dirt	ow			lt cr	wh wh
	lt cr lt cr	ow		lt cr lt cr	lt cr	ow ow
	lt cr		lt cr lt cr	lt cr (smooth)	lt cr lt cr	lt cr/ow lt cr/ow
ca. 1961	lt cr lt cr	ow ow	cr	ow/lt cr ow/lt cr	ow/lt cr	ow ow
	wh	wh	wh	wh	lt cr lt cr	wh wh
	ow (smooth)	ow (oily)			lt cr lt cr	grn grn
	wh		lt cr	wh	lt cr lt cr	grn grn
	wh	lt cr	lt cr	wh	wh	grn
ca. 1987	wh (smooth)	wh	wh	wh	wh	grn grn
	wh wh	wh	wh wh	wh	wh wh	wh wh

Exterior paint samples and their locations are listed below, with those samples reflecting gray layers similarly to sample P080 noted with an asterisk [*], and those samples reflecting green layers similarly to sample P026 noted with a plus sign [+]. Only trim samples from the two connecting buildings display these green finish layers, which appear to have been used as trim colors for *designated* details from the 1940's to the 1987 paint scheme. Even though the gray finishes were earlier than the greens, samples do not reflect both the grays and greens within the same stratigraphy.

Those samples that reflected the lengthiest stratigraphies, date to circa 1900, and were contemporary to one another, include:

P004 Tower, exterior face of Watch Gallery door
[Note: The exterior side of this door was painted less frequently than the exterior trim found on the structures below, but UV fluorescence proved that it was contemporary to the earliest paint sample.]

P057* Keeper's Dwelling, E elev., band course under eave, N of dormer
P064* Keeper's Dwelling ell, N vestibule, S wall, beaded-board entry
P068* Keeper's Dwelling ell, N elev., E corner board
P077 Keeper's Dwelling ell, W elev., porch pilaster against vestibule
P080* Keeper's Dwelling ell, W elev., int. fascia of porch wall

The above samples date no earlier than circa 1900, based on the construction of the porch. Assuming that the sample from the circa-1930 pilaster represents reused material from the earlier (1900) porch, the above grouping of samples provides the benchmark date to the 1900 alteration.

The one sample that begins with a stratigraphy of the third finish is:

P078 Keeper's Dwelling ell, N vestibule, W entry, within paint ghost around door at entry

Samples with stratigraphies beginning at the seventh finish, which may date to circa 1930 (based on the porch rail sample), include:

P031+ Connector at Keeper's Dwelling, W elev., window frame
P033* Connector at Keeper's Dwelling, W elev., trim of blocked doorway
P051* Keeper's Dwelling, E elev., band course under eave S of dormer
P076 Keeper's Dwelling ell, W elev. doorway, beaded boarding
P081* Keeper's Dwelling ell, porch rail, N run near doorway
P092 Keeper's Dwelling ell, W elev., cornice fascia N of dormer
P094 Keeper's Dwelling, W elev., cornice gutter
P096 Keeper's Dwelling, W elev., cornice fascia
P099 Keeper's Dwelling, W elev., dormer, cut-through rake

Samples with stratigraphies beginning at the 13th finish and dating to circa 1950 (based on the porch ceiling samples) include:

P009 Connector at Tower, E elev., cornice gutter
P017+ Connector at Tower, entry, N face, cut cornice section
P021 Connector at Keeper's Dwelling, E elev., blocked doorway jamb molding
P026+ Connector at Keeper's Dwelling, W elev., cornice gutter
P027+ Connector at Keeper's Dwelling, W elev., cornice quarter-round molding
P029+ Connector at Keeper's Dwelling, W elev., window sill
P030 Connector at Keeper's Dwelling, W elev. plywood of blocked door
P032 Connector at Keeper's Dwelling, W elev., blocked doorway trim
P034* Connector at Keeper's Dwelling, E elev. trim of blocked doorway
P049 Keeper's Dwelling, E elev., S dormer rake trim
P056 Keeper's Dwelling, E elev., N dormer, cut-through rake
P058 Keeper's Dwelling, E elev., cornice gutter S of dormer
P082 Keeper's Dwelling ell, int. porch, quarter-round molding
P083 Keeper's Dwelling ell, int. porch, ceiling batten
P084 Keeper's Dwelling ell, int. porch, ceiling board
P087 Keeper's Dwelling ell, int. porch, quarter-round molding at wall
P088 Keeper's Dwelling, W elev., dormer gable trim

Samples with stratigraphies beginning at the 17th finish include (these samples appear to date to circa 1961 when the Assistant Keepers' Dwelling was demolished):

P008+ Tower Connector, N elev., rake fascia
P010+ Tower Connector, E elev. cornice fascia (board at N)
P011+ Tower Connector, E elev., cornice quarter-round molding
P012+ Tower Connector, E elev. cornice fascia (center board)
P014+ Tower Connector, E elev., entry, rake
P015+ Tower Connector, E elev., entry, pedimented trim
P016 Tower Connector, E elev., soffit
P018+ Tower Connector, N elev., cornice fascia
P023+ Connector at Keeper's Dwelling, E elev., cornice fascia
P024+ Connector at Keeper's Dwelling, E elev., cornice quarter-round molding
P025+ Connector at Keeper's Dwelling, E elev., cornice gutter
P028+ Connector at Keeper's Dwelling, W elev., cornice fascia
P042 Keeper's Dwelling, E elev., S end corner board
P047 Keeper's Dwelling, E elev., dormer cut-through, S rake board
P048 Keeper's Dwelling, E elev., S dormer corner board
P052 Keeper's Dwelling, E elev., soffit S of dormers
P055 Keeper's Dwelling, E elev., soffit N of dormers
P059 Keeper's Dwelling, E elev., cornice quarter-round molding (S of dormers)
P061 Keeper's Dwelling ell, N vestibule, E elev. rake, S side
P070 Keeper's Dwelling ell, N elev., recessed fascia
P071 Keeper's Dwelling ell, N elev., rake soffit
P072 Keeper's Dwelling ell, N elev., outer rake board
P073 Keeper's Dwelling ell, N elev., porch cornice fascia
P074 Keeper's Dwelling ell, N elev., porch cornice gutter
P075 Keeper's Dwelling ell, N elev., porch cornice quarter-round mold.
P079 Keeper's Dwelling ell, W elev., porch, plain doorway trim
P090 Keeper's Dwelling ell, W elev., dormer, W corner board of SW
P091 Keeper's Dwelling ell, W elev., dormer, N rake cut-through
P101 Keeper's Dwelling, W elev., main entry, plain door trim

Samples with stratigraphies beginning with the approximate 19th finish include:

P019 Tower Connector, N gable soffit
P038 Keeper's Dwelling, S elev., rake trim, E end (weathered)
P060 Keeper's Dwelling, E elev., cornice fascia S of dormers
P062 Keeper's Dwelling ell, S elev., vestibule entry rafter
[Note: This fabric appears to date to the porch construction, but remained unpainted until later years.]

Samples with stratigraphies beginning with the last one or two painted finishes include (and probably date to 1987 or later):

P006+ Tower Connector, W elev., plate glass window frame
P007 Tower Connector, E window infill, change in brick
P022 Connector at Keeper's Dwelling, E elev., brick wall
P035 Keeper's Dwelling, S elev., E window frame
P036 Keeper's Dwelling, S elev., rake at lower W end
P037 Keeper's Dwelling, S elev., 1st-story window frame
P039 Keeper's Dwelling, S elev., rake at E end
P043 Keeper's Dwelling, E elev., S window frame
P044 Keeper's Dwelling, E elev., middle window frame
P045 Keeper's Dwelling, E elev., N window frame
P046 Keeper's Dwelling, E elev., northernmost window frame (small)
P050 Keeper's Dwelling, E elev., S dormer window frame
P053 Keeper's Dwelling, E elev., N dormer corner board, E face
P054 Keeper's Dwelling, E elev., N dormer window frame
P065 Keeper's Dwelling ell, NE corner board of vestibule, N face
P066 Keeper's Dwelling ell, SE corner board of vestibule, S face
P067 Keeper's Dwelling, N elev., 2nd-story window trim
P069 Keeper's Dwelling ell, N elev., 2nd-story window trim
P085 Keeper's Dwelling ell, W elev., porch, S window frame
P086 Keeper's Dwelling ell, W elev., porch, N window frame
P089 Keeper's Dwelling ell, W elev., 2nd-story dormer window trim
P095 Keeper's Dwelling, W elev., cornice quarter-round
P097 Keeper's Dwelling, W elev., dormer window frame
P098 Keeper's Dwelling, W elev., dormer NW corner board, N face
P100 Keeper's Dwelling, W elev., 1st-story window frame
P102 Keeper's Dwelling, W elev., entrance porch, trim under eave, S face
P103 Keeper's Dwelling, W elev., entrance porch, interior plywood, S "panel"
P106 Keeper's Dwelling, SW corner board, W face

The samples listed just previously above represent fabric that was most recently painted. The majority of fabric has been replaced. This replacement may have occurred in 1987 when the beacon was replaced and other alterations occurred, or at the same time as the interior renovation of the Keeper's Dwelling, circa 1992.

Interior Finishes - Keeper's Dwelling

Basement

Documentation has revealed that a major renovation occurred in the Keeper's Dwelling in 1900, changing the locations of interior partitions as well as the staircases. This analysis included an attempt to determine if any exposed fabric remained from the original 1857 construction. Paint analysis of interior elements proved that very little of the extant fabric dates to the original construction. The only original painted material that is accessible is found in the basement. The majority of building fabric dates to the 1900 and circa-1992 renovations, while some elements may date to circa 1950.

Floor

Painted brick flooring is evident in the basement along the south wall near the east end. An early brick cistern, possibly dating to 1857, remains in the northeast corner of the basement. Physical investigation revealed that the majority of ceiling beams and joists and exposed subflooring of the floor above are original to the structure (1857). A patched space in the southeast corner of the ceiling reveals where the original staircase was located, running east-west between the joists.

The amount of paint on these elements is less than would be expected of original material. However, this is understandable, for two reasons. First, the majority of basement elements were was not originally painted. Second, the use of whitewash as a coating in the basement makes it difficult to compare samples, since the layers often delaminate between recoatings.

Six paint samples were removed from the floor of the basement. One (P133) came from the section of brick floor in the southeast corner that was left exposed when concrete was poured on the rest of the floor. One sample came from the concrete floor itself (P130). The others (P127, P131, P129, and P126) came from the concrete pads that were poured at several locations in the basement to provide level surfaces for various pieces of equipment. One sample (P124) was also removed from the "riser" that steps up from the floor to the bulkhead doorway in the brick basement wall.

Floor paint samples are typically incomplete, due to wear. Nevertheless, the Highland Light samples do provide some information. It is known from the history of masonry technology that concrete would not have been used on the dwelling's original basement floor. This floor would have been either brick or dirt; there is no evidence for either. Concrete may have been applied to the floor circa 1900; although this work was not specifically mentioned in the documentation, concrete floors were poured at that time in the passageways.

Comparison of the paint samples clearly shows that: (a) the brick floor was probably not painted before the concrete floor was poured on top of it; (b) the concrete floor was not painted until after the concrete floor pads were poured on top of it; and (c) the paint on the section of brick floor left uncovered by concrete in the southeast corner is no older than the paint on the rest of the floor.

The bulkhead riser appears to have been painted like the walls, rather than the floor, until the blue/gray finish was applied to the floor well after the bulkhead entrance was created circa 1900. Since no evidence exists to date the concrete floor pads, no dates can be applied to any of the painted floor finishes.

Two samples not represented in the following table include one removed from the bulkhead's brick retaining wall (P121) and one from one of the bulkhead's concrete steps (P122). Both of these samples contain only layers of red paint, nine from the former and eight from the latter. Two considerations affect these samples. First, although historic photographs show that the bulkhead may have been added during the 1900 renovation, its interior may not have been painted at that time. Second, the bulkhead's separation from the basement by a door may have discouraged its being painted the same color as the basement. In any case, the layers from both samples to not appear to be any older than the blue/gray and sage green finishes of the basement floor. No specific date can be applied to these finishes.

Basement Floor

P127 floor pad, SE corner, top pad	P131 floor pad, out from S wall, E floor half	P133 floor, painted brick at S wall @ E corner	P130 center of floor	P129 large floor pad @ SW corner	P124 riser to bulk-head opening, brick found. wall	P126 floor pad, SE corner, bottom pad
concrete	concrete	brick	concrete	concrete	brick	concrete
lt gry	lt gry	lt gry	wh			
dk gry	dk gry	gry	gry			
dk gry	dk gry		gry			
rd	rd fracture	rd	rd			
dk rd			rd (smooth)			
rd	rd	rd	rd (smooth)			
rd			rd (thin) *fracture			
rd	rd	rd	rd			
rd 2	rd	rd	rd			
rd			rd			
rd	rd	rd	rd			
rd			rd			
rd	rd	rd	rd		ow (oily)	
rd (oily)			rd		wh	

P127 floor pad, SE corner, top pad	P131 floor pad, out from S wall, E floor half	P133 floor, painted brick at S wall @ E corner	P130 center of floor	P129 large floor pad @ SW corner	P124 riser to bulk-head opening, brick found. wall	P126 floor pad, SE corner, bottom pad
rd (smooth)	rd	rd			ow	
rd					ow	
blu/gry	lt gry	wh			lt blu/gry	blu/gry
sage grn	ow/lt gry	lt gry			lt sage dk grn/grn	sage grn
rd	rd (smooth, oily)	rd		bk rd	bk rd	bk rd
rd	rd	rd thick		bk rd	bk rd	bk rd
rd	rd	rd		bk rd	bk rd	bk rd
	rd	rd		bk rd fracture	bk rd	bk rd
	rd	rd		bk rd	bk rd	
	rd	rd		rd	bk rd	
	rd	rd		bk rd	bk rd	
	rd			bk rd	bk rd	
				wh	wh	
	rd			bk rd (thin)	bk rd	
				bk rd	bk rd	
				bk rd	bk rd	

Walls

The wall samples reveal that the basement walls were whitewashed, and that this was possibly an original (1856) finish. Visual examination of the brick cistern, located in the northeast corner of the basement, shows that additional widths of brick were added during the painted history of the fabric. The samples suggest that the cistern, possibly original based on archival information, was whitewashed for sanitary and waterproofing reasons (as was customary for the time). When the cistern was rebuilt or reinforced, a sand paint was applied only as the interior finish of the cistern wall. No specific dates can be applied to these paint layers.

Basement Wall Finishes

P111 W wall near N corner	P114 cistern, NE corner, exterior surface	P117 cistern, E wall above cistern	P118 cistern, interior S wall	P123 cistern, 1st finishes of orig. S int. wall
brick	brick	brick	mortar or parging?	brick
whwash	whwash	skim?		whwash
whwash	whwash	dirt		whwash
whwash	whwash			whwash
whwash	whwash			whwash
deteriorated	whwash			whwash
	whwash	whwash?	wh sand paint?	
	whwash			
	whwash	wh	wh sand paint?	
cr #?↓	lt cr	ow		
	lt cr			
	lt cr	cr		
	lt cr			
	lt cr	wh		
	lt cr			
	lt cr	wh		
	lt cr	wh		
	wh	wh	wh	
	wh			

Stairway

All of the paint samples related to the basement stair are no earlier than 1900, when interior access to that level was relocated from the southeast corner. Samples P108, P109, and P132 appear to represent elements that are contemporary with each other. Samples P107 and P125 may also date to the same time period. However, because their substrates were probably originally whitewashed, and because whitewash is prone to fracturing off its substrate, this assumption cannot be proven at this time.

The middle paint layers of sample P109 are contemporary to the final paint layers of basement wall sample P114, based on exposure to ultraviolet light. This indicates that the main basement walls ceased to be painted during the middle painted history of the 1900 stairway. Since the stair elements may have remained unpainted after the 1900 alteration, it is difficult to ascertain if the initial finishes present today date to 1900. However, the most-heavily painted fabric has approximately 24 painted finishes. The similarity in number to the exterior painting campaigns could suggest that samples P109 and P132 are representative of 1900 fabric, and that P108 represents fabric that was first painted in 1900.

Basement Stair-Related Finishes

Date ↓	P107 N wall @ stair, above painted bb	P108 N wall @ stair, painted baseboard	P125 S wall @ stair, 1st-story level	P109 S stringer edge	P132 fascia band at cut-through, N wall
	brick	brick	masonry	wood	wood
1900		whwash		lt cr brt grn	ow charcoal gry
		whwash		lt cr for grn	
		whwash		gry/blu dk gry	gry gry
		whwash		gry dk gry	
		whwash		lt gry	ow/lt gry
		whwash		ow	ow/lt gry
		whwash	whwash?	ow	ow/lt gry
	wh	wh		wh wh	ow ow
	ow	wh	wh	wh	ow
	lt cr	wh	wh	ow/lt gry	lt gry

	lt cr	lt cr	wh	ow	ow
	lt cr	lt cr	wh	ow/lt cr lt cr	lt cr lt cr
	lt cr	wh	ow	lt lt blu	ow/lt blu
	lt cr	wh		ow dirt	
	wh	gry	wh	ow lt lt blu	ow/lt blu
	wh	wh (thin)	wh	lt lt grn lt lt grn	
	wh	gry	wh	lt gry	gry
		gry (thin)		dk gry	dk gry
				dk gry	
		gry		lt gry	lt gry
	wh dirty	wh	brt yel	gry/grn	
	wh	gry	brt yel	gry/grn gry/grn	lt gry
				gry	
	wh	gry	wh	med gry	gry

Miscellaneous Basement Fabric

Sample P110 (from the interior side of the bulkhead door) is contemporary with the two wood-substrate samples from the extant stair (P109 and P132). Therefore, the bulkhead was installed during the 1900 renovation. The exterior side of the bulkhead door and the exterior side of the jamb were painted less frequently than the interior side, with different paint colors.

The sample (P128) removed from the wood screen enclosure under the stair represents a recent addition to the basement, based on paint, hardware, and condition.

Miscellaneous Basement Finishes

Date ↓	P110 door to bulkhead, interior side	P119 & P120 door and jamb to bulkhead, exterior side	P128 wood screen enclosure under stair
	wood	wood	wood
1900	lt cr		
	ow (oily)		
	wh		
	ow (oily)	lt gry	
	wh/lt cr		
	wh (dull)	lt gry	
	wh		
	wh	ow	
	ow		
	ow/lt cr	lt cr	
	lt lt blu		
	lt gry		
	lt lt blu	lt lt blu	
	lt lt blu	lt lt blu	
	gry	gry gry	
	green/gry	dk gry/grn	
	dk gry/blu	gry	
	lt gry	gry	
	lt gry (warm)	sage grn	
	brn/gry		
	dk gry	dk charcoal	gry
	gry		gry

Ceiling Framing

Based on the following chromochronolgies, it was discovered that the ceiling framing was not painted until after 1900 (when the original basement staircase was removed and the corresponding area patched). The paint that these samples reflect was not applied until whitewash was no longer used as a coating in the basement. The paint layers representing the patched area and the original ceiling framing are contemporary to one another, but cannot be dated.

Basement Ceiling Finishes

P112 ceil. patch for former stair, SE corner, underside of subfloor	P113 ceil. patch for former stair, SE corner, subjoist	P115 NE corner, subflooring	P116 underside of ceiling joist
wood	wood	wood	wood
ow/lt cr	lt cr	lt cr	ow
ow/lt cr2?	lt cr		
lt cr	lt cr	lt cr	lt cr/ow
lt cr	lt cr lt cr	ow	ow
ow/lt cr	wh		wh

First and Second Stories

The current inhabitant of the Keeper's Dwelling related that the water pipes burst in the building in 1992, necessitating a fairly complete renovation, including all new kitchen cabinets and fixtures. A cursory visual examination of the interior confirmed this information; paint analysis supported that confirmation. The majority of wood trim and all of the windows have been replaced on the first and second stories. All of the first-story trim, except in the stair hall and bathroom, was replaced with stained, unpainted wood. Some trim was replaced on the second story, and it was painted. Most of the doors also were replaced. Except for interior closet walls, all first-story and some second-story walls were covered with plasterboard at this same time. Older 20th-century paneling is extant on some second-story walls. Paint analysis was able to identify all of the fabric from the latest renovation, as well as fabric that had been installed sometime between 1900 and the present.

Two apparent inconsistencies were discovered during the paint analysis of the interior samples of the Keeper's Dwelling. One was found in sample P141, taken from the north-wall baseboard of the first-story stair hall. It reflected only 12 finishes, with a yellow finish and pink finish falling consecutively in the middle of the stratigraphy. No other interior samples reflect these colors at the

same approximate time frame, nor does ultraviolet exposure correlate this sample to others from the Keeper's Dwelling. Therefore this fabric may have been installed as a replacement piece, reused from some other structure.

The second inconsistency was found in sample P183, removed from the door to the closet in the southwest chamber, and sample P184, removed from the casing of that doorway. The style of this door predates 1900 and was originally thought to date to the 1857 construction period. However, microscopic examination of its paint sample showed some evidence of residual paint in the wood substrate, suggesting that perhaps earlier paint layers were removed. If this assumption is true, then the door and doorway casing may have been stripped of original paint, and/or they may have been reused from another location.

It is known that the 1900 renovation required almost complete interior demolition. Furthermore, no paint samples displayed correlative data that might date them to 1857. It is therefore assumed that all of the sampled interior fabric above the basement level dates to the 1900 renovation or later. As many as 25 finishes (approximately) are evident in paint samples removed from the most frequently painted and oldest fabric. Analysis showed that the trim in the chambers on the second story was painted less frequently than the trim in the halls and stair hall.

Samples removed from the four closets of the three chambers show that the closets were painted much less often than the chambers to which they are connected. However, the 1899 floor plans and a visual examination of the closets suggests that they date to the 1900 renovation. Although the closets were painted infrequently, the baseboards appear to be contemporary to the other samples in this group, based on the earliest paint layers. The respective closet wall plaster samples directly correlate to the baseboard samples. Since no other painted wall-plaster samples were available, these were the only comparisons that could be made.

It is known from the documentation that two second-story closets servicing the ell and southeast chambers were altered in 1909 to provide space for a bathroom. The floor plan reflecting this change also notes that two old doors were reused. These doors have since been replaced, but paint analysis shows that their casings have not, suggesting that they were also reused in 1909. A paint sample removed from the baseboard of the north wall of the east hall (P167) also suggests that the baseboard section was reused at the same time, even though the hall was extended.

Samples representing confirmed 1900 fabric from the Keeper's Dwelling are listed below:

P143 1st-story stair hall, doorway to cellar, N side of casing
P145 1st-story stair hall, stair stringer baseboard, N side
P147 stair hall, fascia of 2nd-story landing overhang
L149 2nd-story stair hall, doorway to E hall, casing header
P151 2nd-story stair hall, doorway to SW chamber, jamb
P159 2nd-story ell chamber, N closet floor
P160 2nd-story ell chamber, N closet, N wall
P162 2nd-story E hallway, W wall baseboard
P164 2nd-story E hallway, doorway to bathroom, casing header
P165 2nd-story E hallway, doorway to SE chamber, casing header

P166 2nd-story E hallway, doorway to stair hall, casing
P167 2nd-story E hallway, N wall baseboard
P169 2nd-story bathroom, doorway casing, S side
P170 2nd-story SE chamber, N wall baseboard
P171 2nd-story SE chamber, doorway to E hall, casing header
P172 2nd-story SE chamber, doorway to W closet, casing header
P173 2nd-story SE chamber, closet, W wall
P174 2nd-story SE chamber, W closet, W wall baseboard
P176 2nd-story SW chamber, doorway to stair hall, casing
P177 2nd-story SW chamber, W wall baseboard
P178 2nd-story SW chamber, N wall doorway to crawl space, casing
P179 2nd-story SW chamber, E closet, floor
P181 2nd-story SW chamber, E closet, E wall
P182 2nd-story SW chamber, E closet, E wall baseboard
P185 2nd-story SW chamber, N crawl space, E wall
P186 2nd-story SW chamber, N crawl space, floor
P187 2nd-story SW chamber, N crawl space, E wall baseboard
P188 2nd-story SW chamber, N door to crawl space
P275 2nd-story SE chamber, E wall baseboard, S end section
P276 2nd-story SE chamber, E wall baseboard, middle section
P277 2nd-story SE chamber, E wall baseboard, N end of run
P278 2nd-story SW chamber, W wall baseboard, S end section
P279 2nd-story SW chamber, W wall baseboard, N of S seam
P281 2nd-story SW chamber, N crawl space, W wall plaster

One sample removed from the south-wall baseboard (P140) in the first-story stair hall may represent 1900 fabric, even though it reflects only five finishes. Exposure to ultraviolet fluorescence indicated that the first four off-white and white finishes may correlate to the first four finishes reflected in other 1900 samples. The fifth and final finish relates to the extant final finish found in all other samples. Since the baseboard appears to be worn and similar to other 1900 fabric, this evidence suggests that the middle 20 finishes wore off or were removed prior to the last repainting.

Two samples, both related to the south-wall baseboard of the ell chamber, appear to begin their stratigraphies one finish later than the 1900 samples. One sample is from the southeast corner jog (P153), and one is from the south wall (P154). Both of these samples represent replacement fabric that was apparently installed when the 1909 bathroom was added on the other side of the wall. The jog probably represents an alteration that was necessary for the new plumbing.

Representative Interior Finishes

Date ↓	P143 1st-story stair hall, basement doorway casing	P145 1st-story stair hall baseboard, inside wall, N	P153 2nd-story ell chamber, E-wall baseboard at jog	P180 2nd-story SW chamber, ceiling batten	P140 1st-story stair hall, S wall baseboard	P142 door to basement
	wood	wood	wood	wood	wood	wood
1900	ow (oily)	lt cr lt cr			ow	
1909	ow/lt cr lt cr	ow	lt cr		ow	
	ow/lt cr		ow ow		ow	
	cr (dk oil)	lt lt grn	ow/lt tan		ow	
	ow/lt cr	lt cr	ow/lt cr			
	ow/lt cr	lt cr	lt cr			
	ow/lt cr	lt cr	lt cr			
	lt cr (oily)		lt cr			
	wh	ow	lt cr			
	lt cr (oily)	ow	lt cr	cr		
	wh	ow/lt cr	ow	wh		
	wh	lt lt or lt lt or	ow			
	ow/lt cr	wh yellow	ow	wh		
	wh fracture	ow ow		wh		
	wh	lt cr/ow		cr		
	cr(thin)	wh		cr		
	ow/lt cr	wh	wh			
		lt cr				
	lt cr	wh		lt cr		
		wh				
		gry				

	cr	gld				
	ow	bk rd		wh		wh
	cr	grn				
	cr	gld/brn	cr/or			ow
	wh	bk rd	wh			wh
	ow	rd	wh	wh		
						lt cr/ow
		wh				
	cr	lt cr	lt cr	wh	lt cr	ow

A sample removed from the ceiling batten (P180) in the southwest chamber begins its painted sequence approximately 10 finishes later than the oldest interior samples. This would suggest that the ceiling probably was installed circa 1940. The style of the board-and-batten ceiling is sympathetic to this date. However, repairs for falling plaster were instituted in 1950, and the sample could also date to that time.

One sample was removed from the west wall of the southwest chamber (P280). It reflected no paint layers, only wallpaper, and displayed a wallboard substrate. This wallboard was probably installed around the middle of the 20th century, and was never painted, only covered with wallpaper.

Two paint samples reflect only five modern paint finishes, suggesting that some renovation or fabric replacement occurred before the pipes burst in 1992. They include P139, taken from the main entrance door on the west elevation of the main block, and P142, which represents the first-story door to the basement. These samples date to circa 1970 when the main entrance was relocated. Both samples were exposed to ultraviolet fluorescence, and showed only the last five modern finishes found in other samples.

Many samples represent the most recent renovation of 1992. One or two paint layers are evident in each of these samples. No samples were removed from the unpainted trim found throughout the first story. It is believed that this trim, although only stained, was installed at the same time as the newest trim interspersed in the stair hall and second story. This assumption is based additionally on similar molding profiles. The samples representing the latest renovation include:

P134 1st-story vestibule, N wall baseboard
P135 1st-story vestibule, S doorway to kitchen, casing
P136 1st-story vestibule, S-wall exterior doorway
P137 1st-story bathroom (former entrance), W wall baseboard
P138 1st-story bathroom, W wall chair rail
P144 1st-story stair hall, E doorway casing
P146 Stair to 2nd story, backboard for railing attachment, N wall
P148 Stair to 2nd story, N window casing

P150 2nd-story stair hall, doorway to ell chamber, casing
P152 2nd-story stair hall, doorway to SW chamber, casing
P155 2nd-story ell chamber, N window opening, trim piece below sill and above baseboard
P156 2nd-story ell chamber, N doorway to eaves storage, casing
P157 2nd-story ell chamber, W window opening, apron
P158 2nd-story ell chamber, W doorway, casing trim
P161 2nd-story ell chamber, W doorway, casing header
P163 2nd-story E hallway, E doorway to bathroom, casing
P168 2nd-story bathroom, S wall baseboard
P175 2nd-story SE chamber, W closet door

Interior Finishes - Connectors

The Keeper's Dwelling and the Tower are connected by a passageway consisting of two distinct sections. These are the Connector at the Keeper's Dwelling (immediately adjacent to the dwelling) and the Tower Connector (between the other connector and the tower). The Connector at the Keeper's Dwelling consists of four small rooms—Rooms 107, 108, and 110, and the Tower entry (Room 109). The Tower Connector has only one large room, the equipment room (Room 111). However, the hallway between Rooms 108 and 110 was blocked off in 1987. Rooms 109 and 110 therefore now relate primarily to the Tower Connector, and so will be considered as part of that connector.

None of the samples extracted from either connecting structure directly relate to interior samples found in the dwelling, except perhaps for the last few finishes. Unlike the whites that were applied in the dwelling, grays and greens were the early colors applied in the connector buildings. Not all the samples from the connecting structures reflect the same last finishes, either. Where the last whites and creams are found in the dwelling, some connector samples have reds, a light green, and tans. Unfortunately, the dwelling retains insufficient early first-story fabric in order to know if there was ever any paint correlation between the dwelling and the connectors. The evidence that was found suggests that no correlation existed.

The samples taken from Rooms 107 and 108 in the Connector at the Keeper's Dwelling, however, do correlate to one another. Representative stratigraphies are charted here. A comparison of these samples with samples extracted from Tower Connector rooms suggests that the oldest fabric in Rooms 107 and 108 was installed three painted finishes later than the oldest fabric in the Tower Connector. Therefore, a renovation must have occurred before the fourth painted finish in these stratigraphies, at a time prior to the blockage between Rooms 108 and 110. This renovation included the addition of the doorway between Rooms 107 and 108 (samples P193, P194, P195, and P202). The trim (P192) on the north side of the doorway has fewer layers than the other doorway samples, and so appears to be somewhat later. However, a burn scar is also present at the first paint layer. This first layer is similar in color to the first layers of the other samples associated with the doorway.

Therefore, the trim could still be contemporary with the rest of the trim, if a fire interfered with some intermediate layers.

The samples (e.g., P199) show that the window sashes in Room 108 was probably replaced at the same time that the baseboards (P191 and P196) in both rooms were replaced, along with the trim around Room 107's doorway into the dwelling (P189). The window trim (P197 and P198) may also have been replaced at this time, although these samples appear to contain an additional early finish. Based on comparisons to other interior paint samples, the relative installation date of the above-mentioned fabric is circa 1950.

Baseboard sample P196 is similar to samples P189 (from the beaded trim around Room 107's north doorway) and P191 (from Room 107's east-wall baseboard), except that P189 reflects white instead of brick red in its second last layer. Door sample P195 is similar to P194 from the trim around Room 108's north doorway. Samples P200 (from Room 107's ceiling molding) and P201 (from that room's ceiling) reflect only the most recent two or three finishes.

Connector at Keeper's Dwelling - Representative Finishes

DATE ↓	P199 Room 108, lower window sash	P190 Room 107, N doorway trim	P196 Room 108, W base-board	P197-98 Room 108, window trim & stool	P192 Room 107, S doorwy trim	P193 Room 107, S door	P195 Room 108, N door	P202 doorway threshold between Rooms 107/108
	wood	wood	wood	wood	wood	wood	wood	wood
1900						gry	gry gry	blu/gry blu/gry
							gry gry	blu/gry

						gry	gry gry	lt gry lt gry
						ow/lt gry	gry	lt gry lt gry
						ow/lt gry	ow ow	ow/lt gry
						ow/lt gry	ow ow	lt gry/blu lt gry/blu
						ow/lt gry	ow/lt gry	
					gry (burnt)	ow/lt gry	dk grn	dk grn
					peach/or	ow/lt gry	dk grn	gry dk grn
				wh gry gry	wh/peach peach	wh wh	peach peach	wh gry gry
					peach peach			
	wh gry	wh gry gry	wh gry	gry gry	gry gry	gry gry gry/grn	gry gry	rd rd
		yel		yel	yel (trace)	gry	gry gry	
		gry gry	gry	gry		gry	gry	rd
		wh wh	ow ow/lt cr	ow	wh		wh	rd
	lt cr lt cr	cr cr	ow ow	lt cr	lt cr			
	wh			ow		wh	wh	
	wh	wh	bk rd	pk/tan	lt grn		tan	rd rd
		wh	wh	wh			wh	

The interior paint samples from the Tower Connector also correlate to the interior samples from the Connector at the Keeper's Dwelling. This is not surprising, since the two structures were once internally connected. The longest stratigraphies of these samples reflect 24 finishes, a number not very different from the finishes found on circa-1900 exterior fabric, and not many fewer than the finishes found on circa-1900 interior fabric in the dwelling. Fabric in the small room just outside the equipment room (Room 110) is older than any fabric found in the Connector at the Keeper's Dwelling, based on sample P216, from the south doorway trim, under newer trim). The trim sample from the east doorway to Room 109 (P214) begins its stratigraphy two finishes later than its counterpart from the south doorway. The trim sample (P203) from the other face of the east doorway reflects a stratigraphy contemporary to sample P214. Therefore, the trim around the east doorway is not as old as that found around the south doorway. Three other samples from Room 110 reflect only the last painted finish of white. These include P211 (from the west wall; the substrate may be plywood), P212 (from the north-wall baseboard), and P217 (from the north wall; substrate may also be plywood). Unless this fabric was originally unpainted, which seems unlikely, these three elements were installed recently, probably during the 1987 renovation.

The samples from Room 110's west-wall baseboard (P213) and the newer piecing of the east doorway trim (P215) show that they were installed during the same circa-1950 alteration that affected the Connector at the Keeper's Dwelling.

It is assumed that the demolition of the Assistant Keeper's Dwelling and its enclosed walkway necessitated some alterations to what is now the entry to the tower (Room 109). This probably occurred circa 1961 when the assistants' dwelling was demolished. The samples from Room 109 suggest that the casing of the west, interior doorway and the concrete step of the east, exterior doorway were installed at the same time, well before 1961. Although the concrete may not have been painted originally, its sample (P208) reflects only one less painted finish at the beginning of its stratigraphy than the west doorway trim sample (P203). Documentation states that a concrete floor was laid in the covered way in 1899 or 1900; paint analysis indicates that this is an extremely plausible date for the casing and the step.

A sample was also removed from the painted baseboard section of the west doorway trim in Room 109 (P205). While it reflected five or six of the most recent finishes, traces of dark green were embedded in its substrate. A dark green paint layer was found at the midpoint of many of the samples from this room and the one adjacent to it. Dark green was also the color of the oldest, first two finishes found in sample P216. Exposure to ultraviolet light did not clarify any major difference in any of these dark green layers, suggesting only that the same pigments and mediums were used at different periods of time. Therefore, it could only be assumed that this sample represents the oldest fabric, and that intermediate layers have worn off. This assumption has some validity, in that another sample (P203) from the same element has layers from one of the earliest represented time periods.

Sample P209, from the concrete-block north wall of Room 109, is very similar to P206, from the brick west wall of that rom. However, it does not reflect any whitewash layers, and instead of displaying three finishes of red at the end of its stratigraphy, it reflects three finishes of white.

Very little paint was found in three other samples from the interior of the entry. Sample P204, taken from the west brick wall north of the doorway and above the baseboard, begins its stratigraphy with the last finish of bright yellow found in other adjacent samples. This is followed by three finishes of white. Samples P207 and P210 were removed from below the sawn-off doorway casing at the north side of the west doorway and from the ceiling, respectively. Each displayed the last three finishes of white-colored paint. Additionally, the ceiling sample reflected a thick white coating adjacent to the substrate and before the last three white finishes. This coating was fibrous, but was assumed to be something other than the substrate. Its composition was not tested and therefore is unknown. It is assumed that these three samples represent fabric that was installed prior to 1987, but not earlier than 1970.

Tower Connector - Representative Finishes

DATE ↓	P216 Room 110, S doorway trim	P214 Room 110, E doorway, old trim under new	P215 Room 110, E doorway trim	P213 Room 110, W wall base-board	P203 Room 109, W doorway trim, above pntd. base-board	P208 Room 109, concrete riser to E doorway	P205 Room 109, W doorwy trim, pntd. base-board	P206 Room 109, W wall N of doorway, pntd. base-board
	wood	wood	wood	wood	wood	concrete	wood	brick
	grn dk grn							
	dk grn dk grn							
	pk				pk			
1900?	wh lt gry dk gry	wh blu/gry blu/gry			dk gry	dk gry		
	ow/lt gry	gry			lt gry	lt gry		

	gry gry	wh wh			lt gry	gry		
	gry gry	gry gry				blu/gry blu/gry		whwash
	lt gry lt gry	gry gry			gry gry	dk gry		whwash
	lt blu	lt blu lt blu			lt blu/gry lt blu/gry	rd		whwash
	lt gry	gry			dk gry	brt yel		whwash
	dk grn	dk grn			dk grn	brt yel	dk grn (trace)	whwash
		dk grn				rd		whwash
	peach peach	peach			peach	brt yel		yel yel
	peach or	wh			wh peach	brt yel		yel yel
	gry gry	gry gry gry	wh gry	gry gry gry	wh gry	rd	gry	
	wh wh		yel	wh wh	yel	brt yel		brt yel
	wh	wh	gry	wh wh	wh		wh	bk rd
	ow/lt cr	ow/lt cr	wh wh	wh ow/lt cr	wh		wh	bk rd
	ow/lt cr	ow/lt cr	lt cr	ow/lt cr	lt cr	blk	cr	wh
	wh wh	ow ow			wh		wh	
	tan	tan	tan	bk rd		rd	bk rd	bk rd
	wh	wh wh	wh	ow		rd	bk rd	bk rd
	wh	wh	wh	wh		rd	bk rd	bk rd

Several correlations can be made to additional samples removed from the equipment room (Room 111). Sample P221, removed from the casing of the equipment room's north doorway, is contemporary to sample P216 from the other side of the doorway. Both of these samples represent the oldest consistently painted interior wooden fabric found in the dwelling or connecting structures. Samples P218 and P219, which are similar to each other, were removed from the same doorway in

the oldest consistently painted interior wooden fabric found in the dwelling or connecting structures. Samples P218 and P219, which are similar to each other, were removed from the same doorway in the equipment room, but represent fabric applied over earlier trim. Both of these samples appear to correlate to samples P193, P195, P202, P214, and P208. Since P208 is believed to represent circa-1900 fabric, samples that correlate to it would represent fabric that was installed at the same time. Therefore, the only sampled fabric in the three rooms of the Tower Connector that predates 1900 is the trim around both sides of the doorway at the north end of the equipment room. The paint on this trim (P216 and P221) predates the 1900 renovations by two painted finishes. It is not possible to assign dates to any of the pre-1900 painted finishes at this time.

The brick walls and ceiling of the hallway from the equipment room to the Tower are original to the 1857 construction period. Ceiling sample P230 may display finishes dating to the 1857 original construction, since the earliest layers appear to be whitewashes. However, due to the characteristic of whitewash and the fact that it easily fractures from its substrate, the number of original layers cannot be calculated with any certainty. The wall sample (P231) shows that it lost the majority of its middle painted layers. Its first layer of white may be a whitewash, as one would expect, but acid testing would react to the lime in its substrate and contaminate any reaction to the coating. Therefore, its composition could not be ascertained.

The metal doorway that separates the equipment room from the Tower is cast iron, and has the date 1840 cast into its surface. Documentation shows that a major renovation occurred to the 1833 lighthouse in 1840; this door undoubtedly dates to that renovation, being reused during the 1857 reconstruction. The reddish color found at the beginning of the stratigraphy of the sample from the door's frame (P229) may be rust encrustation, suggesting that the cast-iron elements related to the door remained unpainted until the beginning of the 20th century, and then was painted during the 1900 renovation. The two samples removed from the door (P227 and P228) seem to confirm this, except their stratigraphies begin much later in the sequence. Since the both samples are very similar, but removed from two separate locations on the door, one could assume that the door was removed from its hinges, stripped and cleaned of any rust, painted dark red, and rehung, all probably during the 1930's. Sample P227 is exactly the same as P228, represented here, except that its detail was highlighted in black during the last two painting campaigns.

Equipment Room - Representative Finishes

DATE ↓	P221 Room 111, N doorway casing, old molding	P218 Room 111, N doorway, W jamb	P220 Room 111, N doorway, attached trim piece	P230 Tower hall, brick ceiling	P231 Tower hall, brick wall	P229 Door to Tower, metal frame	P228 Door to Tower, painted grommet
	wood	wood	wood	brick	brick	metal	metal
				whwash			
				whwash			

				whwash	wh		
				lt gry/gry	gry gry		
				lt grn	lt grn lt grn		
	grn grn			lt gry lt gry	gry	rusty red?	
	grn			gry		rusty red?	
1900		wh				orange (red lead)	
	charcoal gry charcoal gry	charcoal gry charcoal gry		charcoal gry charcoal gry		dk gry dk gry	
	ow/lt gry ow/lt gry	ow/lt gry ow/lt gry		dk gry dk gry		gry lt gry/ow	
	ow/lt gry	ow/lt gry ow/lt gry		lt gry		lt grn	
	gry	ow/lt gry		wh wh		lt gry	
		lt gry lt gry		ow ow		dk rd	
	ow/lt gry ow/lt gry	lt gry lt gry		ow ow		wh rd	
	gry	gry gry		lt tan		dk rd	dk rd
	lt gry/blu	lt blu/gry	lt gry/blu	lt blu		gry	lt blu
						gry	
	lt or	peach	lt or			lt or	lt or
	or	or	or	wh		wh or	or
	gry gry	gry gry	gry gry			gry gry	blu/gry
	gry gry	gry gry	gry			dk gry	

	wh	wh	ow/lt cr	wh		gry gry	
	wh	lt cr	lt cr	wh		gry	
	ow	lt cr				wh	
	ow/lt cr	lt cr	lt cr	wh		gry	gry
	wh	wh wh	wh wh		wh	gry	gry blk
	wh wh	wh	wh	wh	wh	gry	gry blk

Interior Finishes - Tower

Unfortunately, the interior paint samples from the Tower do not directly correlate to those from the connecting structures, except in the last four or five finishes. The same correlation was found in the interior samples removed from the dwelling. At least 30 finishes were found in two of the tower's interior samples: P262, from the Watch Deck's brick wall between the circa-1901 vertical boarding and the doorway to the Watch Gallery; and P263, from the interior metal door jamb of the Watch Deck doorway. The two samples display the longest stratigraphies of any samples studied and reflect the same finishes, except that the jamb sample displays a layer of red lead next to the substrate. It is often difficult to differentiate between **all** finishes unless dirt layers are consistently prominent. These dirt layers were not prevalent in the tower's interior samples. Therefore, there may be more than the 30 finishes represented in the chart below in these two paint samples. Indeed, both samples may retain paint finishes dating to the 1857 construction period.

Since little documentation was found pertaining to alterations specific to the Watch Deck, it is difficult to assign dates to the fabric represented by paint samples. Clearly, samples P254, P255, P257, and P261 prove that the elements from which they came were installed later than those represented by P262 and P263. However, it is not known if they were installed circa 1900 or at some other time. Samples representing the vertical boarding might have been a helpful dating tool, except that the vertical boarding and the majority of wood trim at the Watch Deck level (P249, P250, P251, P258, and P264) was initially varnished, a finish that remained for an indeterminate number of years.

Other hopeful dating tools were the samples from the Lantern Deck floor (P267 and P268), which was documented as being covered by a steel plate when the Fresnel lens was removed and a new beacon was installed in 1946. Paint samples seem to refute the floor's installation, since approximately 24 painted finishes are evident in the sample (P267) representing the inner flooring section (which is more congruous with a circa-1900 installation). According to the documentation,

it seems that at least the inner floor section would have required a new covering in 1946, since it is this space that the lens would have occupied. Only 16 finishes are evident in the other sample from the outer section of deck (P268), which could date to 1946, based on an average of repainting every three years. The sample removed from the quarter-round molding strip that runs around the perimeter of the floor (P269) reflected a very similar stratigraphy to the sample from the outer flooring, and is contemporary to the same period. Initial physical investigation of the elements did not provide any clarification of this conundrum.

Two other samples may correlate to samples P257 and P267, although they reflect far fewer finishes. Sample P256 was removed from the railing around the stair opening in the Watch Deck floor. While all of its paint layers are red—except for the second to last one, which is a bright yellow—it only has a total of 13 paint layers, an average of 10 less than samples P257 and P267. Ultraviolet excitation of layers was somewhat inconclusive, but it is possible that several layers of paint fractured off, and the first paint application to this element is contemporary to samples P257 and P267.

What ultraviolet light exposure did prove, is that sample P256 correlates directly to sample P243, which was removed from the stringer of the stairway from the Half Deck to the Weight Deck. Their initial layers of red are the same, while sample P243 reflects three last finishes of black.

It is interesting to note that, in general, the samples reflecting the most paint layers were removed from the upper two decks. In addition, the replacement of the staircase below the Weight Deck in 1903 is documented, but paint samples removed from its components are not consistent to one another, making comparative analysis most difficult.

Interior of Tower - Representative Finishes

P262 Watch Deck, exposed wall @ doorway to Gallery	P261 Watch Deck, exterior door to Gallery (interior side)	P257 Watch Deck, threshold, doorway to Gallery	P267 Lantern Deck, floor of inner deck	P254 outer floor; P255 inner floor, Watch Deck	P268 Lantern Deck, outer deck	P250 Watch Deck, vert. board, above painted dado	P249 Watch Deck, vert. board, painted dado
brick	wood	wood	metal	metal	metal	wood	wood
wash?							
tan/gld							
cr/gld							
wh cr/gld							

ow ow	wh	ow dk rd dk rd	yel yel	rd		varnish (cor- loca-	varnish rect tion?)
wh wh	lt cr	rd/brn					
lt cr lt cr	lt cr	dk rd	dk rd dk rd	dk rd dk rd			
lt cr (frac.)	lt cr	rd/brn	wh rd/brn	rd/brn rd/brn			
lt cr	wh	rd/or	rd	rd			
lt cr lt cr	wh	rd/or	rd	rd			
lt cr lt cr	wh wh	rd/or	rd	rd			
lt cr lt cr	lt cr		rd	rd			
lt cr lt cr	ow ow	rd/or	rd	rd			
lt cr lt cr	ow ow	rd/or rd/or	rd rd	rd	rd rd		
lt cr lt cr	lt cr		rd				
lt cr lt cr	wh	rd	rd	dk rd	rd		
lt cr lt cr	wh wh	rd	rd	dk rd	rd		
lt cr	wh fract.	rd	rd rd	rd	rd rd		
lt cr lt cr	wh	rd	rd	rd			
lt cr lt cr		rd	rd	rd	rd		
lt cr lt cr	wh	rd	rd	rd	rd		
lt cr lt cr	wh wh	rd	rd	rd	rd		
wh wh		rd	rd	rd	rd		
wh	wh	rd			or or		

wh wh		rd	rd	rd	rd		
lt cr lt cr	wh	rd	rd		rd	wh	grn/gry
lt cr	wh	rd	rd	rd	rd		
lt cr	wh	rd	gry	rd	gry	wh	blk
wh wh	wh wh	rd	rd	rd	rd	wh wh	blk
wh wh	wh	rd	rd		rd rd		

The samples removed from the underside of the Lantern Deck (or the ceiling of the Watch Deck) fit into a more expected relative pattern based on documentary evidence. Here the sample from the center of the ceiling (P253) has fewer paint layers than the sample from the edge ring of the ceiling (P252). If the center section represents the same steel plate that was installed in 1946, then the ceiling was painted less frequently than the majority of other fabric. The same is true of the fabric represented by sample P252, which is believed to be either original or installed in 1901. However, the evidence is inconclusive, since it is unknown whether the fabric remained unpainted after its installation.

The paint samples from the Watch Deck's middle metal door in the doorway to the Watch Gallery suggest that it missed many painting campaigns. Sample P259 from the interior side is represented below; sample P260 from its exterior side is very similar to its counterpart, except it is missing the first layer of orange (red lead) and one layer of the last sequence of whites. Since this door was sandwiched between two other doors, it may have been forgotten when interior and exterior painting occurred.

A second sample (P266) removed from a lower aluminum panel of the Lantern displayed only two layers of white paint, unlike the five layers (four of white and one of yellow/green) reflected in sample P272 (shown here). This difference suggests that perhaps some paint delaminated from fabric is represented by P266. Regardless of the discrepancy, a circa-1970 photograph shows that the bottom row of Lantern glass was not replaced until after that date.

Documentation shows that the Lantern lining was replaced in 1906. It may have been replaced again, and it may not have been painted when it was originally installed. Whichever the case, the first paint finish in the stratigraphy represented by sample P273 does not appear to date to 1906.

Miscellaneous Tower Finishes

D A T E ↓	P252 Watch Deck, outer metal ceiling ring	P253 Watch Deck, inner metal ceiling plate	P259 Watch Deck, middle door to Gallery, interior side	P273 Lantern Deck, ceiling	P271 Lantern Deck, lower mullion	P270 Lantern Deck, grid	P272 Lantern Deck, lower aluminum panel
	metal	metal	metal	metal	metal	metal	metal
	ow grn		or? wh?				
	grn grn						
	grn grn					whwash?	
	lt cr lt cr			or wh wh		whwash?	
1946 ?	lt cr lt cr	yel/gld	or wh wh	wh wh		whwash?	
	lt cr	yel		wh	rd/brn	rd	yel/grn
	wh wh	wh wh		wh wh	wh (thick)		wh wh
	wh	lt cr	wh	wh	wh		
	wh			wh	wh wh	wh	
	wh wh	wh wh		wh wh	wh wh	wh	wh
	wh	wh		wh	wh	wh	wh

Many paint samples from the interior of the tower indicate that fabric may have been left unpainted for years prior to its first pigmented coating. Without specific documentation of painting campaigns employing a certain color, or the date of an installation of a certain painted object, no dates can be assigned to the first painted finish of these details. For example, the circular iron staircase was installed between the ground level and Half Deck in 1903. Many of its elements reflect only three to six paint layers, beginning with a very bright blue-color reminiscent of the 1970's, rather than the early 1900's. These samples include:

P235 Underside of 9th tread from ground level
P236 Backside of 8th tread from ground level

P239 First landing, floor
P240 Second landing, floor
P241 Floor of Half Deck

Other samples beginning with the bright blue color include:

P234 Iron frame of iron door from ground floor to equipment room
P245 Stair between Weight Deck and Watch Deck
P247 Weight Deck ceiling beam

One sample (P237) was taken from the circular staircase stringer approximately 5 feet from the ground-story level. It reflected one layer of red paint between the substrate and the bright blue color. Another sample (P238), removed from a baluster at the circular staircase's first landing, reflects its fourth layer as the bright blue color. Its three previous layers include a red/brown adjacent to the substrate, followed by two red-colored layers. These two samples indicate that at some time, prior to the application of the blue paint and while the remainder of the staircase was left unpainted, the baluster and stringer were highlighted with red paint. Clearly, these samples—and others from which the blue paint is absent—show that the bright blue application was confined to the lower staircase and Weight Deck.

Samples P232 and P233 were removed from the Tower's concrete floor at ground level and from the metal plate in the center of the floor, respectively. Both samples reflect three layers of red paint. Since the concrete is not original and may have remained unpainted after its installation, no correlation can be drawn to date either the concrete or metal plate installation.

Five other samples reflect a minimal number of paint layers, which does not necessarily date their representative fabric to a more recent time frame. These include samples P242, P248, P246, P265, and P244. Sample P242 was removed from a baluster under the Half-Deck rail; sample P248 was removed from a tread on the run of stair between the Weight and Watch Decks. Both reflected only four paint layers, beginning with a red-colored layer, but followed by reciprocating red and black layers. In sample P246, removed from the Weight Deck rail supported by round balusters, only three paint layers were evident: a brick red-colored layer next to the substrate, followed by two black layers. The same is true for sample P265, removed from the pole riser support of the steps leading from the Watch Deck to the Lantern Deck: a gray/green colored paint is adjacent to the substrate, followed by two layers of black paint. This gray/green is the same color that was used to first cover the varnish finish found on the walls of the Watch Deck. Sample P244, removed from the stair railing between the Half Deck and Weight Deck, reflected only two layers of black paint.

APPENDIX C.

MORTAR ANALYSIS

METHODOLOGY

Six mortar samples were removed from various locations at Highland Light Station using a hammer and small masonry chisels. They were collected in plastic zip-loc specimen bags, labelled, and assigned identification numbers ranging from CACO HL M01 through CACO HL M06. Each sample location was noted on the respective sample bag in indelible ink. The samples were returned to the Building Conservation Branch's laboratory for analysis.

In the laboratory, each sample was visually examined for similar characteristics and then ground to a powder using a mortar and pestle, with care not to crush any aggregate. Individual samples were placed in beakers that had their weights recorded (and were labeled with corresponding sample numbers) and were weighed again. Small quantities of dilute hydrochloric acid (HCl) were added to individual crushed samples. (Hydrochloric acid [HCl] reacts with the lime in lime mortars, plasters, and cements.) Once this reaction ceased, the liquid in the beaker was poured into a labelled filter paper that had been weighed (and its weight recorded) and folded into a glass funnel. The funnel was fitted into a rubber stopper that was held upright by the stopper and fitted into an Erlenmeyer flask. The filtered liquid or filtrate was collected in the flask and its color noted. The remaining sand in each beaker was gently rinsed with fresh water and swirled to levigate the finer particles. Again the liquid was poured into the filter paper which collected the fines, leaving only sand or aggregate in the beaker. The beaker and drained filter paper were set under heat lamps to dry. Both the beaker containing the dried aggregate and the filter paper holding the dried fines were weighed. The fines were color matched to the Munsell Color Notation System. The aggregate and fines were then collected in separate test tubes that were labeled with the corresponding sample number. The tubes were capped with a lid and the samples were set aside for comparative analysis.

Samples M02 and M03 proved to contain a high fines content, indicative of the addition of clay. Their sand components appeared to retain uncrushed remnants clay after their first exposure to analysis. Based on the locations from which they were removed, the cistern, it was surmised that hydraulic clay was a component of their matrix: its presence required regrinding of "aggregate" and an additional exposure to dilute hydrochloric acid (HCl).

All of the calculations pertaining to sample, aggregate, and fines' weights were made from the initial records. The weight of the soluble material was determined by adding the weight of the aggregate and fines and subtracting the total from the sample weight. Percentages by weight of aggregate, fines, and soluble material were then calculated. These figures, notes from the initial visual examination, the filtrate colors, the fines' colors, and test tubes of resultant fines and sand were all used to make comparisons among samples. These comparisons helped to establish like groups based on similarities, and when incorporated with the documentary research, provided the basis for deductive conclusions.

ANALYSIS

Sample No.	Location	% by Weight (A.S. = acid solubles)	Fines and Sand
CACO HL M01	Keeper's Dwlg. Basement int., W. wall	Fines: 6.89% Sand: 67.80% A.S.: 25.30%	Fines: 10YR6/2 Type "A" Sand
CACO HL M02	Keeper's Dwlg. Basement int., cistern, S. interior wall (post-original)	Fines: 27.69% Sand: 44.19% A.S.: 28.12%	Fines: 10YR7/2 Type "A" Sand
CACO HL M03	Keeper's Dwlg. Basement int., cistern, original sect. of S. wall	Fines: 24.97% Sand: 40.17% A.S.: 34.86%	Fines: 10YR7/2 Type "A" Sand
CACO HL M04	Tower exterior ground level, S.W. glass block window opening, cement parging on sill	Fines: 6.90% Sand: 74.36% A.S.: 18.73%	Fines: 10YR7/1 Type "B" Sand
CACO HL M05	Tower interior first floor level	Fines: 17.29% Sand: 37.61% A.S.: 45.10%	Fines: 10YR6/2 Type "A" Sand
CACO HL M06	Tower interior weight deck level, window opening, bottom parging layer of two	Fines: 16.76% Sand: 31.90% A.S.: 51.34%	Fines: 10YR8/1 Type "A" Sand

Samples M01, M02, M03, and M05 share the same sand source, labelled as Type "A" for this study. This sand is a beach sand, off-white to light tan in color, interspersed with black and orange particles. It is composed of small to medium-sized granules, some of which are quartz.

Unfortunately, sample M01 was removed from a damp basement wall (a condition that often causes lime to leach from a mortar) and sample M05 was too small to provide an accurate representation of its components. However, several assumptions can be drawn due to similarities in these four samples and the locations from which they were removed. All four *appear* to represent original mortars dating to 1856 and 1857. The mortars used in the foundation of the Keeper's Dwelling and the Tower may have been similar lime mortars, due to their softness and similar fines' colors. Hydraulic clay was added to the mortar used to construct the cistern in the basement of the dwelling, but use of the same sand as in the other two mortars suggests that the cistern was constructed at the same time as the dwelling's foundation. The similarities between samples M02 and M03 also suggest that they were constructed at the same time, but physical evidence shows that the interior cistern wall was added later. All of this combined information does not lead one to draw any specific conclusions, but generally it seems that all four samples represent **early** mortar installations, three of which may be original (1856-57).

Sample P04 reflects components of a portland cement parging, due to its hardness, fines' color, and low percentages of fines and acid-solubles. History of cement technology provides that the widespread use of domestic portland cement occured after 1900. Historic photographs show that this window sill addition of cement parging did not take place until after a 1959 photograph had been snapped. Therefore, sample M04 represents a portland cement installed after 1959. By this time, a different sand source was used. The sand found in this sample, labelled Type "B" for this study, is similar to Type "A" sand, except it also contains large and extra large-sized particles in white, off-white, gray, and black colors.

Sample P06 represents either a natural (hydraulic) cement or a portland cement parging, due to its hardness. Its sand component is the same type as was found in the earliest samples, meaning only that the same sand source was used. Due to the location under later parging, from which it was removed, and its higher percentages of fines and acid-solubles, one might assume that it was a natural cement rather than a portland cement. Use of domestic natural cement was prevalent from circa 1820 to circa 1900, but most often was used for conditions requiring hydraulic properties, such as bridge abutments or river and ocean fortifications. However, this use was not exclusive. Due to the differences in its sand, fines, and weight percentages, it is definitely not similar to sample M04 and therefore represents a different installation period. Its differences from the other samples also exclude it from a category of original installation.

APPENDIX D.

MOLDING PROFILES

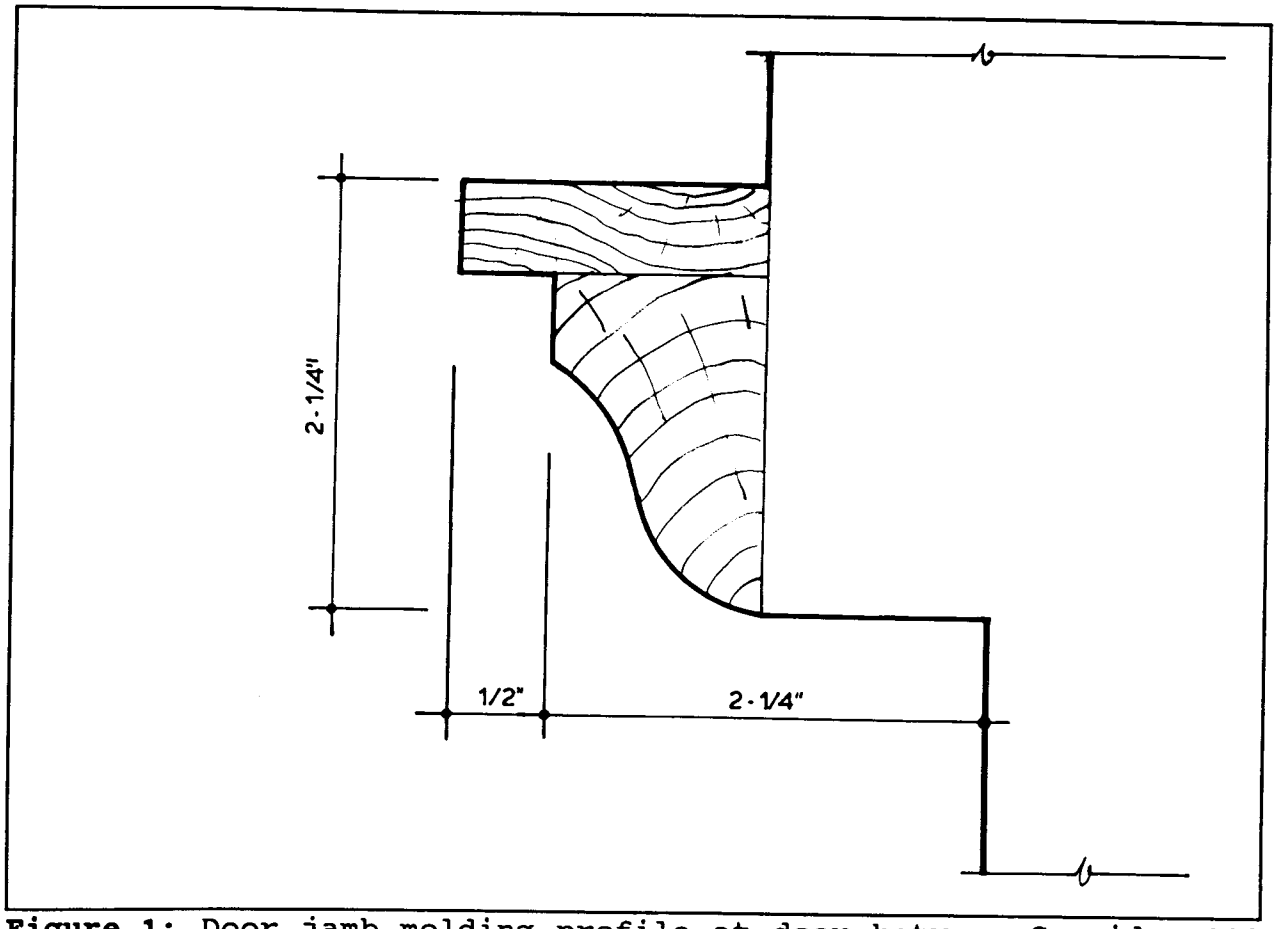


Figure 1: Door jamb molding profile at door between Corridor 110 and Equipment Room 111, Tower Connector. Full size.

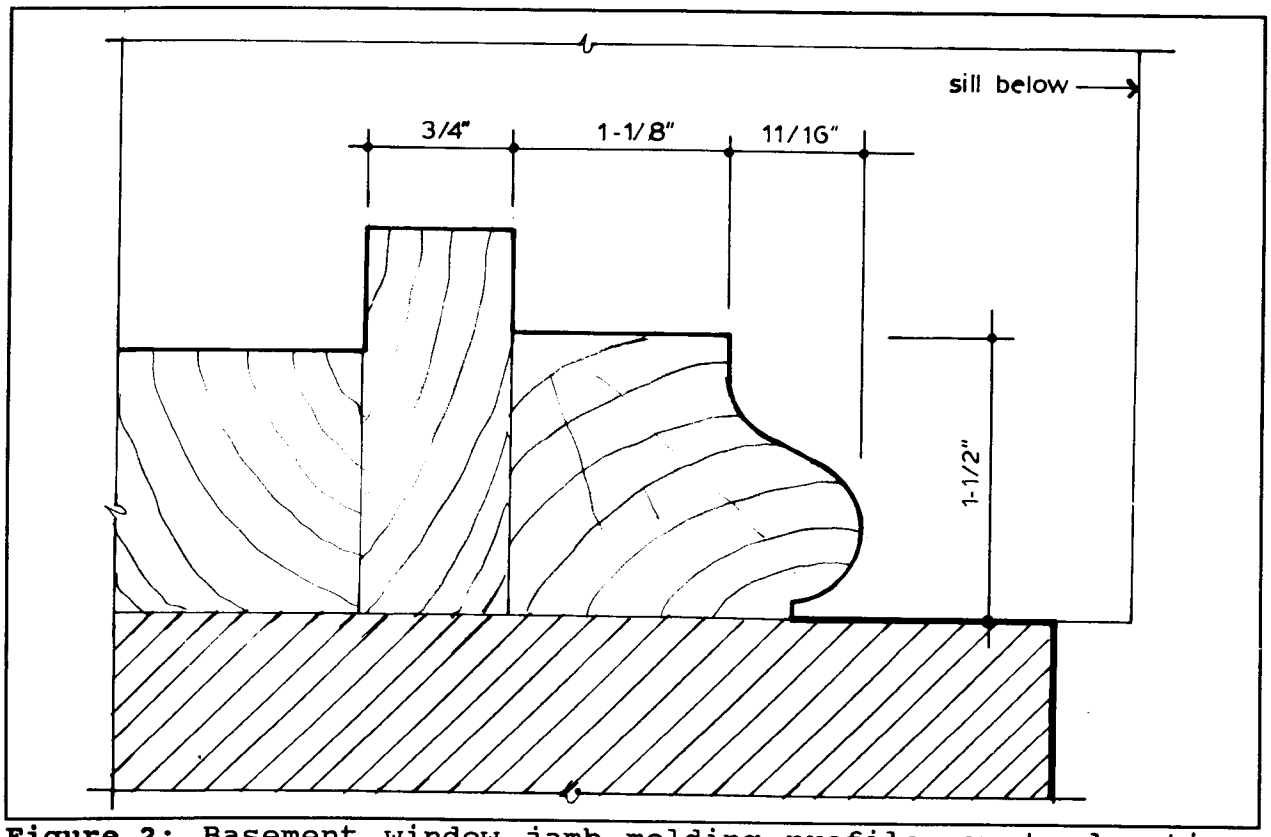


Figure 2: Basement window jamb molding profile, west elevation, north north side, Keeper's Dwelling. Full size.

APPENDIX E.

CONTRACT FOR 1797 CAPE COD LIGHTHOUSE

Between the United States of America
(Agent - Benjamin Lincoln, Collector)
and Theodore Lincoln, Esq.

(National Archives, RG 217, Records of the Accounting Officers
of the Department of the Treasury.
Civil Contracts for Lighthouse Service
June 4, 1800 - March 17, 1903,
Maine to Massachusetts, Box 003, Entry 153.)

(A)

An Estimate of the value of the materials on the spot and labour to erect a light House, other public buildings at the Clay ponds on Cape Cod February 28th 1797

224	Tons of Stone @ $3.50	$ 784	
	laying Ditto & other Masons work	120	904
46	Tons of Timber	276	
40,000	Shingles	160	
30,000	boards & plank	360	
	Carpenters work	1000	
10	Spars for raising the light House & for Scaffolding	50	
	Expence of rigging & men to raise the light House	100	1946
10	Hogsheads lime	65	
7000	Bricks	70	
120	feet of Hewed Stone for under pinning the light House	100	
	Labourers to attend the Masons, for digging the Cellar, & well sinking the foundation of the light House & vault	100	
	white oak planks for the top of the light House	25	
	Painting all the Buildings	300	660
	Copper covering & putting on the Copper on the top	200	
	Lantern Lamps and Stove complete	2000	
	Nails, Glass, putty, setting, &c	90	
22	pair Hinges, locks, bolts latches & fastenings for the doors & windows, Saths, Iron for the Chimnies &c	60	
	the expences of an over seer of the work the stuff &c	200	
7	Cedar Cisterns 70 Iron rods 50	120	2,670
	Articles not enumerated & a Commission for doing the business		6,180

Approved March 25th 1797

Signed John Adams

Articles of Agreement made & concluded at Boston in the State of Massachusetts this second day of March seventeen hundred & ninety seven between the United States of America by their Agent Benjamin Lincoln Collector of the District of Boston & Charleston on the first part & Theodore Lincoln Esquire on the second part witnesseth: That the party of the second part hereby contracts & agrees with the party of the first, that he will truly and faithfully build a Light House on Cape Cod near the clay ponds on the land purchased by the United states of Isaiah Small in such part of said land as the United states shall point out. That the form of the House shall be an Octagon. The foundation shall be of stone sunk five feet below the surface of the Earth, and shall be commenced twenty six feet in the smallest diameter being that perpendicular to the sides. — The foundation Wall shall be three feet thick. The Octagon pyramid shall be of wood, good Oak or white Pine without sap and be twenty five feet in the outside Diameter at the base thereof. The heighth of this wooden building from the top of the stone work or foundation shall be forty five feet, to the top of the floor of the Lantern, where the floor is to be twelve feet. The foundation shall be capped with hewn stones of at the least fourteen inches from the inner to the outer edge and sloped as far as eleven inches at the top to turn off the water. —

The frame of the Pyramid shall be covered with Pine boards of one inch in thickness feather edged over which shall be laid a compleat covering of Shingles made of Cedar or White pine without sap, to be laid out in proportion as six inches is to eighteen, and to be well painted with three Coats of paint. —

The Light House shall have two windows in the East and three in the west, each sash to have twelve panes of glass six by eight & hung with good Iron hinges. —

On the top of the wooden work of the Pyramid shall be a strong framed tier of timber bedded thereon and projecting one foot with suitable ~~jett~~ joists, the timber shall be twelve inches by seven in the centre and reduced to seven inches square at the extremities so as to give a proper descent from the centre to throw off the water. The whole shall be covered in the first place with good two inch white Oak planks and over laid with stout sheet copper and the eaves finished with a Cornish. A compleat and sufficient Lantern of six feet Diameter perpendicular to the sides in the clear and in the octagonal form, shall rest thereon, which shall be secured by eight Iron braces from the wooden frame round the Eaves of the House to the Eaves of the Lantern. —

The eight corner pieces or stanchions of the Lantern shall be well secured to the posts of the pyramid or to the tier of joists or both. — These stanchions should be very stout and strong in the part below the floor & should be two & an half inches square above. The lantern shall be eight feet high from the floor to the bottom of the dome or roof. The dome or roof shall be three feet in heighth; the whole space between the Posts to be occupied by the Sashes which are to be inlaid on the inside & struck solid, Each division or eighth of the Lantern shall contain twenty one squares of glass. A part of the Sash on the south west side is to be hung with good

Iron

Iron hinges for a door to lead out on the plat form. There shall be an Iron railing formed by the eight Iron braces of the lantern (three in each set) running from brace to brace all around the Gallery. The Rails shall be one inch square. The Iron rafters of the Lantern are to be framed into an Iron hoop, over which shall be a copper funnel thro' which the smoke may pass into a large copper ventilator secured from the rain by a copper covering nearly in the form of an Umbrella. Eight dormant ventilators shall be fixed in the roof. — A large curved air pipe shall be passed thro the floor, & a close stove shall be fixed in the Lantern. — There shall be five pair of stairs with a handsome rail to ascend to the Lantern, the entrance to which shall be by a trap door completely covered with copper, as also the groove into which it shall shut. — The light House shall be furnished with two complete electrical conductors or Rods with points. — The floors are to be laid with planks. The entrance into the lighthouse shall be well secured by a strong door hung upon Iron hinges with a strong lock & latch complete. The sills and principal timbers in the floor of the Light House shall be twelve inches square, also the foots of the Posts when worked and ten inches at the top. The Girts shall be as square as the posts at the different stories, where they enter the Posts and the whole shall be sufficiently braced with scantling four by five inches. — The second part further contracts with the first part, to build also, a framed dwelling house twenty five by twenty seven feet, one story and the roof. The Walls shall be boarded on the studs with inch pine boards feather edged, and a covering of good clap boards or shingles thereon, Cedar or Pine without Sap. — The boards on the roof are to be jointed and halved & covered with like good shingles. There shall be under the Easterly side of the House a good Cellar twenty five feet long & twelve feet wide in the clear. The wall thereof shall be eighteen inches thick, & seven feet high or deep. —

The house shall be seven feet & one half stud in the clear the roof to have a right angular pitch the floors to be double above and below, the upper one to be laid in whole lengths and nailed strong. The House shall be divided into different rooms, closets and passage ways into it, as represented in the annexed plan. The place and form of the chimnies & oven shall be made conformable thereto as well as in placing the doors & windows of the large rooms and one in each of the Bed rooms of twenty four squares twelve in each sash of glass six by eight and one window at each end of the garret of twelve squares of like glass both hung on good Iron hinges. Each window is to have a strong plain outside shutter with fastening & hinges. The Doors are to be hung and finished completely. The ceiling and inner sides of the House are to be plastered with good lime mortar, and in like mortar the bricks of the chimney shall be laid. All the wooden work inside and out shall be well painted and the whole shall be finished in a plain and decent manner with seasoned stuff. —

The party of the second part further contracts with the party of the first, to find and stone up an oil vault, sixteen feet by twelve feet in the clear Arched over and covered with earth or sand, over which a shed shall be built, and that it shall be furnished with seven strong Cedar Cisterns with covers capable of containing two hundred gallons each. The entrance to

the

the Door shall be secured by a strong door. A well shall be sunk near the House and properly stoned up & furnished with a curb, Bucket, Windlass & rope complete. Also a small framed Barn shall be built near to the Dwelling House of fifteen feet square and ten feet studd. The Barn shall be well boarded on the walls and roof, & the roof to be well shingled with shingles of the quality provided for the other buildings, — And the said Theodore Lincoln further contracts with the party of the first part, that he will procure and pay for all materials, labor, workmanship, Provisions and other objects of charge or expence for the sum of six thousand five hundred Dollars to be paid to him, and will execute the before directed work and every part thereof in a good and workman like manner on or before the fifteenth day of November next. —

The United States by their Agent aforesaid contract & agree to pay to the said Theodore Lincoln for his performance of the above stipulations on his part the sum of six thousand five hundred Dollars in three different equal payments, one third in hand, one third on the first of June next and the remainder when the Business shall be completed. —

APPENDIX F.

CONTRACT FOR ALTERATIONS TO LIGHTHOUSE, 1812

Between Henry A.S. Dearborn, Deputy Collector and Winslow Lewis

(National Archives, Waltham Branch, RG 26,
Letters Received by Boston Collector,
Contract in Lighthouse Letters, Microfilm Reel 94/4)

Articles of Agreement entered into this seventeenth day of June, Anno Domini, Eighteen hundred and twelve, between Henry A. S. Dearborn, Deputy Collector for the district of Boston & Charlestown, in behalf of the United States, on the one part and Winslow Lewis, of Boston, in the County of Suffolk, in the Commonwealth of Massachusetts, Gentleman, on the other part, Witnesseth that the said Winslow Lewis on his part, hereby agrees & engages to take

the

the Light House on Cape Cod, as it now stands, to make the following alterations, to wit: to cut off seventeen feet from the top of said Light House, and put on it thereafter a deck made of timber, sufficiently strong to support a new Lantern, and to be covered with three inch plank, and then sheathed with Copper, said deck to rise six inches in the centre, and project eight inches from the side of the building. — to make and put on to the deck of said Light House, a new Lantern of the following dimensions & materials, viz: The Lantern to be of an octagon form, ten feet high from the deck to the eaves; in each side of the lantern eighteen sashes, fourteen inches square, the sashes to come within two feet of the deck; and the remainder of the lantern to the deck to be covered with Copper: the posts of the lantern to be two inches square at top, & two & a half inches at bottom of the lantern: the posts to be run down six feet below the deck, and fasten to a timber twelve inches square framed into the building for that purpose: a door two feet wide and four feet high in one of the sides of the lantern, made with an iron frame & covered with Copper: the roof or the dome of the lantern to project from the side six inches, to be framed with sixteen iron rafters to meet in the centre in an iron hoop, eight inches wide, to be covered with heavy Copper. On the top of the Roof or dome there must be a Copper globe as a Ventilator, two feet six inches in diameter, with a Vane of iron or Copper on the globe, sufficiently large to turn it; the lantern to be glazed with the best double glass of the Boston Glass House manufacture. An iron Railing on the outside of the lantern on the outer edge of the deck four feet high, the supporting posts of which to be ten feet high, the top of which are to be bolted to the top hoop of the lantern, each post to be one & a quarter of an inch square. The new woodwork of the building on the outside to be covered with two good Coats of paint, and the whole of the Lantern & iron railing to be painted inside and out three over. All the aforesaid alterations & work to be made & finished in a workmanlike manner in and before the first day of July next, for the consideration of the sum of two thousand dollars. And the said Henry A. S. Dearborn, in

[illegible] the said Lewis engages on his part to pay the said Winslow Lewis the aforesaid sum of two thousand dollars, in the manner following, to wit: One thousand dollars when the Contract with Winslow Lewis for the faithful performance thereof have been signed by said Lewis, and the other One thousand dollars when the said Lewis shall have completed said alterations in conformity with the foregoing Agreement. Provided that no Member of Congress shall be concerned or interested in this Contract.

In Witness whereof the parties have hereunto interchangeably set their hands & seal the day & date above mentioned.

Signed & sealed in presence of
Wm Rowson
Andw Hamer

(Signed)

Winslow Lewis (Seal)
H. A. S. Dearborn (Seal)
Collector

This may Certify that by order of the Superintendent of Light Houses for Massachusetts I have examined the Light House on Cape Cod fitted up by Winslow Lewis on his new plan and find it executed agreeable to Contract and in a workmanlike manner.

(Signed) John Foster Williams

APPENDIX G.

CONTRACT FOR THE CONSTRUCTION OF THE SECOND CAPE COD LIGHT, 1831

Between David Henshaw, Collector, in behalf of the United States of America and Winslow Lewis

(National Archives, RG 26, Lighthouse Contracts, Contract Book E, p. 259-62)

July 22 1831.
Winslow Lewis
Contract Light &c.
Cape Cod — J 4023.

Recorded in Contract book
E. page 259. 260 261. 262

Cape Cod

REPRODUCED AT THE NATIONAL ARCHIVES

Light-House upon Cape Cod

Articles of Agreement entered into this Twenty Second day of July in the year of our Lord One thousand eight hundred and thirty one between David Hinsdale Collector for the District of Boston and Charlestown, in behalf of the United States of America, on the one part, and Winslow Lewis of Boston in the Commonwealth of Massachusetts, on the other part, Witnesseth: that the said Winslow Lewis on his part agrees & engages to build a Light House and Dwelling House at Truro, Cape Cod, of the following dimensions, dimensions and description, viz. The Tower of the Light house to be of hard brick, of form round. The foundation to be sunk as deep as necessary to make the whole fabric secure, to be laid in good lime mortar. The height of the tower to be thirty feet from the surface of the ground. The diameter of the base to be twenty two feet, and the top twelve feet. Thickness of the walls at the Base to be three and a half feet, to be uniformly graduated to two feet at the top. The top to be arched, on which is to be laid a block of soap stone, fourteen feet in diameter, four inches thick, the joints filled in with lead, one side of which to be a scuttle, twenty-four by twenty inches, to enter the lantern; the scuttle-door an iron frame covered with Copper. The outside wall is to be white-washed twice over. There are to be three windows in the tower, of twelve lights each, of ten by eight glass, strong frames and a door five feet by three feet, made of double inch boards, cross nailed, with substantial hinges, lock and latch. The sill, posts and cap of the door to be of stone. The ground floor to be paved with brick or stone. A sufficient number of circular stairs to lead from the ground floor to within six feet of the lantern, connected by a centre [illegible] entrance of the scuttle to be an iron ladder, with steps two and a half inches wide. On the top of the tower, to be an iron lantern of an octagon form, the posts to be two inches square, to run down five feet into the brick work, and secured with anchors. The height and diameter of the lantern to be sufficient to admit an iron sash in each octagon to contain twenty one lights of fourteen by twelve glass, the lower tier to be filled with Copper; the rabbets of the sashes to be three quarters of an inch deep and glazed with double glass from the New England Glass Manufactory. In one of the octagons to be an iron framed door covered with Copper, four feet by two in the clear, to shut tight into the rabbets, with a strong turner button. The top to be a dome formed by sixteen iron rafters concentrating in an iron hoop six inches wide, nine inches diameter, covered with Copper, thirty two ounces to the square foot, which is to come down and rivet in the piece, that forms the top of the sash, which is to be three inches wide. On the dome to be a traversing ventillator, two and a half feet long and fifteen inches diameter, on which is to be secured a vane three feet long and twenty inches wide, the ventillator & vane to be framed with iron, covered with Copper and painted black. Around the lantern to be an iron railing, the posts of

REPRODUCED AT THE NATIONAL ARCHIVES

materials, dimensions and description, viz. The Tower of the Light-house to be of hard brick, the form round. The foundation to be sunk as deep as necessary to make the whole fabric secure, to be laid in good lime mortar. The height of the tower to be thirty feet from the surface of the ground. The diameter of the base to be twenty two feet, and the top twelve feet. Thickness of the walls at the Base to be three and a half feet, to be uniformly graduated to two feet at the top. The top to be arched, on which is to be laid a deck of soap stone, fourteen feet in diameter, four inches thick, the joints filled in with lead, on one side of which to be a scuttle, twenty-four by twenty inches, to enter the lantern, the scuttle-door an iron frame covered with copper. The outside wall is to be white-washed twice over. There are to be three windows in the tower, of twelve lights each, of ten by eight glass in strong frames and a door five feet by three feet, made of double inch boards, cross-nailed, with substantial hinges, lock and latch. The sill, posts and cap of the door to be of stone. The ground floor to be paved with brick or stone. A sufficient number of circular stairs to lead from the ground floor to within six feet of the lantern, connected by a [illegible] post; the stairs and floor to be two inch plank, planed. From the top of the stairs to the entrance of the scuttle to be an iron ladder, with steps two and a half inches wide. On the top of the tower, to be an iron lantern of an octagon form, the posts to be two inches square, to run down five feet into the brick work and secured with anchors. The height and diameter of the lantern to be sufficient to admit an iron sash in each octagon to contain twenty one lights of fourteen by twelve glass, the lower tier to be filled with copper, the rabbets of the sashes to be three quarters of an inch deep and glazed with double glass from the New England Glass Manufactory. In one of the octagons to be an iron framed door covered with copper, four feet by two in the clear, to shut tight into the rabbets, with a strong turn button. The top to be a dome formed by sixteen iron rafters concentrating in an iron hoop [illegible] inches wide, nine inches diameter, covered with copper, thirty two ounces to the square foot, which is to come down and rivet in the piece, that forms the top of the sash, which to be three inches wide. On the dome to be a traversing ventillator, two and a half feet long and fifteen inches diameter, on which is to be secured a vane three feet long and twenty inches wide, the ventillator & vane to be framed with iron, covered with copper and painted black. Around the lantern to be an iron railing, the posts which to be one and three eighths of an inch square, connected by three railings three quarters of an inch square, the upper one to be four feet from the deck. The lantern and wood-work of the tower to be painted twice over with white lead, except the dome which is to be black. The light house to be furnished with one complete electrical conductor of copper, three quarters of an inch in diameter, with points. The Dwelling House to be of brick, twenty six feet front by twenty eight deep, one story, eight feet in the clear, a cellar under the whole with outer doors and steps leading to it. The walls of the cellar and house to be twelve inches thick, the roof rectangular. The house to be divided as follows,

REPRODUCED AT THE NATIONAL ARCHIVES

follows: in front a room 4 feet square; an entry 4 feet wide in front of the chimney; a bed-room 8 feet by 9; a chimney in the centre of the house. In the back part a kitchen 15 ft. by 12; a bed-room 8 ft. by 9, and a pantry 5 feet by 8; between the front bed room and kitchen, to the right of the chimney, to be stairs leading to the chambers with doors to communicate with the front entry and kitchen; a fire place in the front room and one in the kitchen, with closets fitted to the chimney. The chambers to be partitioned off, and lathed and plastered, double floored and well nailed. The inside wall and ceiling to be lathed and plastered; to be three windows in the front room, one window in the front bed-room, one window in the back bed-room, four windows in the kitchen, one window in the pantry, opposite the stair way and two in each of the chambers; each window on the lower story to contain sixteen lights, and the chamber windows twelve lights of ten by eight glass. All the timber to be sound and well seasoned; the roof to be shingled with good pine shingles. The doors, which are to be two in the front room, one from the front bedroom and one from the back bedroom, one from the pantry, one to the stairs which are to lead into the cellar from the side of the house (and which stairs are to be a plank), one to each of the chambers, two to the stairway and the two outer doors, front and back, to be four panneled, except the front door which is to be a frieze door, to have good hinges and thumb latches; the front outer door to have a lock. On one side of the chimney in the kitchen to be an oven of suitable size with an iron door; The kitchen fire place to be furnished with an iron crane hammers and hook, a good sink to be built in the kitchen with a gutter to lead through the brick wall. The roof of the house to have gutters and spouts to lead off the water, the out house five feet by four; boarded & shingled. All the wood work, except the roof, inside & out, to be painted three over. A well to be sunk in the cellar, sufficiently deep to procure good water, if practicable, to be walled or bricked, and fitted with a Cast-iron pump, to stand in the sink in the kitchen. The Light House to be furnished with eight double tin oil cuts, to hold ninety gallons each; eight wooden horses; two spare lamps; one lantern canister and iron funnel; one tube box; one wick box; one oil cannis; one glazier's diamond; one torch, one hand lantern and lamp; two pair scissors; two files; two tube cleaners; one stove and funnel; one oil feeder and all the necessary apparatus, in the same manner as Light Houses of the United States have been fitted up by Winslow Lewis with the addition of apparatus for conducting the heat of the lamps to the oil therein. The whole - the buildings and fitting up - to be completed by the middle of November next; to be done and finished in a workmanlike manner for the sum of Thirty nine hundred and ninety three dollars, including both the buildings and fitting up the Light.

And the said Dante Henshaw, in his capacity aforesaid, agrees and engages on his part to pay to said Winslow Lewis the sum of Thirty nine hundred & ninety three Dollars, when the whole of said work shall have been completed in conformity to his foregoing agreement, and approved by the Superintendant of the establishment, provided that no member of Congress shall be concerned in this contract nor interested therein.

REPRODUCED AT THE NATIONAL ARCHIVES

room, one window in the back bed-room, four windows in the kitchen, one window in the pantry on opposite the stair way and two in each of the chambers; each window on the lower floor to contain sixteen lights, and the chamber windows twelve lights of ten by eight glass. All the timber to be sound and well seasoned; the roof to be shingled with good pine shingles. The doors, which are to be two in the front room, one from the front bedroom, one from the back bedroom, one from the pantry, one to the stairs which are to lead into the cellar from the inside of the house (and which stairs are to be of plank), one to each of the chambers, two to the stairway and the two outer doors, front and back, to be four pannelled, except the front door which is to be a frieze door, to have good hinges and thumb latches; the front outer door to have a good lock. On one side of the chimney in the kitchen to be an oven of suitable size with an iron door; The kitchen fire place to be furnished with an iron crane, pannoms and hook, a good sink to be built in the kitchen, with a gutter to lead through the brick wall. The roof of the house to have gutters and spouts to lead off the water. An out house five feet by four, boarded & shingled. All the wood work, except the roof, inside & out, to be painted twice over. A well to be sunk in the cellar sufficiently deep to procure good water; [illegible] to be [illegible] brick, and fitted with [illegible] pump [illegible] in the sink in the kitchen. The Bright House to be furnished with eight double X tin oil butts, to hold ninety gallons each; eight wooden horses; two spare lamps; one lantern canister and iron funnel, one tube box; one wick box; one oil carrier; one glazier's diamond; one torch; one hand lantern and lamp; two pair scissors; two files; two tube cases; one stove and funnel; one oil feeder, and all the necessary apparatus, on the same manner as Bright Houses of the United States have been fitted up by Winslow Lewis with the addition of apparatus for conducting the heat of the lamps to the oil there. The whole - the buildings and fitting up - to be completed by the middle of November next; to be done and finished in a workmanlike manner for the sum of Thirty nine hundred and ninety three dollars, including both the buildings and fitting up the Bright.

And the said David Henshaw, in his capacity aforesaid, agrees and engages on his part to pay to said Winslow Lewis the sum of Thirty nine hundred & ninety three Dollars, when the whole of said work shall have been completed in conformity to the foregoing agreement, and approved by the superintendant of the establishment, provided that no member of Congress shall be concerned in this contract, nor interested therein.

Signed & Sealed in presence of

Gustavus Horton

Samuel F. Allen

David Henshaw Collector

Winslow Lewis

REPRODUCED AT THE NATIONAL ARCHIVES

APPENDIX H.

REPORT OF LIEUT. EDWARD W. CARPENDER, U.S.N., 1838

(National Archives, RG 26, Lighthouse Clipping Files)

REPRODUCED AT THE NATIONAL ARCHIVES

(Highlands, Truro.)

Report of Lieut. Edward W. Carpender, U.S.N.
New York, November 1, 1838.

x x x x x

Doc. Rel. to Lighthouses 1789–1871. p. 186.

Cape Cod light.—This great and important light stands nine miles to the eastward of Race point, on the high land of Truro, 160 feet above the level of the sea. It consists of 15 lamps, with 15-inch reflectors, in two circular series, 8 in the lower and 7 in the upper. These lamps are so arranged as to be seen from Boston bay as well as the sea. I noticed one of the lamps, in the lower series, to be fronting the iron door of the lantern; of course, to no useful purpose. It should be removed to the upper series, where there is room enough for it. These reflectors are from one to two inches apart, while (without any apparent reason for it) there are ten inches between two of them. I recommend, as at Long Island head, the removal of these reflectors, so that all the lamps in the lantern may be seen from all points of the compass—an effect which cannot be produced while the reflectors intercept the light of half the lamps.

I visited this light a few minutes before sundown, and found the keeper (alarmed at the sight of the revenue cutter) stolen into his lantern to make a hasty rub-up against the expected visit. Time did not admit of the necessary preparations being made before the hour of lighting. But few of the lamps were trimmed. Such chimneys as had been touched were imperfectly cleaned. The reflectors had no appearance of having been recently burnished, and the glass of the lantern was smoked. This light, on account of its magnitude and elevation, would, if properly kept and attended, illuminate this whole coast all the way down to Chatham, a distance of 25 miles; at all events until it intersected that light, which is itself 70 feet above the level of the sea.

This tower is of brick, 30 feet high. The walls, at the base, are 3½ feet thick—one-third more than the walls of the stone tower at Clark's point, which is 10 feet higher. The interior width at the base is 15 feet, two feet more than that tower. The finishings (as steps, doors, sills, &c.) are of wood, exhibiting, though only built seven years, some signs of decay.

This lantern is eight feet high, two feet higher than is necessary. The glass, 12 by 14, is of a better quality than any yet observed. Premises in good order.

APPENDIX I.

REPORT OF I.W.P. LEWIS, C.E., BY ORDER OF HON. W. FORWARD, SECRETARY OF TREASURY, 1842

(National Archives, RG 26, Lighthouse Clipping Files)

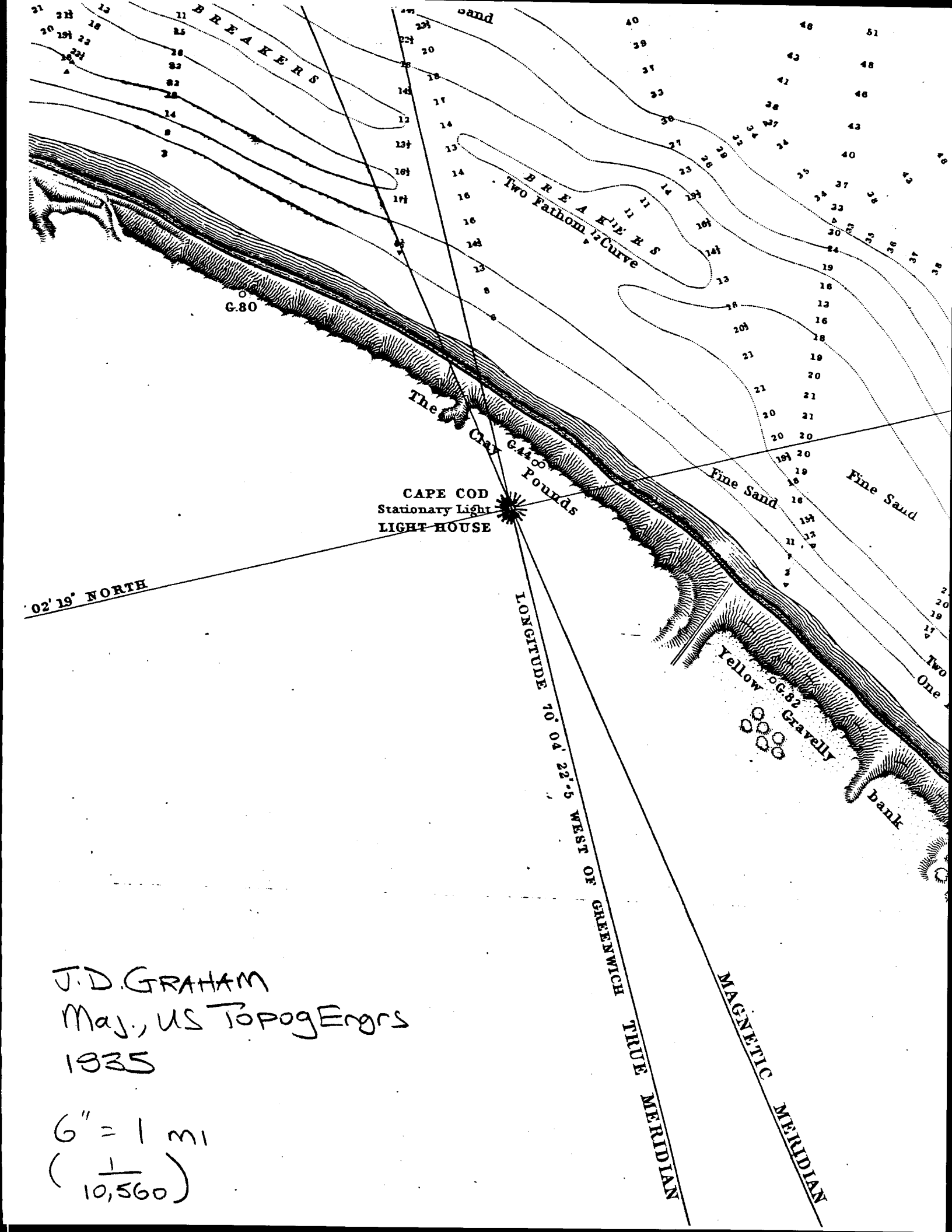
REPRODUCED AT THE NATIONAL ARCHIVES

Report of I.W.P. Lewis, C.E., by order of Hon. W. Forward, Sect'y of Treasury, on the condition of the lt-hos., &c., coasts of Me., N.H., & Mass., in 1842.

x x x x x

Doc. Rel. to Lt-hos. 1789-1871. p. 358.

An illustration of the usual method of constructing brick light-houses is presented, showing an elevation and vertical section of the light-house at Truro, Cape Cod, which was erected by contract in 1833, at a cost of $4,162. This tower was refitted by me in 1840. It will be seen that, in the original construction, the door and window frames, of wood, were set flush with the exterior surface, and at the same angle of inclination. These, with the wooden staircase, (the ends of the steps and risers being bedded into the masonry,) were all rotten. The window frames and staircase were pulled out by hand; and the removal of the latter brought down a portion of the inner face wall, when it was discovered that the interior of the walls was laid without mortar, the brick being loosely thrown in, and the interstices filled with sand. At the base, which *rested* on the *surface of the ground*, there was found in the interior of the wall a large number of stones, thrown in to fill up and save brick. On removing the lantern, the mortar of this superstructure was found to have so little cohesion, that the masons, to save time, shovelled off the bricks; and thirteen feet of the tower were taken down in this manner, before arriving at a part that presented sufficient surface and stability to justify a reconstruction. The tower was, however, rebuilt, and rendered fire proof throughout by the introduction of cast-iron door, window frames, sashes, staircase, roof, and lantern, together with a hot-air furnace, to heat the building in winter. The door and window frames were recessed, and set perpendicularly. The newel of the spiral stairs, being a cylinder of cast iron, communicating by means of a flue, (passing out below the base of the tower,) with the external air, and receiving near its top the smoke pipe of the furnace, assists materially in ventilating the lantern during cold weather. The roof of the tower is formed of one disc of cast iron, fifteen feet in diameter, with a flange beneath, six inches deep, that shuts down over the cornice, and effectually prevents all leakage. The plinth and dome of the lantern are also each cast in one piece, the latter being supported by sixteen wrought-iron stiles, four by one inch, set edgewise to the light. There are but sixteen panes of glass in the lantern, each five feet high and two feet wide. The lamps are cast-brass Argand fountains, with ¾-inch burners; the reflectors, true paraboloids, (made on a cast-iron die, turned and polished with the utmost care,) twenty-one inches in diameter, with a focal axis of three inches, plated with twenty-one ounces of pure silver, and weighing fourteen pounds each. The burners are perfectly adjusted to the focal point, and so attached to the frame-work that the keeper has no power to alter the adjustment. The reflectors are also set truly vertical, and without the possibility of being disturbed in their positions either by carelessness or accident. The whole lighting apparatus is supported upon a massive frame of cast iron, placed in the centre of the lantern. Much animadversion has been thrown upon this construction, from the fact that it cost $5,919, which amount is contrasted with the expense of refitting by *contract* the light-house at Cape Henlopen for $3,600. In Document 811, (2d session 27th Congress, page 72,) the items of respective cost are set forth by the Fifth Auditor, in a letter to George Bancroft, Esq., endeavoring to convey the idea that the refittal was of a similar character in both cases, and that, therefore, the cost should be the same. The statement there made is not a fair exposition of the truth.



J. D. GRAHAM
Maj., US Topog Engrs
1935

6" = 1 mi
(1/10,560)

APPENDIX K.

CAPE COD LIGHT STATION RESERVATION SURVEY, 1885 (Printed 1886)

(Microfilm, U.S. Coast Guard Academy Library, New London, Connecticut)

CAPE COD, MASS.

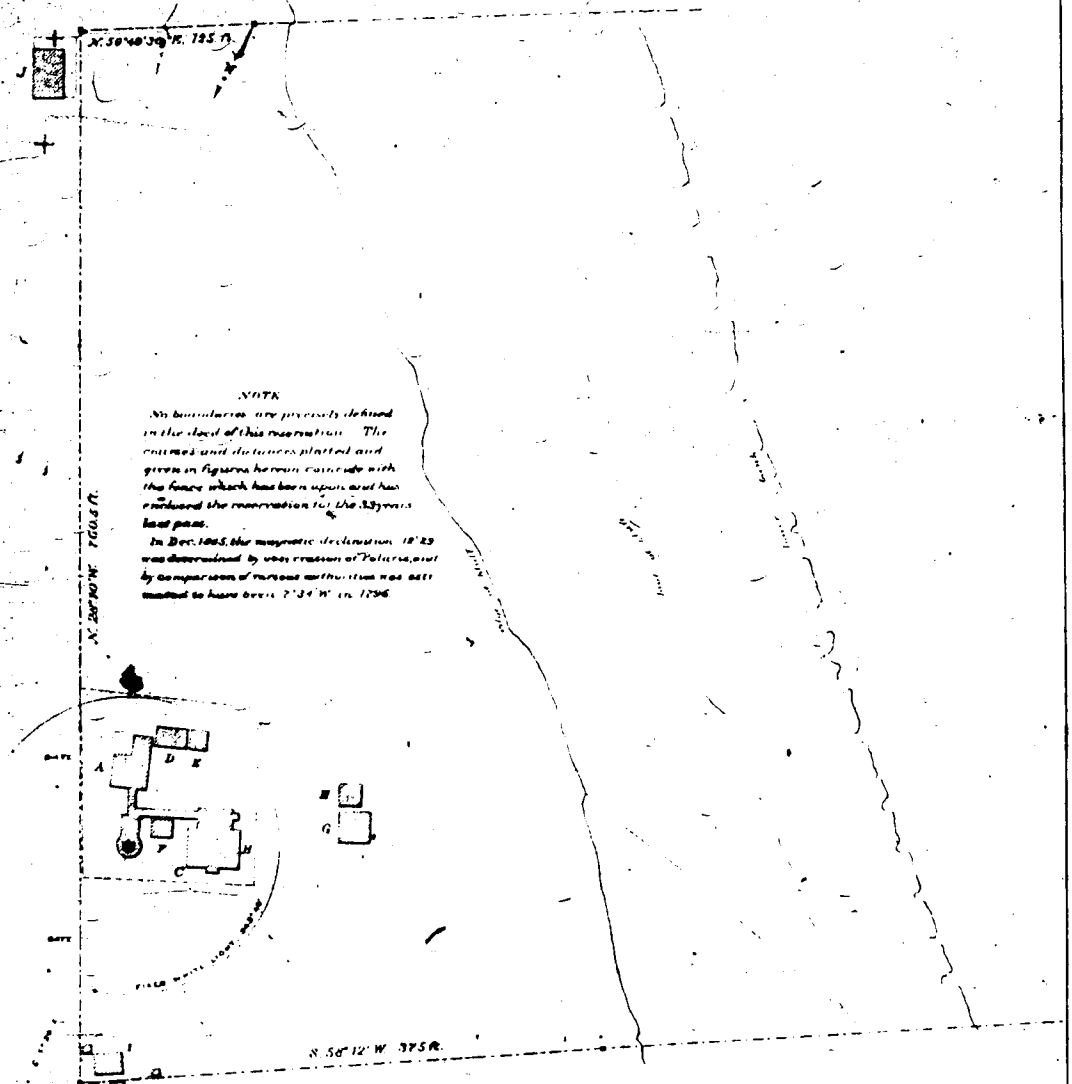
LIGHT STATION.

On the N.E. or seaward side of Cape Cod, Highlands, Truro, Mass.

Lat. 42° 2' 21" N.; Long. 70° 3' 39" W.

Reservation Surveyed Dec. 18 to 23, 1885, by E.P. ADAMS, C.E., L.H. Surveyor.

Scale. 1:600



NOTE

No boundaries are precisely defined in the deed of this reservation. The courses and distances platted and given in figures hereon coincide with the fence which has been upon and has enclosed the reservation for the 33 years last past.

In Dec. 1885, the magnetic declination 18°23' was determined by observation of Polaris, and by comparison of various authorities was estimated to have been 7°34' W. in 1796.

Kind of Light	Primary Sea Coast	Site Purchased	Aug. 5, 1796.
Order of Light	1st	Deed Recorded in Barnstable Co. Reg. Book 49 p. 65.	
Characteristic of Light	Fixed White	First Buildings, when built	1797.
Base of Tower above water level	142 ft.	When rebuilt or renovated	Rebuilt, 1857.
Focal Plane " " "	195 ft.	Area of Reservation as deed Nov. A.D. to M.H.W.	9.955 A
Kind of Fog Signal	1st Class Daboll Trumpet	Area enclosed, to edge of bluff	4.222 Acres
Characteristic " "	Blasts 8 sec. intervals 30s	" " by picket fence	0.383 "

EXPLANATIONS: Mag. Dec. in 1796 (est. 7°34'), det. at survey 12°29' W. Courses given on Plan are True bearings.

● Light Tower. A. Principal Keeper's Dwelling. B. First Assistant's Dwelling. C. Second Asst's Dwelling. D. E. F. Keepers' Wood Houses. G. Fog Signal House. H. Coal House. — Mean High Water Line. — — Boundary of Reservation. Line of Fence. ● Stone Bound 30 long, 6"×6" top cut thus: —. Stake set for True Meridian. I. Barn and Hen houses. J. Merchant Marine Telegraph.

C. J. Allen, L.H. Surveyor 1st & 2d Dists.

H. L. Stanton, Maj. of Engrs. Engr. 1st & 2d L.H. Dists.

US LHE

OFFICE OF L.H. ENGR., ROBBINS BOSTON MASS., MAR. 27, 1886.

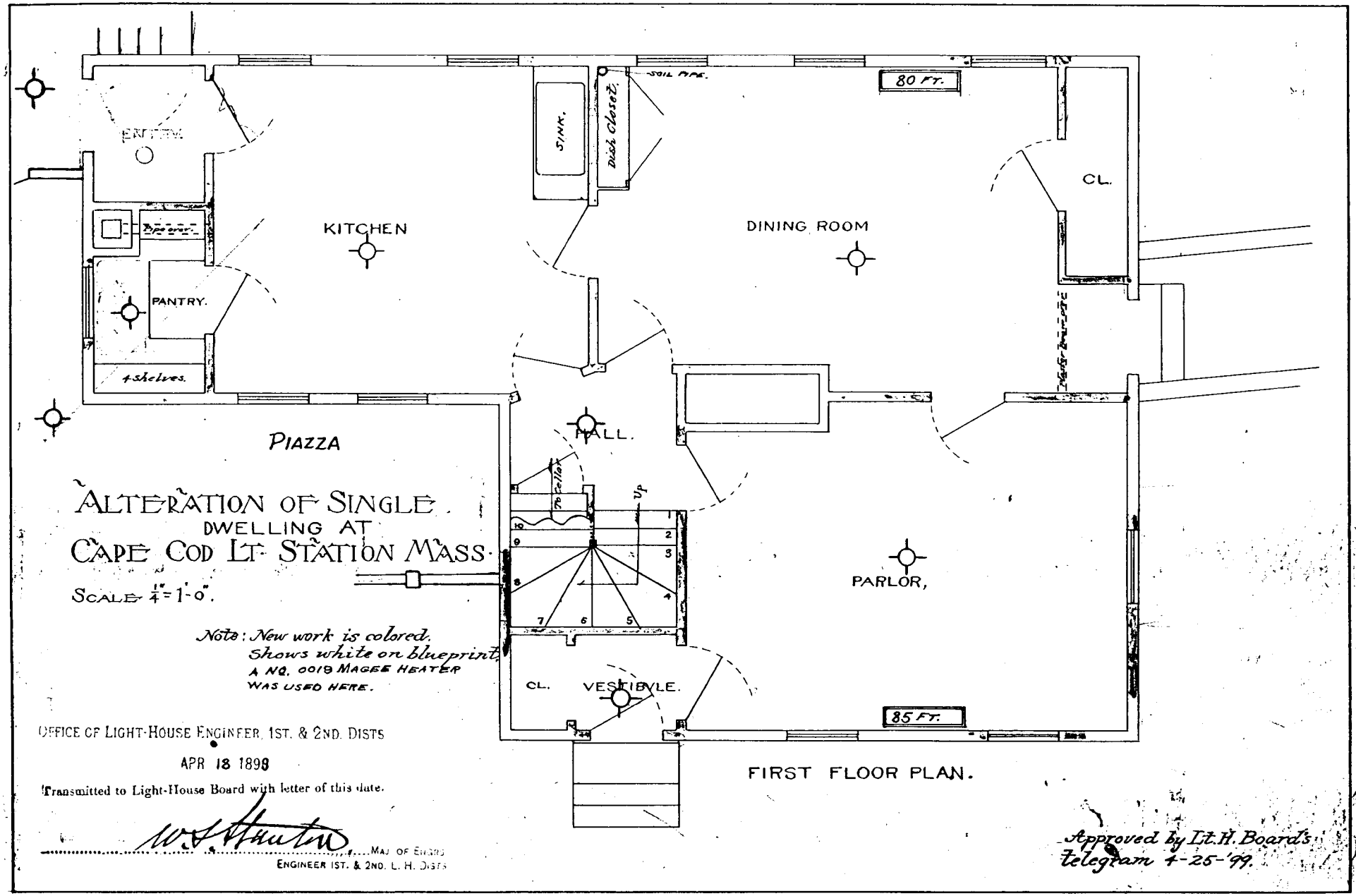
(P)

2-5C-23

APPENDIX L.

ALTERATION OF SINGLE DWELLING AT CAPE COD LIGHT STATION MASS. APRIL 18, 1899

(Archives, USCG Civil Engineering Unit Providence)



ALTERATION OF SINGLE DWELLING AT CAPE COD LT. STATION MASS.

SCALE $\frac{1}{4}$" = 1'-0".

Note: New work is colored. Shows white on blueprint. A No. 0019 MAGEE HEATER WAS USED HERE.

OFFICE OF LIGHT-HOUSE ENGINEER, 1ST. & 2ND. DISTS

APR 18 1898

Transmitted to Light-House Board with letter of this date.

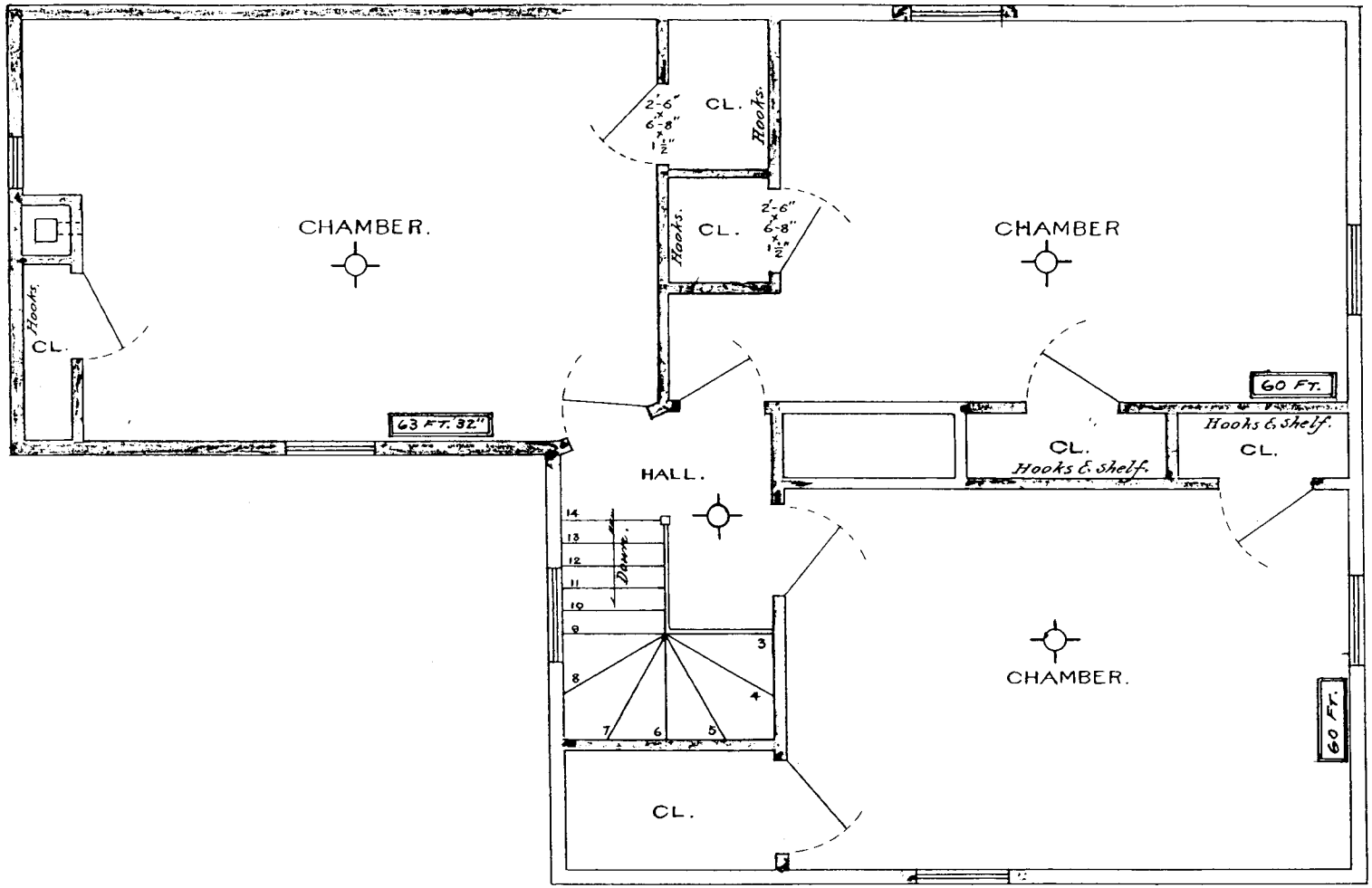
W. S. Hunter ..... MAJ. OF ENGRS
ENGINEER 1ST. & 2ND. L. H. DISTS

Approved by Lt. H. Board's telegram 4-25-'99.

(8)

No 21) S. 38.

No. 1577 Sheet 1



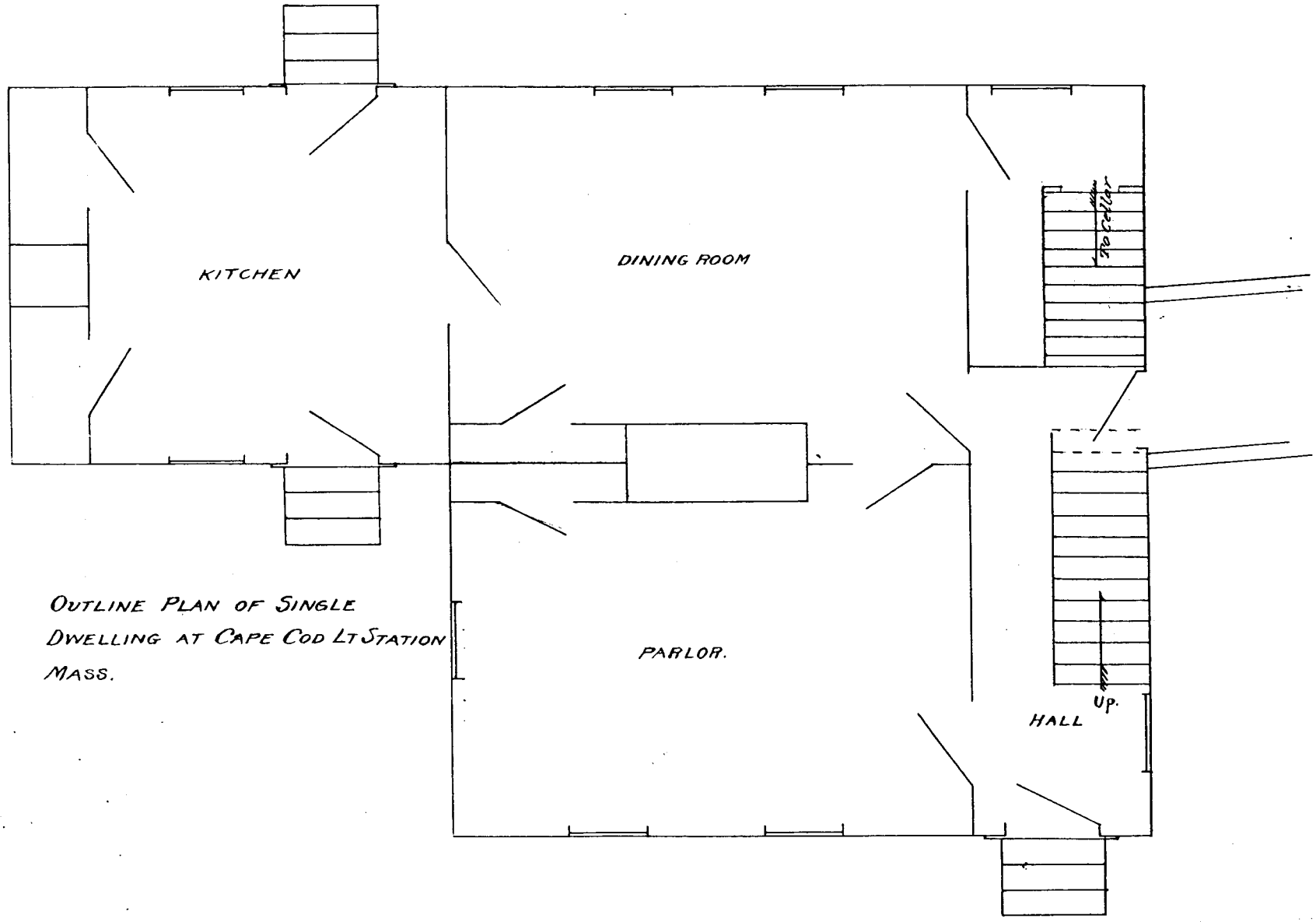
SECOND FLOOR PLAN.
SCALE $\frac{1}{4}$ = 1'-0".

CAPE COD 4/5

No. 1577 Sheet

ELEVATION.
SCALE $\frac{1}{4}$" = 1'-0".

Cape Cod 4/5 Nº 1577



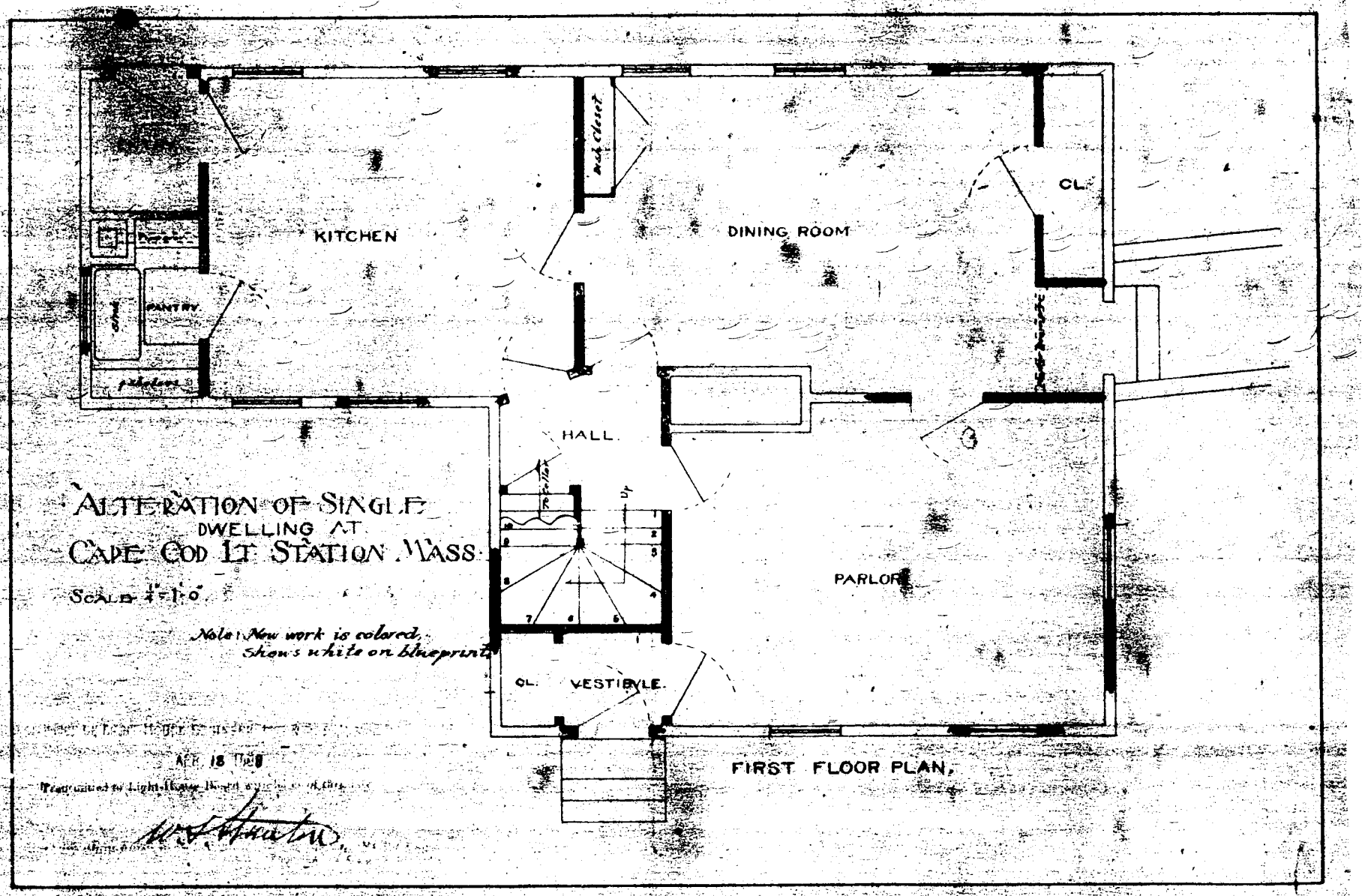
OUTLINE PLAN OF SINGLE DWELLING AT CAPE COD LT STATION MASS.

No 1577 sheet 3

APPENDIX M.

ALTERATION OF SINGLE DWELLING AT CAPE COD LIGHT STATION MASS. APRIL 18, 1899

(Microtext, U.S. Coast Guard Academy Library, New London, Connecticut)



ALTERATION OF SINGLE DWELLING AT CAPE COD LT STATION MASS.

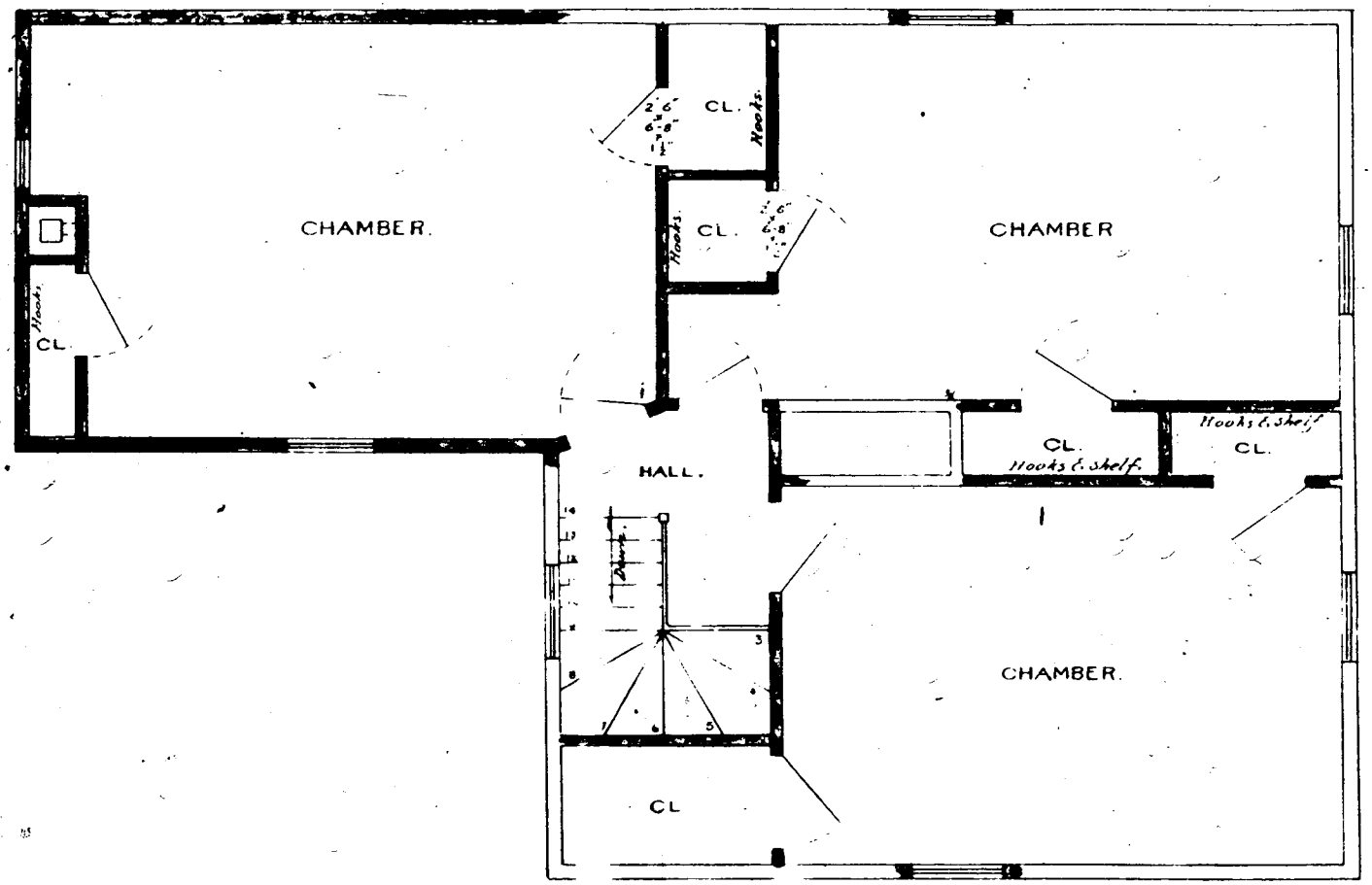
SCALE 1/4" = 1'-0"

Note: New work is colored, shows white on blueprint

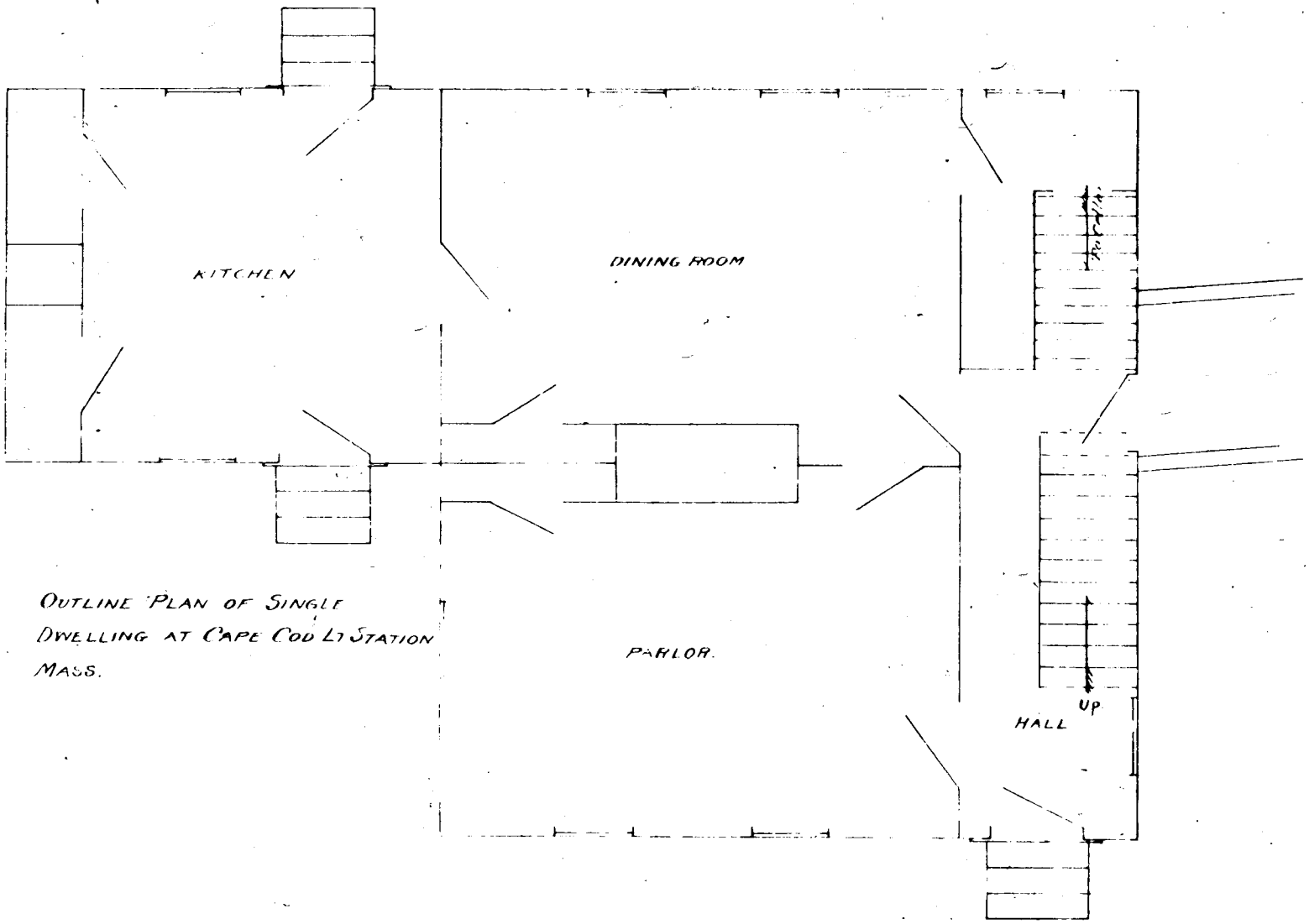
APR 18 1910

Transmitted to Light-House Board

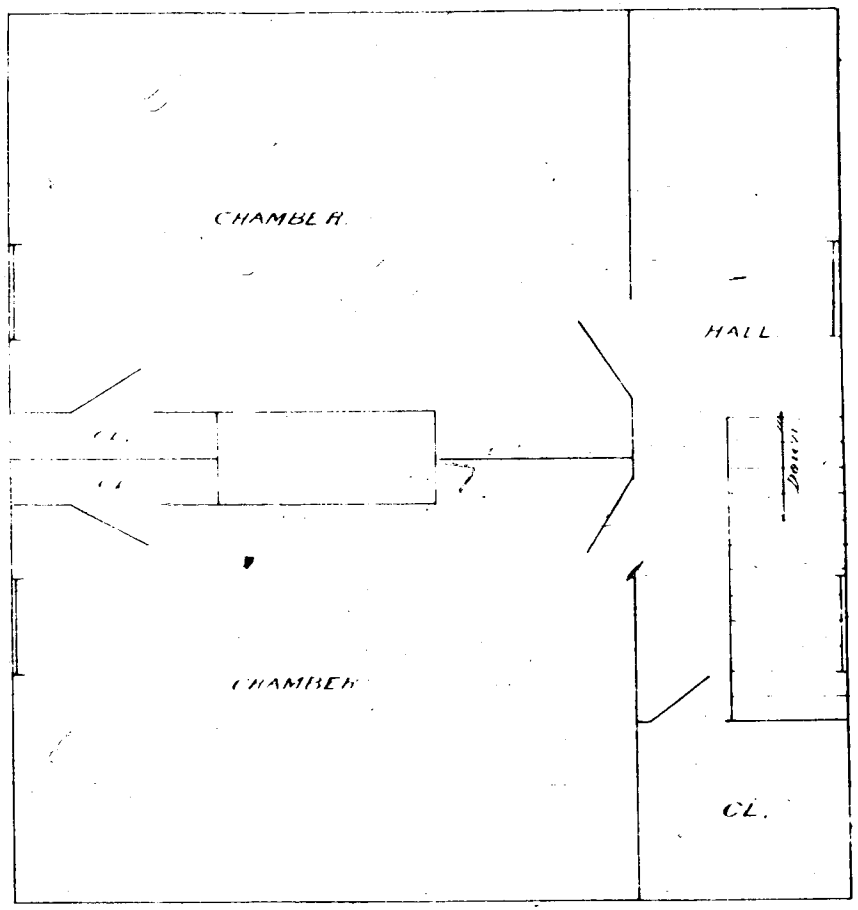
W. A. Atwater



SECOND FLOOR PLAN.
SCALE 1/4" = 1' 0"



OUTLINE PLAN OF SINGLE DWELLING AT CAPE COD L. STATION MASS.



SECOND FLOOR PLAN.

APPENDIX N.

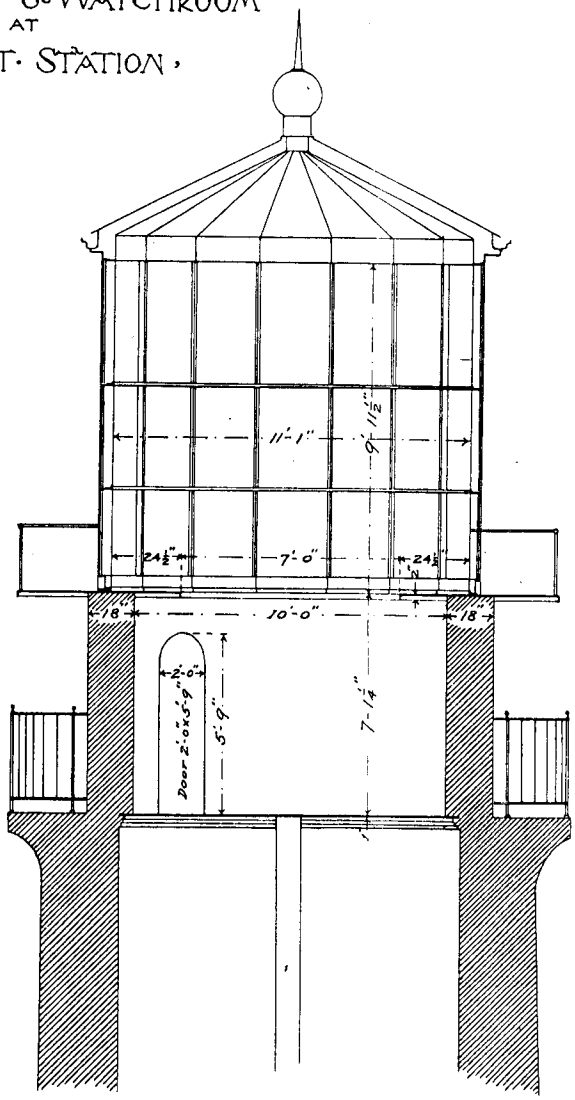
LANTERN AND WATCHROOM AT CAPE COD LIGHT STATION, CIRCA 1900

(Plate 1. - Archives, USCG Civil Engineering Unit Providence;
Sheet 1. - Mircotext, U.S. Coast Guard Academy Library)

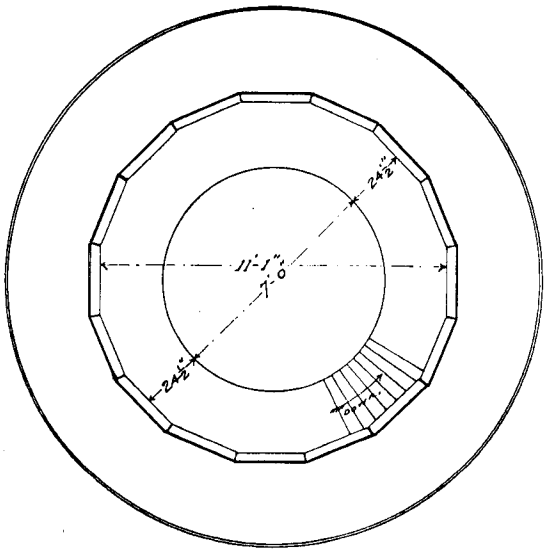
PLATE I.

LANTERN & WATCHROOM AT CAPE COD LT. STATION, MASS.

SCALE - $\frac{1}{4}$" = 1'-0".



SECTION OF LANTERN & WATCHROOM.



PLAN OF LANTERN.

ACCOMPANYING SPECIFICATIONS FOR ILLUMINATING APPARATUS.

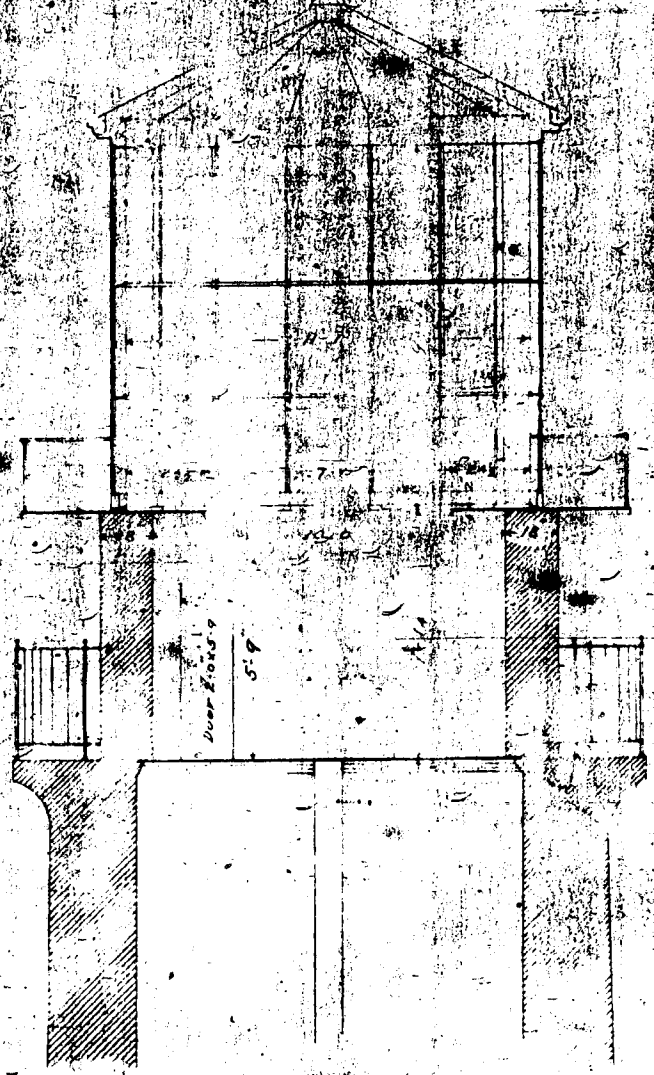
(No 12) S. 38

No 1569

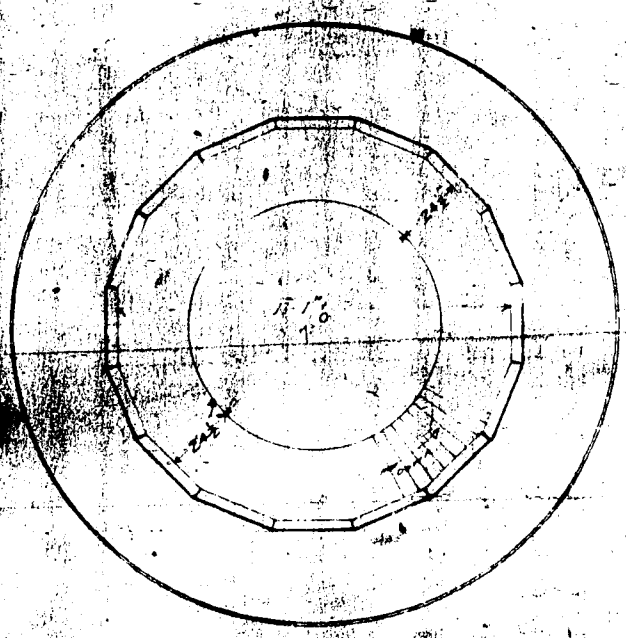
SHEET 1.

LANTERN & WATCHROOM AT CAPE COD LT. STATION MASS.

SCALE 1" = 1'-0"



SECTION OF LANTERN & WATCHROOM.



PLAN OF LANTERN.

2d Dist. 3 C. with Engr's Ltr. #81. of 29 Sept. 1900 — Lib 1 Dec. — 1

(P)

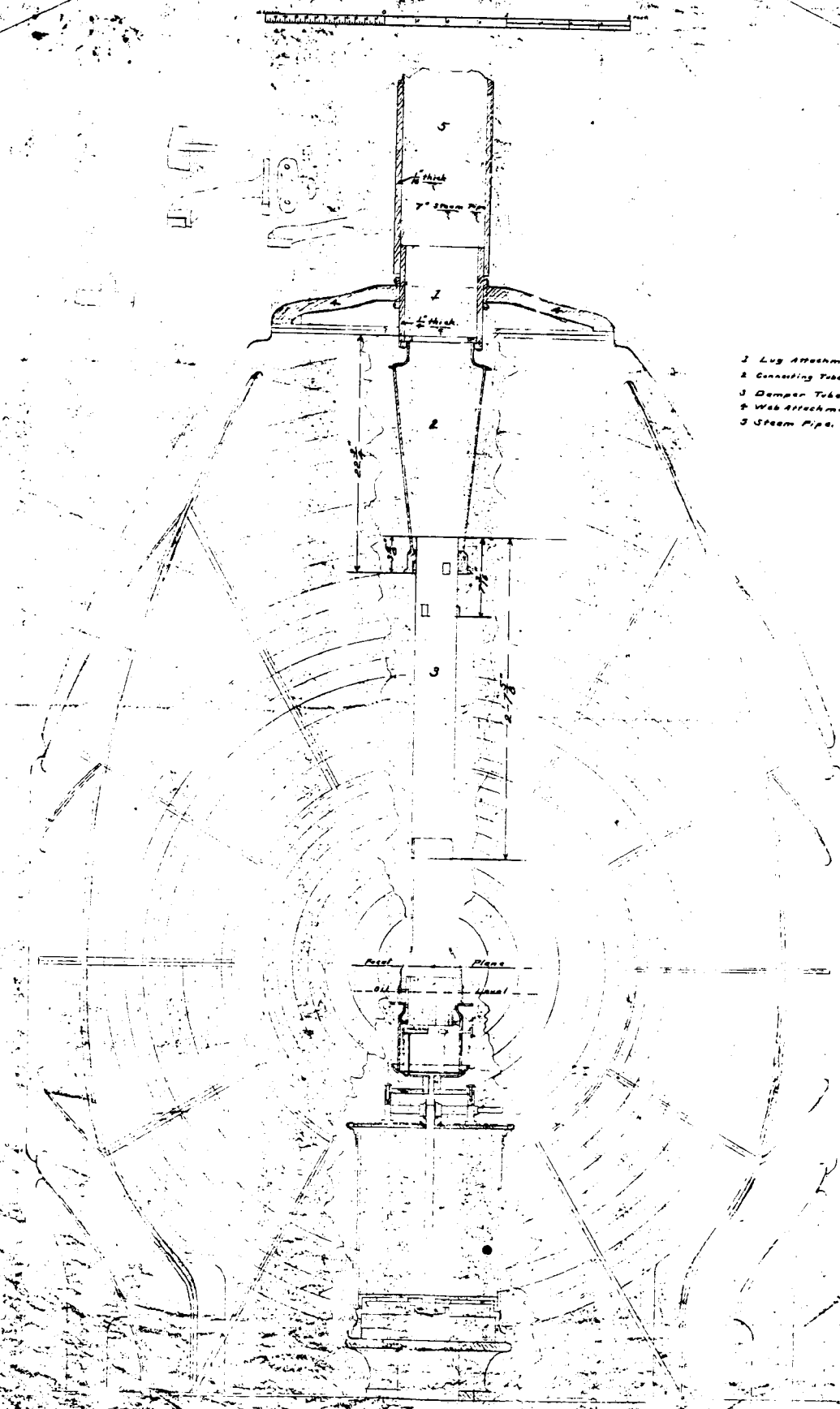
APPENDIX O.

DETAILS OF SMOKE PIPE AND SMOKE PIPE SUPPORT, 1901

(Archives, USCG Civil Engineering Unit Providence)

U.S. Lighthouse Machine Shop, Boston, Mass., September 6, 1901.

Cape Cod 1st Class Lens. — Details of Smoke Pipe.



No. 1580

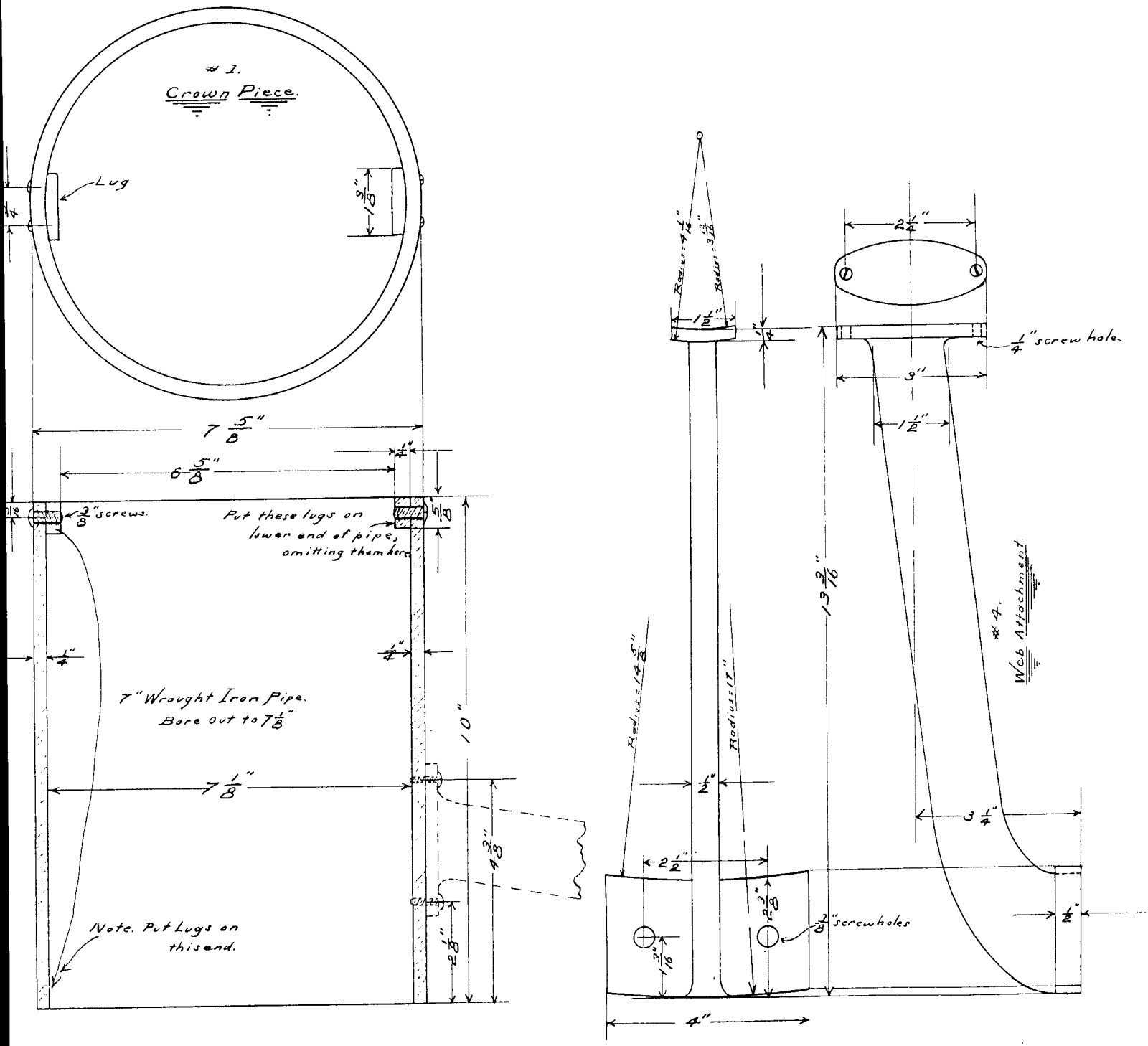
CAPE COD 1st CLASS LENS

SMOKE PIPE SUPPORT.

U.S. Light-House Machine Shop.

Boston, Mass. September 5, 1901.

Scale:— Half Size.

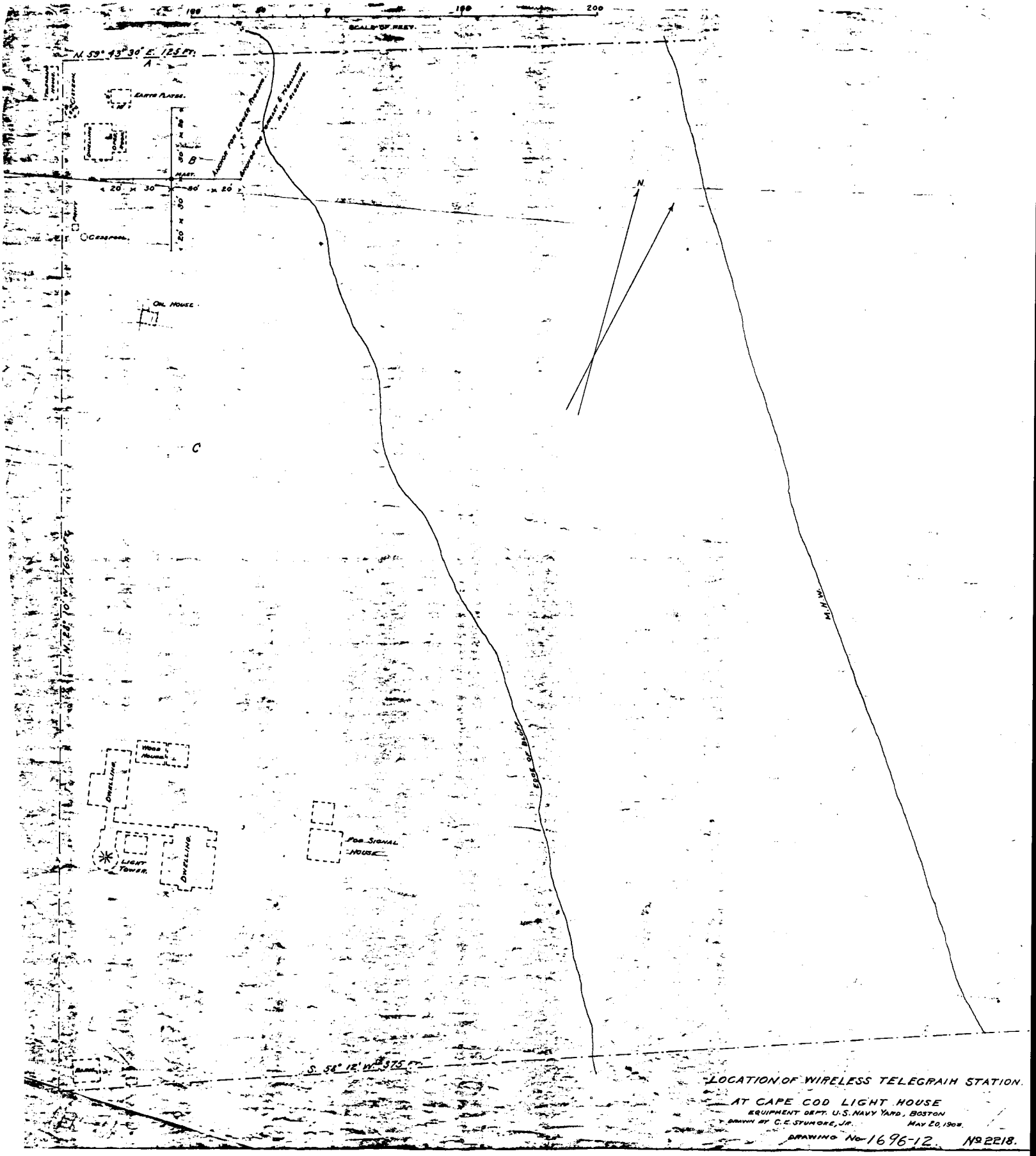


№ 1579

APPENDIX P.

LOCATION OF WIRELESS TELEGRAPH STATION AT CAPE COD LIGHTHOUSE, 1903

(Archives, USCG Civil Engineering Unit Providence)



LOCATION OF WIRELESS TELEGRAPH STATION.

AT CAPE COD LIGHT HOUSE

EQUIPMENT DEPT. U.S. NAVY YARD, BOSTON

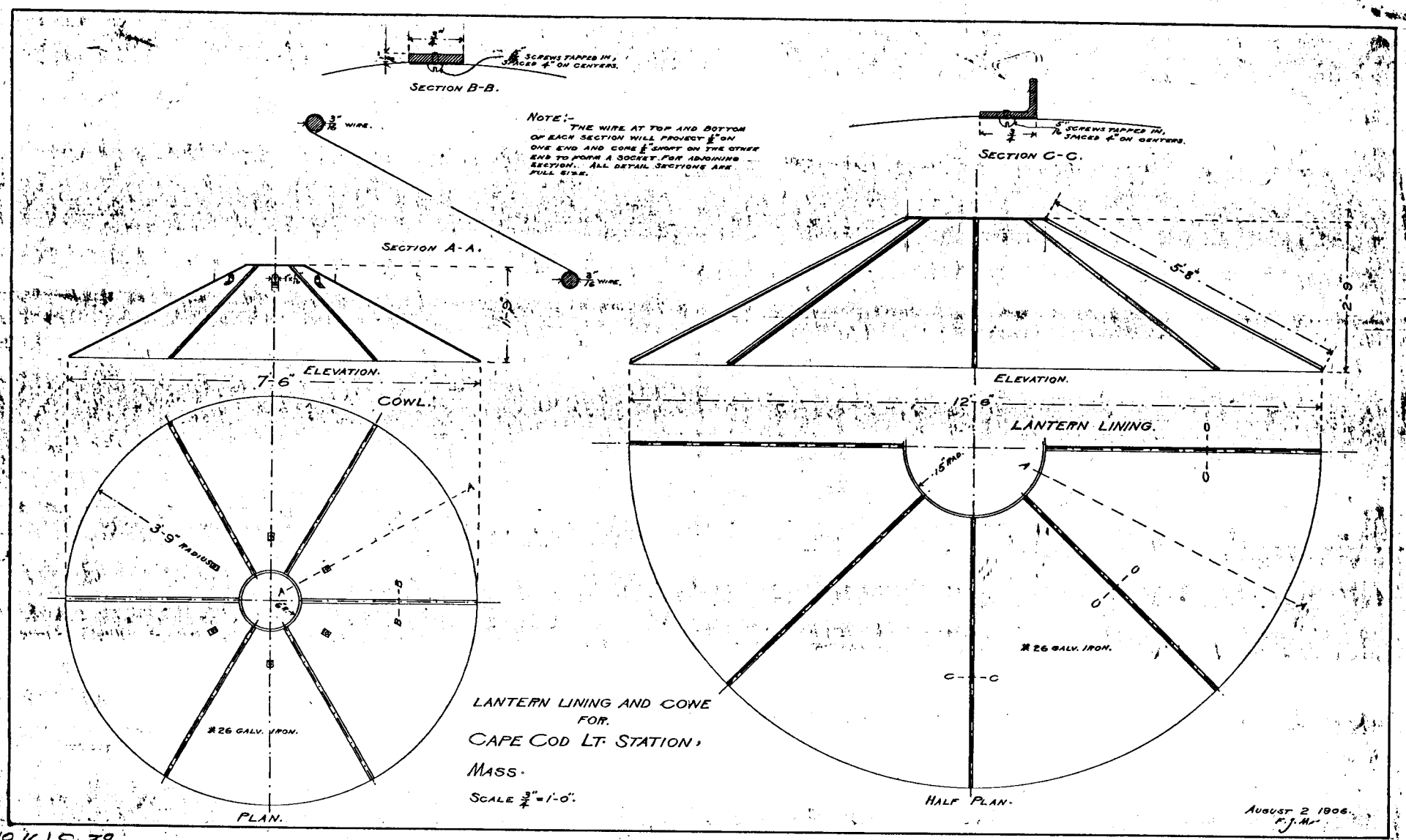
DRAWN BY C. E. STUMORE, JR. MAY 20, 1908.

DRAWING No 1696-12. No 2218.

APPENDIX Q.

LANTERN LINING AND COWL FOR CAPE COD LIGHT STATION, 1906

(Archives, USCG Civil Engineering Unit Providence)



(No 16) S. 38.

No 1556

APPENDIX R.

DESCRIPTIONS OF CAPE COD LIGHT STATION 1908, 1910, 1922, 1927 AND 1933

(Archives, USCG Civil Engineering Unit Providence)

Form 60

Second DISTRICT.

Department of Commerce and Labor

LIGHT-HOUSE ESTABLISHMENT

DESCRIPTION OF LIGHT-HOUSE TOWER,

BUILDINGS, AND PREMISES

AT

Cape Cod Light-Station,

Mass.

April 25, 1908

NOTE.

This Form is designed mainly to guide in preparing accurate descriptions of new light-stations, but will be used also in describing those that have been long established, when required. Screw-pile structures and lights on keepers' dwellings should be fully described without reference to this Form.

DEPARTMENT OF COMMERCE AND LABOR,
LIGHT-HOUSE BOARD, *February, 1906.*

NAME AND POSITION OF THE LIGHT-HOUSE AND LIGHT-STATION.

Cape Cod, on the highlands, on the northeasterly side of Cape Cod, seacoast of Massachusetts

1. By whom described, Lt Col. Edw. Burr, U.S.A. Engr. 2d Dist. District.
2. Date of description, April 25, 1908
3. Distinguishing character of light or lights, Flashing white every 5 seconds
4. Latitude of tower, 42° 02' 23" } Authority, Coast Chart #110
5. Longitude of tower, 70° 03' 40" } U.S. C. & G.S.

PREMISES—A DETAILED DESCRIPTION OF, EMBRACING—

6. Site of station—Public land, purchase, Military or Naval reservation, lease: Purchase
7. Date of reservation,
8. Date of deed, August 5, 1796.
9. Date of permission to occupy,
10. Date of lease,
11. Area of the entire site, (In deed) 10 acres
12. Area inclosed, 6 acres
13. Character of surface soil, Sandy
14. Distance of tower from nearest high-water mark, 600 ft
15. Inclosures to premises, Wire fence
16. Wharf or landing on premises, None
17. Road to landing or wharf, character of, and distance from tower, None
18. Means by which the light-station may be reached, Road

PREMISES—A DETAILED DESCRIPTION OF—CONTINUED.

ance to the nearest public road, railroad station, or steamboat landing, and to which:

tion is on public road 2 miles to RR station at North Truro, Mass.

ance to the nearest post-office, 1½ miles to North Truro, Mass

ance to the nearest village or town, do

ilities for reaching the light-station by public conveyance, None

ilities for reaching the light-station by private conveyance from the nearest village, town, railroad station r steamboat landing, and the distance: By horse & carriage from North Truro, Mass

er or other means used for supporting the lantern and apparatus, Tower

nber of separate lights, 1

en first built or established, 1798

en last thoroughly rebuilt, repaired, or renovated, 1857

dition at this date, Good

pe of tower in plan, Circular

m of tower, cylindrical, conical, or pyramidal, Conical

ght of tower from base to ventilator ball of lantern, 61 feet

ght of focal plane of lantern above mean high water (on sea and gulf coasts) or mean lake level on northern kes and rivers: 183

kground of the light-house, upon which it is projected, as seen from the sea or lake: Sky

r of tower, White

r of tower, how produced: Whitewash

er—connected with keeper's dwelling, and how, or detached: Connected to dwelling by covered way

ect—seacoast, lake coast, bay, harbor, channel, or range; for general or local navigating purposes: Seacoast

erials of which the tower is built: Brick

eral description, embracing—

Thickness of walls at base, 42"

Thickness of walls at parapet, 30"

Diameter of tower (inscribed, if polygonal) at base, 11' (inside)

PREMISES—A DETAILED DESCRIPTION OF—CONTINUED.

General description, embracing—Continued.

43. Diameter of tower (inscribed, if polygonal) at parapet, 11' (inside)
44. Kind of stairway and steps, Cast iron
45. Number of landings of stairway, 3
46. Size of glass for glazing tower windows, 8 x 10
47. Number of windows in tower, and size of sash, 3 - Lower 2' 3 3/4" x 2 2 Upper same
48. Number of doors, 1 in tower and 1 in parapet
49. Kind of foundation and depth below the surface, Brick - 6 feet
50. Character of soil at and surrounding the light-house, Sandy
51. Soil susceptible of being protected by grass, shrubbery, or trees: Grass
52. Miscellaneous remarks upon tower and site:

LANTERN AND LANTERN FIXTURES.

53. Order or class of lantern, First
54. Polygonal or cylindrical, Polygonal
55. Diameter, inscribed, to glass, 12 ft
56. Number of sides in plan, 16
57. Vertical or helical bars, Vertical
58. Height glazed, 9' 6"
59. Number of plates in height, 3
60. Number of plates in each side, 3
61. Thickness of plates, 1/4"
62. Size of different plates, 47 5/8 x 28 - 39 3/8 x 28 25 3/8 x 28
63. Number of storm panes of glass, None
64. Unglazed side of lantern in plates and degrees of arc, None ; between what bearings (magnetic and *from seaward*),
65. Materials of which the lantern is constructed, Cast iron

LANTERN AND LANTERN FIXTURES—CONTINUED.

66. Roof, Cast iron

67. Ventilator ball, Cast iron

68. Lightning-conductor spindle, Rough iron - copper tip

69. Lightning conductor, of what material; how attached to spindle; how led, and how far below the surface of dry earth, or otherwise, as the case may be: Copper to lantern, led down side of tower, 4 feet into ground.

70. Balustrade and outside gallery, Stone gallery deck 24" wide, with iron railing consisting of two rails and 18 round posts and 1/2" square balusters

71. Lantern doors, and how fitted: No door in lantern. Balcony reached from watchroom which has double doors.

72. Floor of lantern—of what materials: Cast iron

73. Watchroom door leading into the lantern, and how fitted: No door. Lantern entered by iron spiral stairs

74. Parapet, inside diameter (inscribed, if polygonal), 10' 4"

VENTILATORS.

75. In parapet, wall, or lower part of lantern: In lower part of lantern

76. Lantern ladders for cleaning plate glass, outside: None

77. Curtain-hooks inside of lantern—how fitted: Spring roller curtains

WATCHROOM.

78. How fitted: Revolving Cook stove

WATCHROOM—CONTINUED.

79. Bell wires, or speaking tubes, or telephones for calling relief keepers—kind: Speaking tube

80. Where led: To 3 dwellings

ILLUMINATING APPARATUS, ETC.

81. Name of maker, Barbier & Benard, Year made, 1901

82. Marks and number on apparatus, Phares & Balises Paris

83. Order of apparatus, 1st Inside diameter (inscribed circle) of central drum, 6'

84. Characteristic of light shown by apparatus, White flash every .5 seconds

85. If movable; time of revolution, 20 seconds

86. Intervals between flashes, .5 second

87. Duration of flash, 1/2 "

88. If fixed, or fixed varied by flashes; state arc of each fixed part in degrees:

89. Number of panels in the lens apparatus, 4

90. Number of flash panels, 4 ; arc of each, in degrees,

91. Number of elements in each panel of central drum of the lens, 9

92. Number of prisms in each panel *above* the central drum of the lens, 18

93. Number of prisms in each panel *below* the central drum of the lens, 8

94. How are the flashes produced—By the whole apparatus revolving Yes ; by revolving belt only if by panels of vertical elements revolving outside of fixed lens, state the number of such panels:

Describe how:

95. If by vertical elements, (*a*) state the number in each panel, ; (*b*) and the of elements of fixed lens covered by the panel:

ILLUMINATING APPARATUS, ETC.—CONTINUED.

96. Pedestal, Special pedestal with mercury float

97. Service table, None

98. Tube leading through the center of the upper metal ring of the lens into the ventilator ball, to carry off the gases of combustion and to assist in producing a proper draft in the lantern—of what material, diameter, and how fitted and connected with damper tube when in place:

Regular 1st order connecting tube.

99. If revolving, revolving machinery: Rotary carriage, with mercury float operated by clockwork.

100. Revolving on chariot, mercury float, or balls: Mercury

101. If a chariot, describe it and state the number and size of each pattern of wheels in it:

102. If on balls, describe the construction of the ball-raceways, whether flat surface, or semi-circular or V grooves:

103. State number of balls: ; diameter of balls,

104. Revolving cord or chain—how led: Cord, drops directly from drum

105. Length of drop tube, No tube open tower with guard for weight. 44' drop

106. Length of time revolving machinery will run after one winding: 2 ½ hours

107. How is the machinery protected: Iron frame with glass

ILLUMINATING APPARATUS, ETC.—CONTINUED.

108. How regulated; describe: Governor

IF COLORED LIGHT—

109. How is the color produced? Describe:

110. Red sectors—between what bearings (from seaward); magnetic, if on sea or gulf coasts; true on northern and rivers:

111. State where colored glass is attached, if to illuminating apparatus or to the lantern:

112. If colored glass is inside of illuminating apparatus, describe its form:

LAMPS AND BURNERS.

113. Description of lamp in use and number of wicks to burner: First order plunger lamp 5 wicks

114. Number of spare lamps at the station, One

115. Number of spare lamp burners at the station, 3

CLOSETS IN TOWER.

116. How fitted and used: None.

OILHOUSE OR ROOM.

117. Describe where placed and how fitted: Brick oil house painted white 150 N. Easterly of tower. No inside fittings

CLOSETS AND STOREROOMS.

118. Where placed, how fitted and used: Close in service room, fitted with shelves used for storage of supplies for the light.

119. Damp or dry, suited or unsuited to the purposes for which they were designed:

Dry & suited

FOG SIGNAL.

120. Kind and character of apparatus: 1st class Daboll trumpet with oil engine & compressor.

121. How much time is required to start the signal? Ten minutes

122. Where, or by whom made: Made in U.S. Lt Machine Shop Boston, Mass.

Year made,

123. Characteristic distinction of:

Blast	Silent interval	Blast	Silent interval
8 sec.	30 sec.	8 sec.	30 sec.

124. What parts of the fog-signal machinery are in duplicate? Duplicate engine and timing device, and reeds.

125. If a bell, state (*a*) weight, lbs.; (*b*) metal, ; (*c*) diameter, ; (*d*) height, ;

(*e*) if struck by clockwork, state time it will run with one winding,

126. If a steam signal, (*a*) describe boiler:

(*b*) Kind:

(*c*) Flue-tube or water-tube,

(*d*) Dimensions: length, diameter,

(*e*) Number and length of tubes,

(*f*) Diameter of tubes,

(*g*) Furnace: Kind, ; length, ; width, ; height,

(*h*) Total heating surface in square feet,

(*i*) Grate surface in square feet,

(*j*) Number of grate bars,

FOG SIGNAL—CONTINUED.

(*k*) Kind of grate bars,

(*l*) Kind of coal or other fuel generally used,

(*m*) Kind of safety valve,

(*n*) Maximum pressure the boiler is capable of,

(*o*) Usual working pressure,

(*p*) Diameter of smokestack,

(*q*) Height of smokestack from grate,

(*r*) Height or length of steam drum, ; diameter,

(*s*) Kind of covering or jacket,

(*t*) Present condition of boiler,

(*u*) When built,

(*v*) Where built,

(*w*) By whom built,

(*x*) Is there a heater? ; what kind, ; what size,

How much does its use reduce the time of starting the fog signal?

127. If a steam engine is used, kind: Number of revolutions per minute,

(*a*) Diameter of cylinder,

(*b*) Stroke of piston,

(*c*) Size of steam pipe,

(*d*) When built,

(*e*) Where built,

(*f*) By whom built,

128. Whistle, trumpet, or siren, pressure at which blown,

129. Diameter of whistle, ; height, ; distance between orifice and edge of whistle,

single tone, ; chime,

130. Disk or cylindrical siren, ; diameter of revolving part,

when made, ; by whom made,

number, width and length of ports, ; revolutions per minute,

type of governor, ; condition of revolving part,

131. Daboll trumpet, . Reed, Steel ; length, 20" ; breadth, 5" ; thickness at base, 13/16"

thickness at tip, 3/8"

132. Trumpet: Length, 15' ; diameters, 5" x 14" ; material, Copper

133. Timing device: Gears & cams.

FOG SIGNAL—CONTINUED.

134. Height of whistle or trumpet above mean high water, 1112 feet

135. Direction, by compass, in which trumpet points, NE.

136. If signal is blown by compressed air, describe compressing machinery:

Kind of engine, Horsby Akroyd ; by whom made, DeLa Vergne Machine Co.

when made, 1899 ; nominal size, 4"x12" horsepower, 4 ;

kind of compressor, 7x7 horizontal, single acting; name of maker, American Air Compression Works.

State if compressor is on same bed and geared with engine, or separate and belt-driven: Gear driven

137. Location, with reference to the light-house, to a particular danger or channel, or to the special object for establishing it: To warn vessels of their approach to the coast

138. Distance and direction from the light-house, 150 feet NE.

139. Water supply for it, Rain water

140. How it is reached from the light-house: Path

141. Description of fog-signal building or buildings: Brick fog-signal house 18'x22' in plan with hip roof. Located about 150 ft. northeasterly from tower.

DWELLINGS FOR KEEPERS.

142. Location, with reference to the light-house tower: Connected by covered way to tower

143. Coloring: White

144. Materials of which built, Wood

145. Number of rooms in each dwelling, Keeper's 6 — Asst. Keeper's 5 each

146. Number of keepers and assistants to each dwelling, One keeper single dwelling; two assistant keepers double dwelling

147. Outhouses, 3 fuel houses & barn

148. Coloring: White

149. Paths or walks on the premises, Plank Walks connect dwellings & from front door of [illegible]

DWELLINGS FOR KEEPERS—CONTINUED.

150. Area of premises inclosed, and how: 6 acres, with wire fence

151. Area of garden,

152. Area in timber or shrubbery,

153. Area susceptible of profitable cultivation,

154. Area cultivated or prepared for cultivation,

None

155. Character of adjacent surrounding country—Soil, sandy, clay, marsh, swamp, wood, fast ground, or sl sands: Sandy

WATER FOR FOG SIGNAL, DRINKING, AND DOMESTIC USES GENERALLY.

156. How procured, Rain water from roofs of buildings

157. Quality, Good

158. Quantity ample or not for the station at all seasons of the year, No

159. Liable or not to be injured by the inroads of storm tides and seas, No

160. If rain water in tanks or cisterns, what precautions have been taken to insure its purity?

Cleaning cistern.

161. Capacity of tanks or cisterns, and where placed: 1500 gal. in cellar

162. Tanks or cisterns—of what material made: Brick

WATER FOR FOG SIGNAL, DRINKING, AND DOMESTIC USES GENERALLY—CONTINUED.

163. Is there a distilling apparatus at the station?

Name of maker:

Capacity, ; when installed, ; condition, ;

efficiency,

164. If from a well, describe and give depth:

165. Diameter,

166. Lined or not,

167. Water obtained by pump or bucket, Pump

168. Distance from keeper's dwelling, In dwelling

HEALTHFULNESS OF THE LIGHT-STATION AND VICINITY.

169. General opinion in regard to the healthfulness or unhealthfulness of the light-station and vicinity:

Healthful

170. Diseases—what are most prevalent at the station and in the vicinity? None

171. Do they prevail at particular seasons of the year, or not? No

172. Are there any local causes, such as swamps, marshes, etc., in the immediate vicinity of the light-house which are likely to be the cause of these diseases? No

HEALTHFULNESS OF THE LIGHT-STATION AND VICINITY—CONTINUED.

173. Would draining or other artificial means employed on the light-house premises be likely to improve the sa condition of the light-station?

No.

LANDING, WHARF, BOATHOUSE, AND ROAD TO THE LIGHT-HOUSE.

174. Describe: None

The station is situated on the public road.

175. Distance and direction from light-house:

176. Hoisting engine, what kind?

Number of revolutions per minute, ; diameter of cylinder, ; stroke,

Kind of boiler:

Second DISTRICT

Department of Commerce and Labor

LIGHT-HOUSE ESTABLISHMENT

DESCRIPTION OF

BUILDINGS, PREMISES, EQUIPMENT

AT

Cape Cod

LIGHT-STATION,

Mass.

March 2 1920

11—8921

NOTE.

This Form is designed mainly to guide in preparing accurate descriptions of new light-stations, but will be used also in describing those that have been long established, when required, and especially when changes have been made at a station which affect the replies to the questions herein. Screw-pile structures and lights on keepers' dwellings should be fully described, as nearly as practicable, with reference to this Form.

DEPARTMENT OF COMMERCE AND LABOR,
LIGHT-HOUSE BOARD, *February, 1909.*

11—2921

NAME AND POSITION OF STATION.

Cape Cod, on the highlands, on the northeasterly side of Cape Cod, ...
of Massachusetts

1. By whom described, Lt. Col. Edw. Burr, Corps of Engineers, U.S.A., Engineer Second L.H. ...
2. Date of description, March 21, 1910
3. Distinguishing character of light or lights, Flashing white every five seconds
4. Latitude of light, 42° 02′ 23″ | Authority, U.S. Coast and Geodetic ...
5. Longitude of light, 70° 03′ 40″ | Chart No 110

PREMISES—A DETAILED DESCRIPTION OF, EMBRACING—

6. Site of station—Public land, purchase, Military or Naval reservation, lease: Purchase
7. Date of reservation,
8. Date of deed, August 5, 1796.
9. Date of permission to occupy,
10. Date of lease,
11. Area of the entire site, [illegible]
12. Area inclosed, [illegible]
13. Character of surface soil, [illegible]
14. Distance of tower from nearest high-water mark, [illegible]
15. Inclosures to premises, [illegible]
16. Wharf or landing on premises, [illegible]
17. Road to landing or wharf, character of, and distance from tower, [illegible]
18. Means by which the light-station may be reached, [illegible]

11—2921

PREMISES—A DETAILED DESCRIPTION OF—CONTINUED.

Distance to the nearest public road, railroad station, or steamboat landing, and to which:

Distance to nearest post office,

Distance to nearest village or town, 17 miles

Facilities for reaching the light-station by public conveyance, stage

Facilities for reaching light-station by private conveyance from nearest village, town, railroad station, or steamboat landing, and the distance: Carriage from RR sta 1¼ mile

Tower or other means used for supporting the lantern and apparatus,

Number of separate lights, ✓

When first built or established, ✓

When last thoroughly rebuilt, repaired, or renovated, 185 ✓

Condition at this date,

Shape of tower in plan, Circular

Form of tower—Cylindrical, conical, or pyramidal, Conical

Height of tower from base to ventilator ball of lantern, 66-2"

Height of focal plane of lantern above mean high water (on sea and gulf coasts) or mean lake level on northern lakes and rivers: ✓

Background of the light-house, upon which it is projected, as seen from the sea or lake: Sky

Color of tower,

Color of tower, how produced:

Tower—Connected with keeper's dwelling, and how, or detached:

Object—Seacoast, lake coast, bay, harbor, channel, or range; for general or local navigating purposes: Primary

Materials of which the tower is built:

General description, embracing—

Thickness of walls at base,

Thickness of walls at parapet, 2'-2"

PREMISES—A DETAILED DESCRIPTION OF—CONTINUED.

General description, embracing—Continued.

42. Diameter of tower (inscribed, if polygonal) at base,
43. Diameter of tower (inscribed, if polygonal) at parapet,
44. Kind of stairway and steps, Circular
45. Number of landings of stairway,
46. Size of glass for glazing tower windows,
47. Number of windows in tower, and size of sash, 3 – 2'-3½" x 2'-2½" to each
48. Number of doors,
49. Kind of foundation and depth below the surface,
50. Character of soil at and surrounding the light-house,
51. Soil susceptible of being protected by grass, shrubbery, or trees:
52. Miscellaneous remarks upon tower and site:

LANTERN AND LANTERN FIXTURES.

53. Order or class of lantern,
54. Polygonal or cylindrical,
55. Diameter, inscribed (*a*) to glass, 12'-1" ; (*b*) in the clear,
56. Number of sides in plan, 16
57. Vertical or helical bars,
58. Height glazed, 9'-11½"
59. Number of plates in height, 3
60. Number of plates in each side, 3
61. Thickness of plates,
62. Size of different plates, 28" x 47½"
63. Number of storm panes of glass,
64. Unglazed side of lantern in plates and degrees of arc, ; between what bearings (*true* and *from seaward*),
65. Materials of which the lantern is constructed,

LANTERN AND LANTERN FIXTURES—Continued.

Roof, [illegible]

Ventilator ball, [illegible]

Lightning-conductor spindle, [illegible] copper-platinum tip

Lightning conductor, of what material; how attached to spindle; how led, and how far below the surface of dry earth, or otherwise, as the case may be: [illegible] 1/8 × 1/2" attached to lan[illegible] [illegible] 6 [illegible]

Balustrade and outside gallery, [illegible]

Lantern doors, and how fitted: [illegible]

Floor of lantern—Of what materials, [illegible]

Watchroom door leading into lantern, and how fitted: [illegible] and handle

Parapet, inside diameter (inscribed, if polygonal), Circular 10' in diameter

VENTILATORS.

In parapet, wall, or lower part of lantern: Large pair of Cowles

Lantern ladders for cleaning plate glass, outside: [illegible]

Curtain hooks inside of lantern—How fitted: [illegible]

WATCHROOM.

How fitted: Ceiling and heating [illegible] described

Good [illegible]

WATCHROOM—Continued.

79. Bell wires, or speaking tubes, or telephones for calling relief keepers—Kind: [illegible]

80. Where led: [illegible]

ILLUMINATING APPARATUS, ETC.

81. Name of maker, [illegible] Year made, 1901

82. Marks and number on apparatus, [illegible]

83. Order of apparatus, 1st Inside diameter (inscribed circle, tangent to *glass*) of central drum, 6'

84. Characteristic of light shown *by apparatus*, [illegible]

85. If movable; time of revolution, —

86. Intervals between flashes, 1/2 [illegible]

87. Duration of flash, 1/2

88. If fixed, or fixed varied by flashes, state arc of each fixed part in degrees: [illegible]

89. Number of panels in the lens apparatus, 28

90. Number of flash panels, 4 ; arc of each, in degrees, 15°

91. Number of elements in each panel of central drum of lens, 8

92. Number of prisms in each panel *above* central drum of lens, 18

93. Number of prisms in each panel *below* central drum of lens, 8

94. How are the flashes produced—By the whole apparatus revolving [illegible]; by revolving belt only if by panels of vertical elements revolving outside of fixed lens, state the number of such panels:

Describe how:

95. If by vertical elements, (*a*) state the number in each panel, ; (*b*) and ~~the number~~ of elements of fixed lens covered by the panel:

ILLUMINATING APPARATUS, ETC.—Continued.

light is occulting, state (*a*) the characteristic.

(*b*) Between what time limits may characteristic be varied without structural changes in mechanism,

(*c*) Are eclipses produced by sleeve, revolving screens, or valve (if gas light),

(*d*) Size of sleeve and amplitude of movement,

(*e*) Axis of rotation of screens, horizontal or vertical, ; (*f*) relation of axis to vertical axis of illuminating apparatus,

Screens: (*g*) Do they revolve as parts, or independently, of illuminating apparatus,

(*h*) If about vertical axis, how many in circumference, ; (*i*) time required for complete revolution, ; (*j*) form, ; (*k*) how mounted (see Questions 101–109), ; (*l*) if actuated by standard clockwork, state order, ; (*m*) date made,

If occultation is effected by valve (*n*) state name of maker, ;

(*o*) pattern, ; (*p*) does it operate reliably,

Pedestal, [illegible]

Service table, [illegible]

Tube leading through center of upper metal ring of lens into ventilator ball, to carry off gases of combustion and to assist in producing proper draft in lantern—Of what material, diameter, and how fitted and connected with damper tube when in place: [illegible] $7\frac{1}{8}$ [illegible]

If revolving, revolving machinery: [illegible]

Revolving on chariot, mercury float, or balls:

If a chariot, describe it and state the number and size of each pattern of wheels in it:

ILLUMINATING APPARATUS, ETC.—Continued.

103. If on balls, describe the construction of the ball-raceways, whether flat surface, or semicircular or V grooves:

104. State number of balls: ; diameter of balls,

105. Revolving cord or chain—How led: By [illegible]

106. Length of drop tube, [illegible]

107. Length of time revolving machinery will run after one winding: [illegible]

108. How is the machinery protected? [illegible]

109. How regulated? Describe: [illegible]

IF COLORED LIGHT—

110. How is the color produced? Describe:

111. Red sectors—Between what bearings, true (from seaward):

112. State where colored glass is attached, if to illuminating apparatus or to lantern:

113. If colored glass is inside of illuminating apparatus describe its form:

ILLUMINATING APPARATUS, ETC.—Continued.

96. If light is occulting, state (*a*) the characteristic,

(*b*) Between what time limits may characteristic be varied without structural changes in mechanism,

(*c*) Are eclipses produced by sleeve, revolving screens, or valve (if gas light),

(*d*) Size of sleeve and amplitude of movement,

(*e*) Axis of rotation of screens, horizontal or vertical, ; (*f*) relation of axis to vertical axis of illuminating apparatus,

Screens: (*g*) Do they revolve as parts, or independently, of illuminating apparatus,

(*h*) If about vertical axis, how many in circumference, ; (*i*) time required for complete revolution, ; (*j*) form, ; (*k*) how mounted (see Questions 101–109), ; (*l*) if actuated by standard clockwork, state order, ; (*m*) date made,

If occultation is effected by valve (*n*) state name of maker, ;

(*o*) pattern, ; (*p*) does it operate reliably,

97. Pedestal, [illegible]

98. Service table, [illegible]

99. Tube leading through center of upper metal ring of lens into ventilator ball, to carry off gases of combustion and to assist in producing proper draft in lantern—Of what material, diameter, and how fitted and connected with damper tube when in place: [illegible]

100. If revolving, revolving machinery: [illegible]

101. Revolving on chariot, mercury float, or balls:

102. If a chariot, describe it and state the number and size of each pattern of wheels in it:

ILLUMINATING APPARATUS, ETC.—Continued.

103. If on balls, describe the construction of the ball-raceways, whether flat surface, or semicircular or V-g[illegible]

104. State number of balls: ; diameter of balls,

105. Revolving cord or chain—How led: [illegible]

106. Length of drop tube, [illegible]

107. Length of time revolving machinery will run after one winding: [illegible]

108. How is the machinery protected? [illegible]

109. How regulated? Describe: [illegible]

IF COLORED LIGHT—

110. How is the color produced? Describe:

111. Red sectors—Between what bearings, true (from seaward):

112. State where colored glass is attached, if to illuminating apparatus or to lantern:

113. If colored glass is inside of illuminating apparatus describe its form:

LAMPS, BURNERS, ETC.

1st Order

114. (a) Description of lamp in use and number of wicks, ~~or mantels~~, to burner, ; (b) diameter of outside wick, 4 7/8" ; (c) ~~diameter of mantel~~, ; (d) if more than one mantel, ~~also diameter of circumscribing circle~~, if gas light, (e) state kind, ; (f) number of burners, if more than one in group, ; (g) kind of burner, ; (h) candlepower per burner, ; (i) total candlepower of group, ; (j) consumption of gas per burner per hour, cubic feet; (k) total consumption per hour, cubic feet; (l) how is gas obtained? ; if generated at station, (m) describe generator, ; (n) state name of maker, ; (o) date of pattern, ; (p) maximum capacity per hour, cubic feet. If compressed gas is used, (q) describe container, ; (r) capacity, cubic feet of free gas; (s) to what pressure charged, lbs.; (t) how is supply renewed? ; (u) if by substitution of full for empty container, at what intervals,

115. Number of spare lamps at station,

116. Number of spare lamp burners at station, 2000

CLOSETS IN TOWER.

117. How fitted and used,

OILHOUSE OR ROOM.

118. Describe (a) where placed and how fitted, ; (b) inside dimensions, ; (c) materials of which built, ; (d) capacity in 5-gallon cans, 700

CLOSETS AND STOREROOMS.

119. Where placed, how fitted and used,

120. Damp or dry, suited or unsuited to the purposes for which they were designed,

FOG SIGNAL.

121. Kind and character of apparatus:

122. How much time is required to start the signal? ; how long may the signal sound characteristic with the quantity of air stored under pressure?

123. Where, or by whom, made:

Year made,

124. Characteristic distinction of:

Blast	Silent interval	Blast	Silent interval
8 sec.	30 sec.	8 sec.	30 sec.

125. What parts of the fog-signal machinery are in duplicate?

126. If a bell, state (a) weight, lbs.; (b) metal, ; (c) diameter, ; (d) height, (e) if struck by clockwork, state time it will run with one winding:

127. If a steam signal, (a) describe boiler:

(b) Kind,

(c) Flue-tube or water-tube,

(d) Dimensions: length, diameter,

(e) Number and length of tubes,

(f) Diameter of tubes,

(g) Furnace: Kind, ; length, ; width, ; height,

(h) Total heating surface in square feet,

(i) Grate surface in square feet,

(j) Number of grate bars,

(k) Kind of grate bars,

(l) Kind of coal or other fuel generally used,

(m) Kind of safety valve,

(n) Maximum pressure the boiler is capable of,

(o) Usual working pressure,

(p) Diameter of smokestack,

(q) Height of smokestack from grate,

(r) Height or length of steam drum, ; diameter,

FOG SIGNAL—CONTINUED.

(s) Kind of covering or jacket,

(t) Present condition of boiler,

(u) When built,

(v) Where built,

(w) By whom built,

(x) Is there a heater? ; what kind? ; what size?

How much does its use reduce the time of starting the fog signal?

128. If a steam engine is used, kind: Number of revolutions per minute,

(a) Diameter of cylinder,

(b) Stroke of piston,

(c) Size of steam pipe,

(d) When built,

(e) Where built,

(f) By whom built,

129. Whistle, trumpet, or siren, pressure at which blown, 4½ to 5½ lbs.

130. Diameter of whistle, ; height, ; distance between orifice and edge of whistle, ;

single tone, ; chime,

131. Disk or cylindrical siren, ; diameter of revolving part, ;

when made, ; by whom made, ;

number, width, and length of ports, ; revolutions per minute, ;

type of governor, ; condition of revolving part,

132. Daboll trumpet, yes. Reed, yes ; length, 20" ; breadth, 5" ; thickness at base, 1 3/16" ;

thickness at tip, 3/8"

133. Trumpet: Length, 15' ; diameters, 5" & 14" ; material, copper

134. Timing device, Automatic Clock

135. Height of whistle or trumpet above mean high water, 150 feet

136. Direction, *true*, in which trumpet points, 47°

137. If signal is blown by compressed air, describe compressing machinery:

Kind of engine, by whom made,

when made, 1899 ; nominal size, ; horsepower, ;

kind of compressor, ; name of maker, Air Compressor Works

State if compressor is on same bed and geared with engine, or separate and belt-driven:

Air Compressor

FOG SIGNAL—CONTINUED.

138. Location, with reference to light-house, to a particular danger or channel, or to the special object for which established: [illegible]

139. Distance and direction, *true*, from light-house, [illegible] 150 feet

140. Water supply for it, [illegible]

141. How is it reached from the light-house? [illegible]

142. Description of fog-signal building or buildings: [illegible]

DWELLINGS FOR KEEPERS.

143. Location, with reference to light-house tower: ~~One two~~ Single dwelling north, double dwelling East, of tower

144. Coloring: [illegible]

145. Materials of which built, [illegible]

146. Number of rooms in each dwelling, 6 [illegible] each in the two quarters

147. Number of keepers and assistants to each dwelling, [illegible]

148. Outhouses, ~~Three~~ Four

149. Coloring: [illegible] with [illegible]

150. Paths or walks on the premises, [illegible]

151. Area of premises inclosed, and how: About 63 acres by wire fence

152. Area of garden, [illegible]

153. Area in timber or shrubbery,

154. Area susceptible of profitable cultivation, [illegible] hay — 5 acres

DWELLINGS FOR KEEPERS—Continued.

55. Area cultivated or prepared for cultivation, [illegible]

56. Character of adjacent surrounding country—Soil, sandy, clay, marsh, swamp, wood, fast ground, or shifting sands: [illegible]

WATER FOR FOG SIGNAL, DRINKING, AND DOMESTIC USES GENERALLY.

57. How procured, [illegible]

58. Quality, [illegible]

59. Quantity ample or not for the station at all seasons of the year, [illegible]

60. Liable or not to be injured by the inroads of storm tides and seas, [illegible]

61. If rain water in tanks or cisterns, what precautions have been taken to insure its purity? [illegible]

62. Capacity of tanks or cisterns, and where placed: [illegible] 1200 gallons

63. Tanks or cisterns—Of what material made: [illegible]

64. Is there a distilling apparatus at the station? [illegible]

Name of maker:

Capacity, ; when installed, ; condition, ;

efficiency,

65. If from a well, describe and give depth: 4½" diam. [illegible]

66. Diameter, 4½"

67. Lined or not, [illegible]

68. Water obtained by pump or bucket, [illegible]

69. Distance from keeper's dwelling, 16 [illegible]

HEALTHFULNESS OF THE LIGHT-STATION AND VICINITY.

170. General opinion in regard to the healthfulness or unhealthfulness of the light-station and vicinity:

171. Diseases—What are most prevalent at the station and in the vicinity?

172. Do they prevail at particular seasons of the year, or not?

173. Are there any local causes, such as swamps, marshes, etc., in the immediate vicinity of the light-house which are likely to be the cause of these diseases?

174. Would draining or other artificial means employed on the light-house premises be likely to improve the sanitary condition of the light-station? [illegible]

LANDING, WHARF, BOATHOUSE, AND ROAD TO THE LIGHT-HOUSE.

175. Describe:

176. Distance and direction from light-house:

177. Hoisting engine, what kind?

Number of revolutions per minute, ; diameter of cylinder, ; stroke,

Kind of boiler:

MISCELLANEOUS REMARKS UPON THE GENERAL CHARACTER AND CONDITION OF THE PREMISES, TOWERS, BUILDINGS, AND ILLUMINATING APPARATUS AT THIS DATE.

All in Good Condition
A brick oil house used by the Navy Dep. is located 313 ft. ENE northeasterly from the tower

The premises, tower, buildings & illuminating apparatus are in good condition
A brick oil-house, used by the Navy Department, is located 313 feet northeasterly from tower.
~~Cedar Cove~~ There is a signal-display station on the reservation

Respectfully,

Edw. Burr.

Lt. Col. Corps of Engineers, *U. S. A.,*
Engineer, Second Light-House District.

Form 30

LIGHTHOUSE DISTRICT

[illegible]

[illegible]

[illegible]

[illegible]

INSTRUCTIONS

This form is to be filled out by your [illegible] for lighted stations which have not [illegible]. When changes are made in existing stations [illegible] tion previously given, pages containing the [illegible] be promptly forwarded. The use of this form should be limited to stations having resident keepers.

DESCRIPTION OF LIGHT STATION.

1. By whom described [illegible], date June 8, 1927.

STATION.

2. Name of station, Cape Cod
3. Characteristic of light, Flashing white every 5 seconds.
4. Geographical position of light: Latitude, 42° 02' 23"; longitude, 70° 03' 40".
5. Location, On Highlands north east side of Cape Cod, Mass.

PREMISES.

6. Origin of title to site of station (public land, purchase, lease, military or naval reservation), Purchase.
7. Date of reservation, deed, lease, or permission to occupy, [illegible]
8. Area of the entire site, 100478 sq. ft. (b) area inclosed, None; (c) type of fence, [illegible]
9. Distance of tower from nearest high-water mark, About 550 feet.
10. Wharf or landing on premises, None.
11. Means by which the light station may be reached and distance to nearest post office or town, with name, [illegible] road [illegible] Post Office Truro [illegible] Truro [illegible] 12 miles.
12. Tower or other means used for supporting the lantern and apparatus, Tower.
13. Number of separate lights, One.
14. When first built or established, 1798.

12/11/10 8 3/8 3 3/8

PREMISES—Continued.

15. When last thoroughly rebuilt, repaired, or renovated, 1888

16. Height of focal plane of lantern above mean high water (on sea and gulf coasts) or mean lake level on northern lakes and rivers, 183 ft

17. Background of the lighthouse, upon which it is projected, as seen from seaward, sky

18. Color of tower, and how produced, White – whitewash

19. Tower—Connected with keeper's dwelling, and how; or detached, Connected by covered way

20. Purpose of aid—Seacoast, lake coast, bay, harbor, channel, or range; for general or local navigation, ~~[illegible]~~ Primary Seacoast

21. Materials of which the tower is built, Brick and concrete

22. Kind of stairway and steps, Iron

23. Size of glass for glazing tower windows, 8"x10" and 7"x10½"

24. Number of windows in tower, and size of sash, Three 2'-3½"x2'-3½"

25. Number and size of doors, One – 3'-0"x7'-0"

26. General remarks upon tower and site, Tower stands on concrete foundation [illegible]

LANTERN AND LANTERN FIXTURES.

27. Order or class of lantern, 1st Order

28. If polygonal, state number of sides; if cylindrical, state diameter, Octagonal 16 sides

29. Vertical or helical bars, Vertical; thickness of bars, 1½"; height glazed, 9'-11½" 9'-5⅞"

30. Number of plates in height, Three; in each side, Three

31. Thickness and size of plates, 1" Top Row 28"x47 5/8" – 16 lbs; Middle Row 28"x37" – 16"; Bottom " 28"x25" – 16"

32. Unglazed side of lantern in plates and degrees of arc, None; between what bearings (true and from seaward), —

33. Materials of which the lantern is constructed, Iron

34. Roof, Iron

LANTERN AND LANTERN FIXTURES—Continued.

35. Ventilator ball, Iron

36. Lightning-conductor spindle, Copper, Vitreous tip, & grounded

37. Balustrade and outside gallery, Yes

38. Lantern doors, and how fitted, Swing hinged with latch

39. Floor of lantern—Of what materials, Iron

40. Watch-room door leading into lantern, and how fitted, Swing gear and handle

VENTILATORS.

41. In parapet, wall, or lower part of lantern, Lower part of lantern

42. Lantern ladders for cleaning plate glass, outside, None

43. Curtain hooks inside of lantern—How fitted, Spring rollers

WATCH ROOM.

44. How fitted, Painted ~~and varnished~~ sides sheathed

45. Bell wires, speaking tubes, or telephones for calling relief keepers—Kind, Telephone ~~Speaking tubes~~

46. Where led, To lower dwellings

ILLUMINATING APPARATUS, ETC.

47. Kind of apparatus, Flashing white; intensity in English candles, 350 000

48. Name of maker, Barbier & Fenestre and Lucenne; year made, 1891

49. Marks and number on apparatus, Paris

50. Order of apparatus, First; inside diameter (inscribed circle, tangent to glass) of central drum, 6'-0½"

51. **If the apparatus is a parabolic mirror,** state (*a*) diameter of opening, None; (*b*) depth of mirror, —; (*c*) its focal length, —; (*d*) material of which it is made, —

52. **If revolving,** time of revolution, 20 seconds

(*a*) duration of flash, 0.2 sec.; (*b*) duration of eclipse, 4.8 sec.

53. **If fixed,** or fixed varied by flashes, state arc of each fixed part in degrees, —;

(*a*) duration of fixed light, — sec.; (*b*) eclipse, — sec.; (*c*) flash, — sec.

ILLUMINATING APPARATUS, ETC.—Continued.

54. Number of panels in the lens apparatus, 25

55. Number of flash panels, 4; arc of each, in degrees, 22°

56. Number of elements in each panel of central drum of lens, 8

57. Number of prisms in each panel *above* central drum of lens, 18; are they fixed or flash? Fixed

58. Number of prisms in each panel *below* central drum of lens, 8; are they fixed or flash? Fixed

59. How are the flashes produced—By the whole apparatus revolving Yes; by revolving belt only —; if by panels or vertical elements revolving outside of fixed lens, state the number of such panels, —

60. **If by vertical elements,** state (*a*) the number in each panel, —; and (*b*) the number of elements of fixed lens covered by the panel, —

61. **If light is occulting,** state (*a*) the characteristic, —

(*b*) Between what time limits may characteristic be varied without structural changes in mechanism? —

(*c*) Are eclipses produced by sleeve, revolving screens, or valve (if gaslight)? —

(*d*) Size of sleeve and amplitude of movement, —

(*e*) Axis of rotation of screens, horizontal or vertical, —; (*f*) relation of axis to vertical axis of illuminating apparatus, —

(*g*) Do the screens revolve as parts, or independently, of illuminating apparatus? —

(*h*) If about vertical axis, how many in circumference, —; (*i*) time required for complete revolution, —; (*j*) form, —;

(*k*) how mounted (see Questions 62–65), —;

(*l*) if actuated by clockwork, state order and maker, —;

(*m*) date made, —

If occultation is effected by valve, state (*n*) name of maker, —;

(*o*) pattern, —;

(*p*) does it operate reliably? —

62. **If revolving,** does the apparatus revolve on chariot wheels, mercury float, or balls? Mercury float

63. **If a chariot,** describe it and state the number and size of each pattern of wheels in it, —

ILLUMINATING APPARATUS, ETC.—Continued.

64. **If on mercury float,** give (*a*) inside diameter of trough, 5' 1/4"; (*b*) inside depth of trough, 10"; (*c*) outside diameter of float, 5' 7"; (*d*) depth of float, 11 1/2"; (*e*) weight of mercury required, in pounds, about 600; (*f*) how often mercury is renewed? Have not been renewed since 1901

65. **If on balls,** (*a*) describe the construction of the ball-raceways, whether they are flat surface or semicircular or V grooves, None; (*b*) is a cage used to separate balls? —; (*c*) state number of balls, —; (*d*) diameter of balls, —

66. Clock cord or chain, kind, —; size, —; length, —; how led, —; diam. and length of clock drum, —

67. Length and inside dimensions of drop tube or weight box, No tube, weight goes in stairway; clock weight, about 200 pounds.

68. Length of time clock will run after one winding, 24 hours

69. Does clock drive apparatus while being rewound? Yes

70. How is the machinery protected? Glass case

71. How regulated? By friction by ball governor

72. Describe the pedestal, Cast iron

73. Lens protector—Is there one? No; kind, —

74. Draft tube leading into ventilator ball—Of what material, diameter, and how fitted and connected with damper tube when in place, Iron tube 7" diam. bolted in place by collar

75. **If colored light,** (*a*) how is the color produced? —

(*b*) state where colored glass is attached, if to illuminating apparatus or to lantern, —

76. If colored glass is inside of illuminating apparatus, describe its form, —

77. Red sectors—Between what bearings, true (from seaward), —

LAMPS, BURNERS, ETC.

78. Description of lamp: (a) give order, 55 m m IOV.; (b) kind of illuminant, Kero[illegible]
(c) intensity in English candles, 550 [illegible]

If oil, or oil vapor:

(a) number of wicks, or mantels, to burner, One mantle ✓;
(b) diameter of outside wick, —; (c) diameter of mantel, 2 1/8" ✓;
(d) if more than one mantel, also diameter of circumscribing circle, One only ✓

If gaslight:

(e) state kind, None; (f) number of burners, if more than one burner in group, —; (g) kind of burner, —;
(h) candlepower per burner, —; (i) total candlepower of group, —;
(j) size of burner in cubic feet of gas per hour, —;
(k) consumption of gas per hour, — cubic feet; (l) how is gas obtained?

If gas is generated at station:

(m) describe generator, None;
(n) state name of maker, —;
(o) date of pattern, —; (p) maximum capacity per hour, — — cubic feet.

If compressed gas is used:

(q) describe container and give number in service, None; spare —;
(r) capacity, — cubic feet of free gas; (s) to what pressure charged, — lbs.; (t) how is supply renewed? —;
(u) if by substitution of full for empty container, at what intervals? —

79. Number of spare lamps at station, Two
80. Number of spare lamp burners at station, —

CLOSETS IN TOWER.

81. How fitted and used, None

OIL HOUSE OR ROOM.

82. Describe (a) where placed and how fitted, About 150 feet N.E'ly from tower no fittings
(b) inside dimensions, 11'-10" X 13'-8"; (c) materials of which built, Brick;
(d) capacity in 5-gallon cans, 700

CLOSETS AND STOREROOMS.

83. Where placed, how fitted and used, None

84. Damp or dry, suited or unsuited to the purpose for which they were designed, —

FOG SIGNAL.

85. Kind and character of apparatus, 1st Class Daboll trumpet

86. How much time is required to sound the signal? 5 to 8 minutes; how long may the signal sound its characteristic with the quantity of air stored under pressure? One minute

87. Characteristic:

If ~~whistle~~, trumpet, ~~or siren~~:

Blast	Silent	Blast	Silent
8 sec.	30 sec.	8 sec.	30 sec.

~~If bell:~~ ____ strokes ____ Silent sec. ____ strokes ____ Silent sec.

88. What parts of the fog-signal machinery are in duplicate? All parts

89. Location, with reference to lighthouse, to a particular danger or channel, or to the special object for which established, To warn mariners from easterly side of Cape Cod

90. Distance and direction, true, from lighthouse, 140 feet 77°
91. Water supply for it, Cistern water
92. How is it reached from the lighthouse? Path

FOG SIGNAL—Continued.

93. **Description** of fog-signal building or buildings, Brick house with hip roof

94. **If a bell,** state (*a*) weight, None lbs.; (*b*) metal, —; (*c*) diameter, —; (*d*) height, —; (*e*) if struck by clockwork, state time it will run with one winding, —; (*f*) maker and date, —; (*g*) weights for operating, — lbs.

95. **If a steam signal,** describe boiler: (*a*) type, None; (*b*) length, —; (*c*) diameter, —; (*d*) horsepower, —; (*e*) maker and date, —; (*f*) Is there a heater? No; what kind? —; what size? —; how much does its use reduce the time of starting the fog signal?

96. **If a steam engine is used:** (*a*) kind, None; (*b*) number of revolutions per minute, —; (*c*) diameter of cylinder, —; (*d*) stroke of piston, —; (*e*) horsepower, —; (*f*) maker and date, —

97. **If internal combustion engines are used:** (*a*) kind of engine, Hornsby Akroyd; (*b*) maker, Gr. Co. Vern Refg. & Mch. Co.; (*c*) date, 1899; (*d*) nominal size, 7X8"; (*e*) horsepower, 4; (*f*) fuel used, Kerosene; (*g*) how started, Hot Tube; (*h*) kind of compressor, Single stage; (*i*) maker and date, Clayton Air Compressor Works 1899

State if compressor is on same bed and geared with engine, or separate and belt-driven, or both pistons on same rod, Separate bed geared if geared or belt-driven, state ratio, 1 to 2

Describe compressor machinery, (*a*) diameter of cylinder, 7"; (*b*) stroke of piston, 7"; (*c*) number of revolutions per minute, 150; (*d*) character and size of air-inlet valves, due 1½"; (*e*) kind of unloader, None safety valve on tank; (*f*) diameter of delivery pipe, 1½"

FOG SIGNAL—Continued.

98. (*a*) Number air receivers, Three; (*b*) diameter, Two 3-6, one 3-3; (*c*) height, Two 8-0, one 7-6; (*d*) capacity cubic feet, each, Two 80, one 65; (*e*) pressure in each, 5½; (*f*) make of reducing valve, if used, None; (*g*) remarks, These engines are ideal for fog signal purposes

99. **If whistle, trumpet, or siren,** pressure at which blown, 5½ lbs.

100. Diameter of whistle, None; height, —; distance between orifice and edge of whistle, —; single tone, —; chime, —

101. **If disk or cylindrical siren,** None; diameter of revolving part, —; when made, —; by whom made, —; number, width, and length of ports, —; revolutions per minute, —; type of governor, —; condition of revolving part, —

102. **If Daboll trumpet:** Class, 1st; reed: length, 20"; breadth, 5"; thickness at base, 1 3/16"; thickness at tip, 3/8"

103. **If trumpet:** Length, 15'-0"; diameters, 5" & 14"; material, Copper

104. Timing device, Automatic clocks

105. Height of whistle or trumpet above mean high water, 150 feet

106. Direction, *true*, in which trumpet points, 47°

107. Pressure and recording gauge, Yes

DWELLINGS FOR KEEPERS.

108. Location with reference to lighthouse tower, Keepers dwelling North, Asst's East of tower

109. Coloring, White, lead trimmings

110. Materials of which built, Wood

111. Number of dwellings, Two; number of rooms in each, Five single & bath. Keepers dwelling with bath each one

112. Describe heating plant, Direct hot water

113. Number of keepers and assistants in each dwelling, Keeper in single, two Asst's in double

114. Which keepers are furnished quarters? All

115. Which keepers are not furnished quarters? None

116. Outhouses, Two fuel houses & pump house; coloring, White lead trimmings

117. Paths or walks on the premises, Plank walks to fuel houses

118. Area susceptible of profitable cultivation, whole; area cultivated or prepared for cultivation, None

DWELLINGS FOR KEEPERS—Continued.

119. Character of adjacent surrounding country—Soil, sandy, clay, marsh, swamp, wood, fast ground, or shifting sands, Sandy

120. Furnish following data for stoves, kitchen sink, sink pump, and lamps in quarters:

Articles.	Keeper.	1st Assistant Keeper.	2d Assistant Keeper.	3d Assistant Keeper.
Stove, maker,	Magee Grand	Magee Grand	Magee Grand	
Stove, size,	7-18	7-18	7-18	
Sink, maker,	Not Known	Not Known	Not Known	
Sink, size,	22"x48"	22"x48"	22"x48"	
Pump, maker,	Douglas	Douglas	Douglas	
Pump, size,	No 2	No 2	No 2	
Lamps. (Give name, number, and make of all lamps in each set of quarters.)	1 brass hand and 1 brass table lamp from Dist. Depot	do	do	

WATER FOR FOG SIGNAL, DRINKING, ETC.

121. How procured, From deep driven well and from roofs

122. Quality, Good

123. Quantity ample or not for the station at all seasons of the year, Ample

124. Liable or not to be injured by the inroads of storm tides and seas, No

125. If rain water in tanks or cisterns, what precautions have been taken to insure its purity? Frequent cleaning

126. Capacity of tanks or cisterns, and where placed, Cisterns in each dwelling 1200 gals

127. Tanks or cisterns—Of what material made, Bricks cement plastered.

WATER FOR FOG SIGNAL, DRINKING, ETC.—Continued.

128. Is there a distilling apparatus at the station? None

Name of maker and date, —;

capacity, —; when installed, —; condition, —;

efficiency, —

129. If from a well, describe and give depth, Driven well 153 feet deep

130. Diameter, 4"; lined or not, Iron pipe

131. Water obtained by pump or bucket, Pump and pump; what power is used? Kerosene engine

132. Distance from keeper's dwelling, 16 feet

HEALTHFULNESS OF STATION.

133. General opinion in regard to the healthfulness of the light station and vicinity, Healthful

134. Diseases—What are most prevalent at the station and in the vicinity? None

135. Do they prevail at particular seasons of the year, or not? —

136. Are there any local causes, such as swamps, marshes, etc., in the immediate vicinity of the lighthouse which are likely to be the cause of these diseases? No

137. Would draining or other artificial means employed on the lighthouse premises be likely to improve the sanitary condition of the light station? No

BOATS.

138. Furnish following data for each boat at station: None

Number.	Type.	Length.	Width.	When Built.	Date Received at Station.	Is Boat Fitted with Sails?	Suited to Work Performed.

BOATS—Continued.

139. **If power boat,** kind of engine, None; horsepower, —;

maker of engine, shop number, and date, —

(*a*) type, size, number, and maker's name of spare coil, —

(*b*) type, size, number, and maker's name of magneto, —

(*c*) type and number of batteries, —

(*d*) propeller wheel, diameter, —; pitch, —

140. Where are boats kept at station? None

LANDING, WHARF, BOATHOUSE, AND ROAD TO THE LIGHTHOUSE.

141. Description, None

142. Distance and direction of landing from lighthouse, No suitable Track landing

143. Hoisting engine, what kind? None;

diameter of cylinder, —; number of revolutions per minute, —;

stroke, —; kind of boiler, —;

maker and date, —

144. General Remarks: The tower dwellings Fog Signal building and apparatus in good condition. There is a wireless station operated by Navy Dept located on northern end of reservation.

[illegible]

Form 60

SECOND LIGHTHOUSE DISTRICT

DEPARTMENT OF COMMERCE

DESCRIPTION

OF

LIGHT STATION

No. MASSACHUSETTS

1796
1798

580'

INSTRUCTIONS

This form is to be filled out for new stations as established [illegible] for present stations which have not heretofore been described. When changes are made at existing stations affecting the description previously given, pages containing the revised data should be promptly forwarded. The use of this form should be limited to stations having resident keepers.

DESCRIPTION OF LIGHT STATION.

1. By whom described ....., date .....

STATION.

2. Name of station, Cape Cod
3. Characteristic of light, Flashing white every 5 seconds.

4. Geographical position of light: Latitude, 42° 02' 23"; longitude, 70° 03' 40".
5. Location, On highlands northeast side of Cape Cod Mass.

PREMISES.

6. Origin of title to site of station (public land, purchase, lease, military or naval reservation), Purchase
7. Date of reservation, deed, lease, or permission to occupy, August 5, 1796
8. Area of the entire site, 10A. ~~47 Rods~~ (b) area inclosed, whole; (c) type of fence, Wire concrete posts.
9. Distance of tower from nearest high-water mark, About 580 feet.
10. Wharf or landing on premises, None
11. Means by which the light station may be reached and distance to nearest post office or town, with name, By public road: Post Office, North Truro, distant 1¼ miles.
12. Tower or other means used for supporting the lantern and apparatus, Tower
13. Number of separate lights, One
14. When first built or established, 1798

PREMISES—Continued.

15. When last thoroughly rebuilt, repaired, or renovated, 1857

16. Height of focal plane of lantern above mean high water (on sea and gulf coasts) or mean lake level on northern lakes and rivers, 183 feet

17. Background of the lighthouse, upon which it is projected, as seen from seaward, Sky

18. Color of tower, and how produced, White - whitewash

19. Tower—Connected with keeper's dwelling, and how; or detached, Connected by covered way

20. Purpose of aid—Seacoast, lake coast, bay, harbor, channel, or range; for general or local navigation, Primary seacoast.

21. Materials of which the tower is built, Bricks and cement.

22. Kind of stairway and steps, Iron

23. Size of glass for glazing tower windows, 8 x 10" and 9 x 10½"

24. Number of windows in tower, and size of sash, Three 2'-3½" x 22½"

25. Number and size of doors, One 3'-0" x 7'-0"

26. General remarks upon tower and site, Tower sets on concrete foundation - Land is sandy.

LANTERN AND LANTERN FIXTURES.

27. Order or class of lantern, 1st order

28. If polygonal, state number of sides; if cylindrical, state diameter, Polygonal-16 sides

29. Vertical or helical bars, Vertical; thickness of bars, 1 1/8"; height glazed, 9'-5 7/8"

30. Number of plates in height, Three; in each side, Three

31. Thickness and size of plates, 1/4" - Top Row 28" x 47 3/8" - 16 Lts.
Middle " 28" x 39" - 16 "
Bottom " 28" x 25" - 16 "

32. Unglazed side of lantern in plates and degrees of arc, none, between what bearings (true and from seaward), —

33. Materials of which the lantern is constructed, Iron

34. Roof, Iron

LANTERN AND LANTERN FIXTURES—Continued.

35. Ventilator ball, Iron

36. Lightning-conductor spindle, Copper, platinum tip and grounded

37. Balustrade and outside gallery, yes

38. Lantern doors, and how fitted, Iron hinged with latch

39. Floor of lantern—Of what materials, Iron

40. Watch-room door leading into lantern, and how fitted, Hinges and handle

VENTILATORS.

41. In parapet, wall, or lower part of lantern, Lower part of lantern

42. Lantern ladders for cleaning plate glass, outside, Iron

43. Curtain hooks inside of lantern—How fitted, Spring rollers

WATCH ROOM.

44. How fitted, Pedestal and sides sheathed.

45. Bell wires, speaking tubes, or telephones for calling relief keepers—Kind, None

46. Where led, —

ILLUMINATING APPARATUS, ETC.

47. Kind of apparatus, Flashing white; intensity in English candles, 4,000,000

48. Name of maker, Barbier, Benard & Turenne; year made, 1901

49. Marks and number on apparatus, Paris

50. Order of apparatus, First; inside diameter (inscribed circle, tangent to glass) of central drum, 6'-0 ½"

51. **If the apparatus is a parabolic mirror,** state (*a*) diameter of opening, None; (*b*) depth of mirror, —; (*c*) its focal length, —; (*d*) material of which it is made, —

52. **If revolving,** time of revolution, 20 seconds
(*a*) duration of flash, 0.2 sec.; (*b*) duration of eclipse, 4.8 sec.

53. **If fixed,** or fixed varied by flashes, state arc of each fixed part in degrees, —;
(*a*) duration of fixed light, — sec.; (*b*) eclipse, — sec.; (*c*) flash, — sec.

ILLUMINATING APPARATUS, ETC.—Continued.

54. Number of panels in the lens apparatus, 28

55. Number of flash panels, 4; arc of each, in degrees, 90°

56. Number of elements in each panel of central drum of lens, 8

57. Number of prisms in each panel *above* central drum of lens, 18; are they fixed or flash? Flashing

58. Number of prisms in each panel *below* central drum of lens, 8; are they fixed or flash? Flashing

59. How are the flashes produced—By the whole apparatus revolving yes; by revolving belt only —; if by panels or vertical elements revolving outside of fixed lens, state the number of such panels, —

60. **If by vertical elements,** state (*a*) the number in each panel, —; and (*b*) the number of elements of fixed lens covered by the panel, —

61. **If light is occulting,** state (*a*) the characteristic, —

(*b*) Between what time limits may characteristic be varied without structural changes in mechanism? —

(*c*) Are eclipses produced by sleeve, revolving screens, or valve (if gaslight)? —

(*d*) Size of sleeve and amplitude of movement, —

(*e*) Axis of rotation of screens, horizontal or vertical, —; (*f*) relation of axis to vertical axis of illuminating apparatus, —

(*g*) Do the screens revolve as parts, or independently, of illuminating apparatus? —

(*h*) If about vertical axis, how many in circumference, —; (*i*) time required for complete revolution, —; (*j*) form, —;

(*k*) how mounted (see Questions 62–65), —;

(*l*) if actuated by clockwork, state order and maker, —;

(*m*) date made, —

If occultation is effected by valve, state (*n*) name of maker, —;

(*o*) pattern, —;

(*p*) does it operate reliably? —

62. **If revolving,** does the apparatus revolve on chariot wheels, mercury float, or balls? Mercury float

63. **If a chariot,** describe it and state the number and size of each pattern of wheels in it, —

ILLUMINATING APPARATUS, ETC.—Continued.

64. **If on mercury float,** give (*a*) inside diameter of trough, 5'-7¼"; (*b*) inside depth of trough, 10"; (*c*) outside diameter of float, 5'-7"; (*d*) depth of float, 11½"; (*e*) weight of mercury required, in pounds, about 600; (*f*) how often mercury is renewed? Never has been renewed since 1901

65. **If on balls,** (*a*) describe the construction of the ball-raceways, whether they are flat surface or semicircular or V grooves, None; (*b*) is a cage used to separate balls? —; (*c*) state number of balls, —; (*d*) diameter of balls, —

66. Clock cord or chain, kind, —; size, —; length, —; how led, —; diam. and length of clock drum, —

67. Length and inside dimensions of drop tube or weight box, No tube, weight goes in stair well; clock weight, about 200 pounds.

68. Length of time clock will run after one winding, 2¼ hours

69. Does clock drive apparatus while being rewound? yes

70. How is the machinery protected? Glass case

71. How regulated? By friction fly ball governor. The above clock is now used as standby—use motor and speed reducer unit for driving lens

72. Describe the pedestal, Cast iron

73. Lens protector—Is there one? no; kind, —

74. Draft tube leading into ventilator ball—Of what material, diameter, and how fitted and connected with damper tube when in place, yes—black iron 7½" dia. held in space by cellar

75. **If colored light,** (*a*) how is the color produced? —

(*b*) state where colored glass is attached, if to illuminating apparatus or to lantern, —

76. If colored glass is inside of illuminating apparatus, describe its form, —

77. Red sectors—Between what bearings, true (from seaward), —

LAMPS, BURNERS, ETC.

78. Description of lamp: (a) give order, 1000 watt P.S.52-clear C-T filament elec. incandescent; (b) kind of illuminant, Electric

(c) intensity in English candles, 1670

If oil, or oil vapor:

(a) number of wicks, or mantels, to burner, —;

(b) diameter of outside wick, —; (c) diameter of mantel, —;

(d) if more than one mantel, also diameter of circumscribing circle, —

If gaslight:

(e) state kind, none; (f) number of burners, if more than one burner in group, —; (g) kind of burner, —;

(h) candlepower per burner, —; (i) total candlepower of group, —;

(j) size of burner in cubic feet of gas per hour, —;

(k) consumption of gas per hour, — cubic feet; (l) how is gas obtained? —

If gas is generated at station:

(m) describe generator, none;

(n) state name of maker, —;

(o) date of pattern, —; (p) maximum capacity per hour, — cubic feet.

If compressed gas is used:

(q) describe container and give number in service, none; spare —;

(r) capacity, — cubic feet of free gas; (s) to what pressure charged, — lbs.; (t) how is supply renewed? —;

(u) if by substitution of full for empty container, at what intervals? —

79. Number of spare lamps at station, Four

80. Number of spare lamp burners at station, —

CLOSETS IN TOWER.

81. How fitted and used, none

OIL HOUSE OR ROOM.

82. Describe (a) where placed and how fitted, About 150 ft. N.E'ly from tower (no fittings)

(b) inside dimensions, 11'-10" x 13'-8"; (c) materials of which built, Bricks;

(d) capacity in 5-gallon cans, 700 - 56 cell battery installed in oilhouse to supply current for station needs

CLOSETS AND STOREROOMS.

83. Where placed, how fitted and used, none

84. Damp or dry, suited or unsuited to the purpose for which they were designed, —

FOG SIGNAL.

85. Kind and character of apparatus, 1st class Daboll trumpet standard Type 325 Sub Signal & air oscillator main fog signal Installed 1929

86. How much time is required to sound the signal? 5 to 8 minutes; how long may the signal sound its characteristic with the quantity of air stored under pressure? One minute

87. Characteristic:

If ~~whistle~~, trumpet, ~~or siren~~:

Blast	Silent	Blast	Silent
8 sec.	30 sec.	8 sec.	30 sec.

~~If bell~~:

..... strokes ..... Silent sec. ..... strokes ..... Silent sec.

88. What parts of the fog-signal machinery are in duplicate? All parts

89. Location, with reference to lighthouse, to a particular danger or channel, or to the special object for which established, To warn mariners from easterly side of Cape Cod.

90. Distance and direction, true, from lighthouse, 140 feet N°

91. Water supply for it, Cistern water

92. How is it reached from the lighthouse? Path

FOG SIGNAL—Continued.

93. Description of fog-signal building or buildings, Brick house with hip roof.

94. **If a bell,** state (*a*) weight, None lbs.; (*b*) metal, —; (*c*) diameter, —; (*d*) height, —; (*e*) if struck by clockwork, state time it will run with one winding, —; (*f*) maker and date, —; (*g*) weights for operating, — lbs.

95. **If a steam signal,** describe boiler: (*a*) type, None; (*b*) length, —; (*c*) diameter, —; (*d*) horsepower, —; (*e*) maker and date, —

(*f*) Is there a heater? —; what kind? —; what size? —; how much does its use reduce the time of starting the fog signal? —

96. **If a steam engine is used:** (*a*) kind, None; (*b*) number of revolutions per minute, —; (*c*) diameter of cylinder, —; (*d*) stroke of piston, —; (*e*) horsepower, —; (*f*) maker and date, —

97. **If internal combustion engines are used:** (*a*) kind of engine, Hornsby-Akroyd; (*b*) maker, De La Vergne Refg. & Mch. Co. and Novo Engine; (*c*) date, 1899; (*d*) nominal size, 7x8"; (*e*) horsepower, 4; (*f*) fuel used, Kerosene; (*g*) how started, Hot ball; (*h*) kind of compressor, Single stage; (*i*) maker and date, Clayton Air Compressor Works 1899.

State if compressor is on same bed and geared with engine, or separate and belt-driven, or both pistons on same rod, Sep. bed geared; if geared or belt-driven, state ratio, 1 to 2

Describe compressor machinery, (*a*) diameter of cylinder, 7"; (*b*) stroke of piston, 7"; (*c*) number of revolutions per minute, —; (*d*) character and size of air-inlet valves, disc 1½"; (*e*) kind of unloader, safety valve on tank; (*f*) diameter of delivery pipe, 1½"

FOG SIGNAL—Continued.

98. (*a*) Number air receivers, Two; (*b*) diameter, Two 3'-6" one 3'-3"; (*c*) height, Two 8'-0" one 7-6; (*d*) feet, each, Two 8'-0" one 6-5; (*e*) pressure in each, 5½; (*f*) make of reducing valve, if used, None; (*g*) remarks, These engines are ideal for fog signal purposes

99. **If whistle, trumpet, or siren,** pressure at which blown, 5½ lbs.

100. Diameter of whistle, None; height, —; distance between orifice and edge of whistle, —; single tone, —; chime, —

101. **If disk or cylindrical siren,** —; diameter of revolving part, —; when made, —; by whom made, —; number, width, and length of ports, —; revolutions per minute, —; type of governor, —; condition of revolving part, —

102. **If Daboll trumpet:** Class, 1st; reed: length, 20"; breadth, 5"; thickness at base, 1 5/16"; thickness at tip, 3/8"

103. **If trumpet:** Length, 15'-0"; diameters, 5" and 14"; material, Copper

104. Timing device, Automatic clocks

105. Height of whistle or trumpet above mean high water, 150 feet

106. Direction, *true*, in which trumpet points, 47°

107. Pressure and recording gauge, yes

DWELLINGS FOR KEEPERS.

108. Location with reference to lighthouse tower, Keepers' dwelling North-Asst's East of tower

109. Coloring, White lead trimmings

110. Materials of which built, Wood

111. Number of dwellings, Two; number of rooms in each, Six single & bath - ten double with bath each side

112. Describe heating plant, Direct hot water

113. Number of keepers and assistants in each dwelling, Keeper in single, two Asst's in double.

114. Which keepers are furnished quarters? All

115. Which keepers are not furnished quarters? None

116. Outhouses, Two fuel houses & pump house; coloring, White lead trim.

117. Paths or walks on the premises, Cement walks to fuel houses.

118. Area susceptible of profitable cultivation, whole; area cultivated or prepared for cultivation None

DWELLINGS FOR KEEPERS—Continued.

119. Character of adjacent surrounding country—Soil, sandy, clay, marsh, swamp, wood, fast ground, or shifting sands, sandy

120. Furnish following data for stoves, kitchen sink, sink pump, and lamps in quarters:

Articles.	Keeper.	1st Assistant Keeper.	2d Assistant Keeper.	3d Assistant Keeper.
Stove, maker,	Magee-Grand	Magee-Grand	Magee-Grand	
Stove, size,	7-18	7-18	7-18	
Sink, maker,	Don't know	Not known	not known	
Sink, size,	22x48"	22x48"	22x48"	
Pump, maker,	Douglas	Douglas	Douglas	
Pump, size,	No. 2	No. 2	No. 2	
Lamps. (Give name, number, and make of all lamps in each set of quarters.)	1 brass hand and 1 brass table lamp from Gen. Depot.	do	do	

WATER FOR FOG SIGNAL, DRINKING, ETC.

121. How procured, from deep driven well and from roofs.

122. Quality, Good

123. Quantity ample or not for the station at all seasons of the year, Ample

124. Liable or not to be injured by the inroads of storm tides and seas, No

125. If rain water in tanks or cisterns, what precautions have been taken to insure its purity? Frequent cleaning

126. Capacity of tanks or cisterns, and where placed, Cisterns in each dwelling 1200 gals.

127. Tanks or cisterns—Of what material made, Bricks cement plastered.

WATER FOR FOG SIGNAL, DRINKING, ETC.—Continued.

128. Is there a distilling apparatus at the station? None

Name of maker and date, —;

capacity, —; when installed, —; condition, —;

efficiency, —

129. If from a well, describe and give depth, Driven well 155 feet deep.

130. Diameter, 4"; lined or not, Iron pipe

131. Water obtained by pump or bucket, Pump; what power is used? Kerosene engine and pump.

132. Distance from keeper's dwelling, 16 feet

HEALTHFULNESS OF STATION.

133. General opinion in regard to the healthfulness of the light station and vicinity, Healthful

134. Diseases—What are most prevalent at the station and in the vicinity? None

135. Do they prevail at particular seasons of the year, or not? —

136. Are there any local causes, such as swamps, marshes, etc., in the immediate vicinity of the lighthouse which are likely to be the cause of these diseases? No

137. Would draining or other artificial means employed on the lighthouse premises be likely to improve the sanitary condition of the light station? No

BOATS.

138. Furnish following data for each boat at station: None

Number.	Type.	Length.	Width.	When Built.	Date Received at Station.	Is Boat Fitted with Sails?	Suited to Work Performed.

BOATS—Continued.

139. **If power boat**, kind of engine, None; horsepower, —;

maker of engine, shop number, and date, —

(*a*) type, size, number, and maker's name of spare coil, —

(*b*) type, size, number, and maker's name of magneto, —

(*c*) type and number of batteries, —

(*d*) propeller wheel, diameter, —; pitch, —

140. Where are boats kept at station? —

LANDING, WHARF, BOATHOUSE, AND ROAD TO THE LIGHTHOUSE.

141. Description, None

142. Distance and direction of landing from lighthouse, No suitable beach landing.

143. Hoisting engine, what kind? None;

diameter of cylinder, —; number of revolutions per minute, —;

stroke, —; kind of boiler, —;

maker and date, —

144. General Remarks: The tower dwellings, fog signal building and apparatus in good condition. There is a wireless station and compass station operated by Navy Dept. located on northerly end of reservation. Light changed to electric Oct. 28, 1933.

APPENDIX F.

CONTRACT FOR ALTERATIONS TO LIGHTHOUSE, 1812

Between Henry A.S. Dearborn, Deputy Collector and Winslow Lewis

(National Archives, Waltham Branch, RG 26,
Letters Received by Boston Collector,
Contract in Lighthouse Letters, Microfilm Reel 94/4)

Articles of Agreement entered into this seventeenth day of June, Anno Domini, Eighteen hundred and twelve, between Henry A. S. Dearborn, Deputy Collector for the district of Boston & Charlestown, in behalf of the United States, on the one part and Winslow Lewis, of Boston, in the County of Suffolk, in the Commonwealth of Massachusetts, Gentleman, on the other part, Witnesseth that the said Winslow Lewis on his part, hereby agrees & engages to take

the

the Light House on Cape Cod, as it now stands, to make the following alterations, to wit: to cut off seventeen feet from the top of said Light House, and put on it thereafter a deck made of timber, sufficiently strong to support a new Lantern, and to be covered with three inch plank, and then sheathed with Copper, said deck to rise six inches in the centre, and project eight inches from the side of the building. — to make and put on to the deck of said Light House, a new Lantern of the following dimensions & materials, viz: The Lantern to be of an octagon form, ten feet high from the deck to the eaves; in each side of the lantern eighteen sashes, fourteen inches square, the sashes to come within two feet of the deck; and the remainder of the lantern to the deck to be covered with Copper: the posts of the lantern to be two inches square at top, & two & a half inches at bottom of the lantern: the posts to be run down six feet below the deck, and fasten to a timber twelve inches square framed into the building for that purpose: a door two feet wide and four feet high in one of the sides of the lantern, made with an iron frame & covered with Copper: the roof or the dome of the lantern to project from the side six inches, to be framed with sixteen iron rafters to meet in the centre in an iron hoop, eight inches wide, to be covered with heavy Copper. On the top of the Roof or dome there must be a Copper globe as a Ventilator, two feet six inches in diameter, with a Vane of iron or Copper on the globe, sufficiently large to turn it; the lantern to be glazed with the best double glass of the Boston Glass House manufacture. An iron Railing on the outside of the lantern on the outer edge of the deck four feet high, the supporting posts of which to be ten feet high, the top of which are to be bolted to the top hoop of the lantern, each post to be one & a quarter of an inch square. The new woodwork of the building on the outside to be covered with two good Coats of paint, and the whole of the Lantern & iron railing to be painted inside and out three over. All the aforesaid alterations & work to be made & finished in a workmanlike manner in and before the first day of July next, for the consideration of the sum of two thousand dollars. And the said Henry A. S. Dearborn, in

[illegible] the said Lewis engages on his part to pay the said Winslow Lewis the aforesaid sum of two thousand dollars, in the manner following, to wit: One thousand dollars when the Contract with Winslow Lewis for the faithful performance thereof have been signed by said Lewis, and the other One thousand dollars when the said Lewis shall have completed said alterations in conformity with the foregoing Agreement. Provided that no Member of Congress shall be concerned or interested in this Contract.

In Witness whereof the parties have hereunto interchangeably set their hands & seal the day & date above mentioned.

Signed & sealed in presence of
Wm Rowson
Andw Hamer

(Signed)

Winslow Lewis (Seal)
H. A. S. Dearborn (Seal)
Collector

This may Certify that by order of the Superintendent of Light Houses for Massachusetts I have examined the Light House on Cape Cod fitted up by Winslow Lewis on his new plan and find it executed agreeable to Contract and in a workmanlike manner.

(Signed) John Foster Williams

APPENDIX G.

CONTRACT FOR THE CONSTRUCTION OF THE SECOND CAPE COD LIGHT, 1831

Between David Henshaw, Collector, in behalf of the United States of America and Winslow Lewis

(National Archives, RG 26, Lighthouse Contracts, Contract Book E, p. 259-62)

July 22 1831.
Winslow Lewis
Contract Light &c.
Cape Cod — J 4023.

Recorded in Contract book
E. page 259. 260 261. 262

Cape Cod

REPRODUCED AT THE NATIONAL ARCHIVES

Light-House upon Cape Cod

Articles of Agreement entered into this Twenty Second day of July in the year of our Lord One thousand eight hundred and thirty one between David Hinsdale Collector for the District of Boston and Charlestown, in behalf of the United States of America, on the one part, and Winslow Lewis of Boston in the Commonwealth of Massachusetts, on the other part, Witnesseth: that the said Winslow Lewis on his part agrees & engages to build a Light House and Dwelling House at Truro, Cape Cod, of the following dimensions, dimensions and description, viz. The Tower of the Light house to be of hard brick, of form round. The foundation to be sunk as deep as necessary to make the whole fabric secure, to be laid in good lime mortar. The height of the tower to be thirty feet from the surface of the ground. The diameter of the base to be twenty two feet, and the top twelve feet. Thickness of the walls at the Base to be three and a half feet, to be uniformly graduated to two feet at the top. The top to be arched, on which is to be laid a block of soap stone, fourteen feet in diameter, four inches thick, the joints filled in with lead, one side of which to be a scuttle, twenty-four by twenty inches, to enter the lantern; the scuttle-door an iron frame covered with Copper. The outside wall is to be white-washed twice over. There are to be three windows in the tower, of twelve lights each, of ten by eight glass, strong frames and a door five feet by three feet, made of double inch boards, cross nailed, with substantial hinges, lock and latch. The sill, posts and cap of the door to be of stone. The ground floor to be paved with brick or stone. A sufficient number of circular stairs to lead from the ground floor to within six feet of the lantern, connected by a centre [illegible] entrance of the scuttle to be an iron ladder, with steps two and a half inches wide. On the top of the tower, to be an iron lantern of an octagon form, the posts to be two inches square, to run down five feet into the brick work, and secured with anchors. The height and diameter of the lantern to be sufficient to admit an iron sash in each octagon to contain twenty one lights of fourteen by twelve glass, the lower tier to be filled with Copper; the rabbets of the sashes to be three quarters of an inch deep and glazed with double glass from the New England Glass Manufactory. In one of the octagons to be an iron framed door covered with Copper, four feet by two in the clear, to shut tight into the rabbets, with a strong turner button. The top to be a dome formed by sixteen iron rafters concentrating in an iron hoop six inches wide, nine inches diameter, covered with Copper, thirty two ounces to the square foot, which is to come down and rivet in the piece, that forms the top of the sash, which is to be three inches wide. On the dome to be a traversing ventillator, two and a half feet long and fifteen inches diameter, on which is to be secured a vane three feet long and twenty inches wide, the ventillator & vane to be framed with iron, covered with Copper and painted black. Around the lantern to be an iron railing, the posts of

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materials, dimensions and description, viz. The Tower of the Light-house to be of hard brick, the form round. The foundation to be sunk as deep as necessary to make the whole fabric secure, to be laid in good lime mortar. The height of the tower to be thirty feet from the surface of the ground. The diameter of the base to be twenty two feet, and the top twelve feet. Thickness of the walls at the Base to be three and a half feet, to be uniformly graduated to two feet at the top. The top to be arched, on which is to be laid a deck of soap stone, fourteen feet in diameter, four inches thick, the joints filled in with lead, on one side of which to be a scuttle, twenty-four by twenty inches, to enter the lantern, the scuttle-door an iron frame covered with copper. The outside wall is to be white-washed twice over. There are to be three windows in the tower, of twelve lights each, of ten by eight glass in strong frames and a door five feet by three feet, made of double inch boards, cross-nailed, with substantial hinges, lock and latch. The sill, posts and cap of the door to be of stone. The ground floor to be paved with brick or stone. A sufficient number of circular stairs to lead from the ground floor to within six feet of the lantern, connected by a [illegible] post; the stairs and floor to be two inch plank, planed. From the top of the stairs to the entrance of the scuttle to be an iron ladder, with steps two and a half inches wide. On the top of the tower, to be an iron lantern of an octagon form, the posts to be two inches square, to run down five feet into the brick work and secured with anchors. The height and diameter of the lantern to be sufficient to admit an iron sash in each octagon to contain twenty one lights of fourteen by twelve glass, the lower tier to be filled with copper, the rabbets of the sashes to be three quarters of an inch deep and glazed with double glass from the New England Glass Manufactory. In one of the octagons to be an iron framed door covered with copper, four feet by two in the clear, to shut tight into the rabbets, with a strong turn button. The top to be a dome formed by sixteen iron rafters concentrating in an iron hoop [illegible] inches wide, nine inches diameter, covered with copper, thirty two ounces to the square foot, which is to come down and rivet in the piece, that forms the top of the sash, which to be three inches wide. On the dome to be a traversing ventillator, two and a half feet long and fifteen inches diameter, on which is to be secured a vane three feet long and twenty inches wide, the ventillator & vane to be framed with iron, covered with copper and painted black. Around the lantern to be an iron railing, the posts which to be one and three eighths of an inch square, connected by three railings three quarters of an inch square, the upper one to be four feet from the deck. The lantern and wood-work of the tower to be painted twice over with white lead, except the dome which is to be black. The light house to be furnished with one complete electrical conductor of copper, three quarters of an inch in diameter, with points. The Dwelling House to be of brick, twenty six feet front by twenty eight deep, one story, eight feet in the clear, a cellar under the whole with outer doors and steps leading to it. The walls of the cellar and house to be twelve inches thick, the roof rectangular. The house to be divided as follows,

REPRODUCED AT THE NATIONAL ARCHIVES

follows: in front a room 4 feet square; an entry 4 feet wide in front of the chimney; a bed-room 8 feet by 9; a chimney in the centre of the house. In the back part a kitchen 15 ft. by 12; a bed-room 8 ft. by 9, and a pantry 5 feet by 8; between the front bed room and kitchen, to the right of the chimney, to be stairs leading to the chambers with doors to communicate with the front entry and kitchen; a fire place in the front room and one in the kitchen, with closets fitted to the chimney. The chambers to be partitioned off, and lathed and plastered, double floored and well nailed. The inside wall and ceiling to be lathed and plastered; to be three windows in the front room, one window in the front bed-room, one window in the back bed-room, four windows in the kitchen, one window in the pantry, opposite the stair way and two in each of the chambers; each window on the lower story to contain sixteen lights, and the chamber windows twelve lights of ten by eight glass. All the timber to be sound and well seasoned; the roof to be shingled with good pine shingles. The doors, which are to be two in the front room, one from the front bedroom and one from the back bedroom, one from the pantry, one to the stairs which are to lead into the cellar from the side of the house (and which stairs are to be a plank), one to each of the chambers, two to the stairway and the two outer doors, front and back, to be four panneled, except the front door which is to be a frieze door, to have good hinges and thumb latches; the front outer door to have a lock. On one side of the chimney in the kitchen to be an oven of suitable size with an iron door; The kitchen fire place to be furnished with an iron crane hammers and hook, a good sink to be built in the kitchen with a gutter to lead through the brick wall. The roof of the house to have gutters and spouts to lead off the water, the out house five feet by four; boarded & shingled. All the wood work, except the roof, inside & out, to be painted three over. A well to be sunk in the cellar, sufficiently deep to procure good water, if practicable, to be walled or bricked, and fitted with a Cast-iron pump, to stand in the sink in the kitchen. The Light House to be furnished with eight double tin oil cuts, to hold ninety gallons each; eight wooden horses; two spare lamps; one lantern canister and iron funnel; one tube box; one wick box; one oil cannis; one glazier's diamond; one torch, one hand lantern and lamp; two pair scissors; two files; two tube cleaners; one stove and funnel; one oil feeder and all the necessary apparatus, in the same manner as Light Houses of the United States have been fitted up by Winslow Lewis with the addition of apparatus for conducting the heat of the lamps to the oil therein. The whole - the buildings and fitting up - to be completed by the middle of November next; to be done and finished in a workmanlike manner for the sum of Thirty nine hundred and ninety three dollars, including both the buildings and fitting up the Light.

And the said Dante Henshaw, in his capacity aforesaid, agrees and engages on his part to pay to said Winslow Lewis the sum of Thirty nine hundred & ninety three Dollars, when the whole of said work shall have been completed in conformity to his foregoing agreement, and approved by the Superintendant of the establishment, provided that no member of Congress shall be concerned in this contract nor interested therein.

REPRODUCED AT THE NATIONAL ARCHIVES

room, one window in the back bed-room, four windows in the kitchen, one window in the pantry on opposite the stair way and two in each of the chambers; each window on the lower floor to contain sixteen lights, and the chamber windows twelve lights of ten by eight glass. All the timber to be sound and well seasoned; the roof to be shingled with good pine shingles. The doors, which are to be two in the front room, one from the front bedroom, one from the back bedroom, one from the pantry, one to the stairs which are to lead into the cellar from the inside of the house (and which stairs are to be of plank), one to each of the chambers, two to the stairway and the two outer doors, front and back, to be four pannelled, except the front door which is to be a frieze door, to have good hinges and thumb latches; the front outer door to have a good lock. On one side of the chimney in the kitchen to be an oven of suitable size with an iron door; The kitchen fire place to be furnished with an iron crane, pannoms and hook, a good sink to be built in the kitchen, with a gutter to lead through the brick wall. The roof of the house to have gutters and spouts to lead off the water. An out house five feet by four, boarded & shingled. All the wood work, except the roof, inside & out, to be painted twice over. A well to be sunk in the cellar sufficiently deep to procure good water; [illegible] to be [illegible] brick, and fitted with [illegible] pump [illegible] in the sink in the kitchen. The Bright House to be furnished with eight double X tin oil butts, to hold ninety gallons each; eight wooden horses; two spare lamps; one lantern canister and iron funnel, one tube box; one wick box; one oil carrier; one glazier's diamond; one torch; one hand lantern and lamp; two pair scissors; two files; two tube cases; one stove and funnel; one oil feeder, and all the necessary apparatus, on the same manner as Bright Houses of the United States have been fitted up by Winslow Lewis with the addition of apparatus for conducting the heat of the lamps to the oil there. The whole - the buildings and fitting up - to be completed by the middle of November next; to be done and finished in a workmanlike manner for the sum of Thirty nine hundred and ninety three dollars, including both the buildings and fitting up the Bright.

And the said David Henshaw, in his capacity aforesaid, agrees and engages on his part to pay to said Winslow Lewis the sum of Thirty nine hundred & ninety three Dollars, when the whole of said work shall have been completed in conformity to the foregoing agreement, and approved by the superintendant of the establishment, provided that no member of Congress shall be concerned in this contract, nor interested therein.

Signed & Sealed in presence of

Gustavus Horton

Samuel F. Allen

David Henshaw Collector

Winslow Lewis

REPRODUCED AT THE NATIONAL ARCHIVES

APPENDIX H.

REPORT OF LIEUT. EDWARD W. CARPENDER, U.S.N., 1838

(National Archives, RG 26, Lighthouse Clipping Files)

REPRODUCED AT THE NATIONAL ARCHIVES

(Highlands, Truro.)

Report of Lieut. Edward W. Carpender, U.S.N.
New York, November 1, 1838.

x x x x x

Doc. Rel. to Lighthouses 1789–1871. p. 186.

Cape Cod light.—This great and important light stands nine miles to the eastward of Race point, on the high land of Truro, 160 feet above the level of the sea. It consists of 15 lamps, with 15-inch reflectors, in two circular series, 8 in the lower and 7 in the upper. These lamps are so arranged as to be seen from Boston bay as well as the sea. I noticed one of the lamps, in the lower series, to be fronting the iron door of the lantern; of course, to no useful purpose. It should be removed to the upper series, where there is room enough for it. These reflectors are from one to two inches apart, while (without any apparent reason for it) there are ten inches between two of them. I recommend, as at Long Island head, the removal of these reflectors, so that all the lamps in the lantern may be seen from all points of the compass—an effect which cannot be produced while the reflectors intercept the light of half the lamps.

I visited this light a few minutes before sundown, and found the keeper (alarmed at the sight of the revenue cutter) stolen into his lantern to make a hasty rub-up against the expected visit. Time did not admit of the necessary preparations being made before the hour of lighting. But few of the lamps were trimmed. Such chimneys as had been touched were imperfectly cleaned. The reflectors had no appearance of having been recently burnished, and the glass of the lantern was smoked. This light, on account of its magnitude and elevation, would, if properly kept and attended, illuminate this whole coast all the way down to Chatham, a distance of 25 miles; at all events until it intersected that light, which is itself 70 feet above the level of the sea.

This tower is of brick, 30 feet high. The walls, at the base, are 3½ feet thick—one-third more than the walls of the stone tower at Clark's point, which is 10 feet higher. The interior width at the base is 15 feet, two feet more than that tower. The finishings (as steps, doors, sills, &c.) are of wood, exhibiting, though only built seven years, some signs of decay.

This lantern is eight feet high, two feet higher than is necessary. The glass, 12 by 14, is of a better quality than any yet observed. Premises in good order.

APPENDIX I.

REPORT OF I.W.P. LEWIS, C.E., BY ORDER OF HON. W. FORWARD, SECRETARY OF TREASURY, 1842

(National Archives, RG 26, Lighthouse Clipping Files)

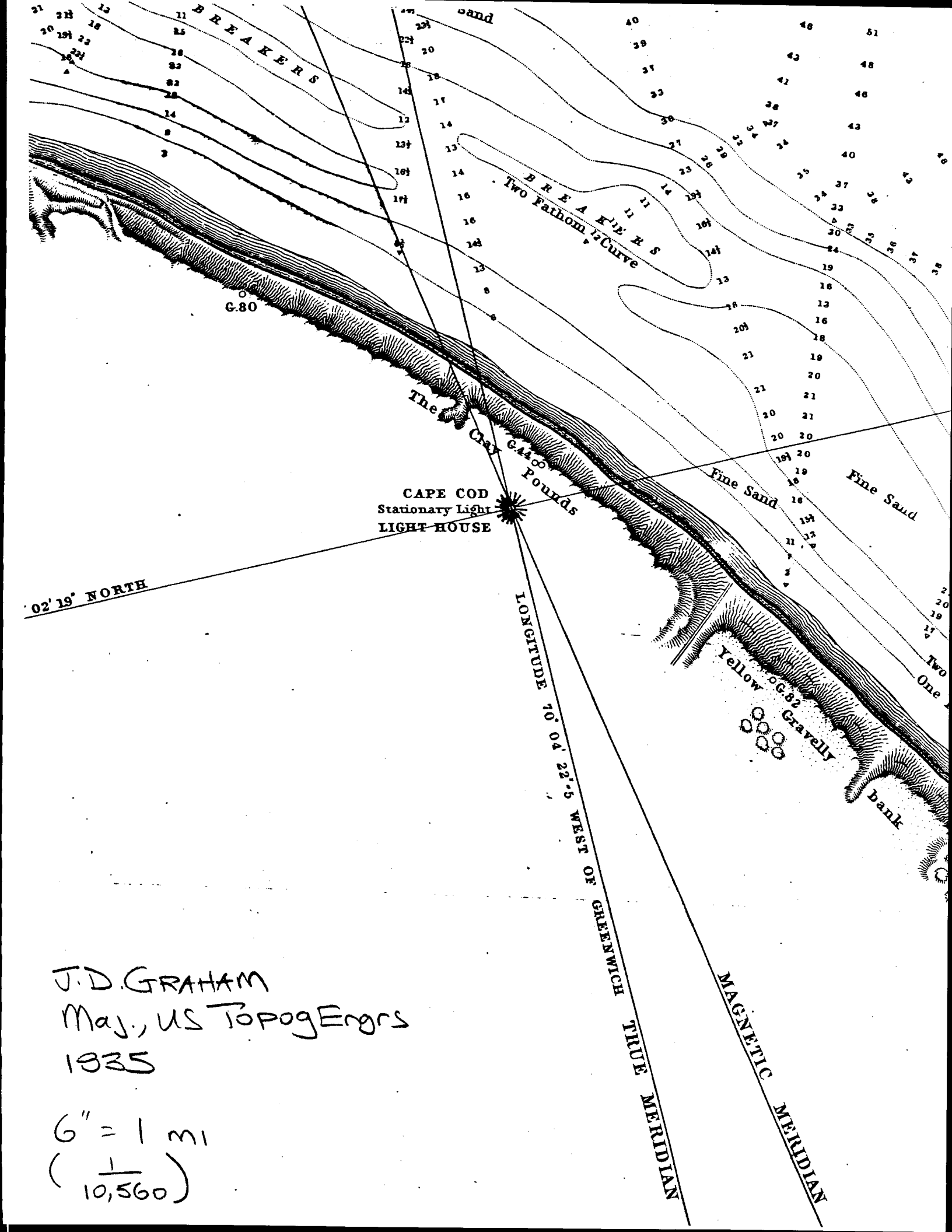
REPRODUCED AT THE NATIONAL ARCHIVES

Report of I.W.P. Lewis, C.E., by order of Hon. W. Forward, Sect'y of Treasury, on the condition of the lt-hos., &c., coasts of Me., N.H., & Mass., in 1842.

x x x x x

Doc. Rel. to Lt-hos. 1789-1871. p. 358.

An illustration of the usual method of constructing brick light-houses is presented, showing an elevation and vertical section of the light-house at Truro, Cape Cod, which was erected by contract in 1833, at a cost of $4,162. This tower was refitted by me in 1840. It will be seen that, in the original construction, the door and window frames, of wood, were set flush with the exterior surface, and at the same angle of inclination. These, with the wooden staircase, (the ends of the steps and risers being bedded into the masonry,) were all rotten. The window frames and staircase were pulled out by hand; and the removal of the latter brought down a portion of the inner face wall, when it was discovered that the interior of the walls was laid without mortar, the brick being loosely thrown in, and the interstices filled with sand. At the base, which *rested* on the *surface of the ground*, there was found in the interior of the wall a large number of stones, thrown in to fill up and save brick. On removing the lantern, the mortar of this superstructure was found to have so little cohesion, that the masons, to save time, shovelled off the bricks; and thirteen feet of the tower were taken down in this manner, before arriving at a part that presented sufficient surface and stability to justify a reconstruction. The tower was, however, rebuilt, and rendered fire proof throughout by the introduction of cast-iron door, window frames, sashes, staircase, roof, and lantern, together with a hot-air furnace, to heat the building in winter. The door and window frames were recessed, and set perpendicularly. The newel of the spiral stairs, being a cylinder of cast iron, communicating by means of a flue, (passing out below the base of the tower,) with the external air, and receiving near its top the smoke pipe of the furnace, assists materially in ventilating the lantern during cold weather. The roof of the tower is formed of one disc of cast iron, fifteen feet in diameter, with a flange beneath, six inches deep, that shuts down over the cornice, and effectually prevents all leakage. The plinth and dome of the lantern are also each cast in one piece, the latter being supported by sixteen wrought-iron stiles, four by one inch, set edgewise to the light. There are but sixteen panes of glass in the lantern, each five feet high and two feet wide. The lamps are cast-brass Argand fountains, with ¾-inch burners; the reflectors, true paraboloids, (made on a cast-iron die, turned and polished with the utmost care,) twenty-one inches in diameter, with a focal axis of three inches, plated with twenty-one ounces of pure silver, and weighing fourteen pounds each. The burners are perfectly adjusted to the focal point, and so attached to the frame-work that the keeper has no power to alter the adjustment. The reflectors are also set truly vertical, and without the possibility of being disturbed in their positions either by carelessness or accident. The whole lighting apparatus is supported upon a massive frame of cast iron, placed in the centre of the lantern. Much animadversion has been thrown upon this construction, from the fact that it cost $5,919, which amount is contrasted with the expense of refitting by *contract* the light-house at Cape Henlopen for $3,600. In Document 811, (2d session 27th Congress, page 72,) the items of respective cost are set forth by the Fifth Auditor, in a letter to George Bancroft, Esq., endeavoring to convey the idea that the refittal was of a similar character in both cases, and that, therefore, the cost should be the same. The statement there made is not a fair exposition of the truth.



J. D. GRAHAM
Maj., US Topog Engrs
1935

6" = 1 mi
(1/10,560)

APPENDIX K.

CAPE COD LIGHT STATION RESERVATION SURVEY, 1885 (Printed 1886)

(Microfilm, U.S. Coast Guard Academy Library, New London, Connecticut)

CAPE COD, MASS.

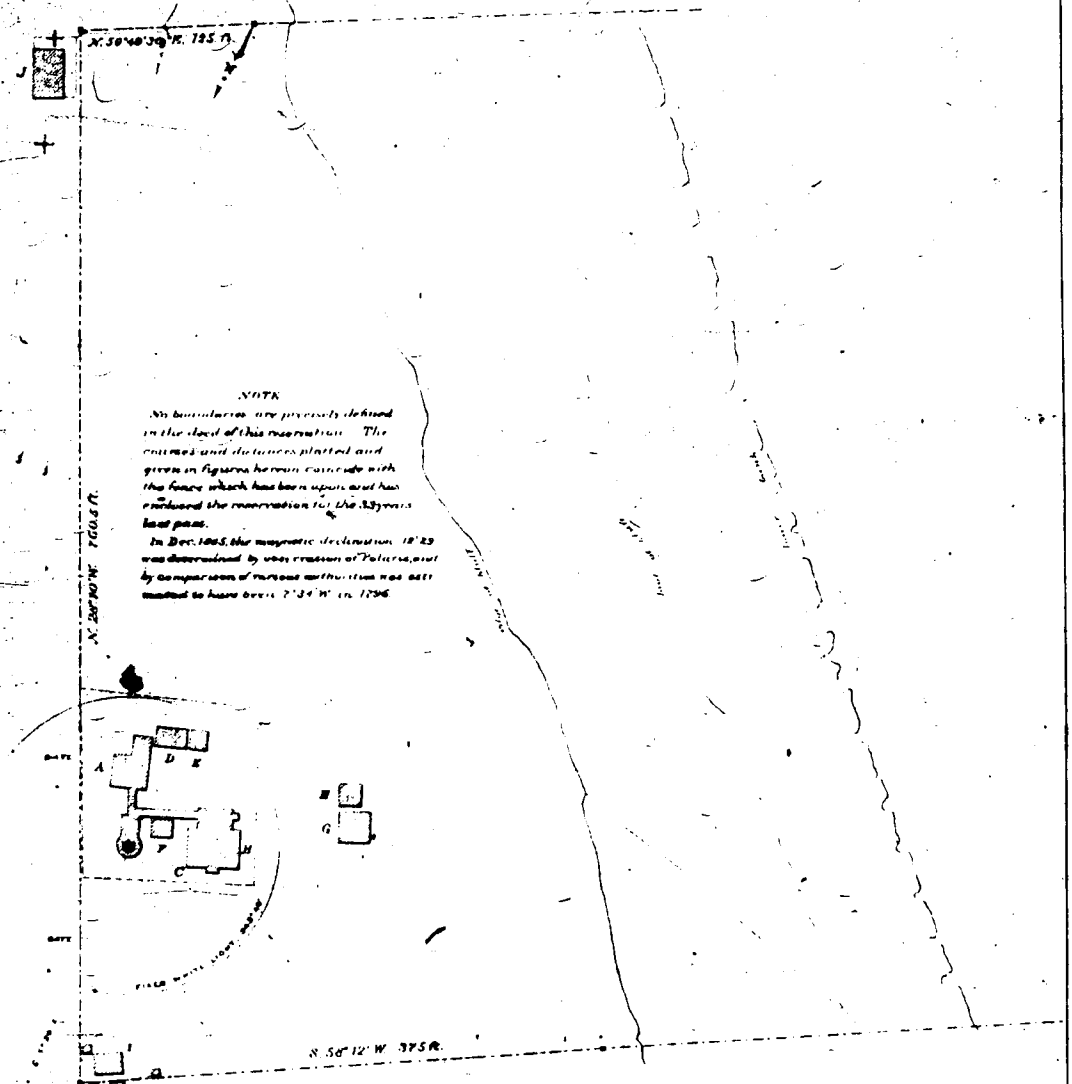
LIGHT STATION.

On the N.E. or seaward side of Cape Cod, Highlands, Truro, Mass.

Lat. 42° 2' 21" N.; Long. 70° 3' 39" W.

Reservation Surveyed Dec. 18 to 23, 1885, by E.P. ADAMS, C.E., L.H. Surveyor.

Scale. 1:600



NOTE

No boundaries are precisely defined in the deed of this reservation. The courses and distances platted and given in figures hereon coincide with the fence which has been upon and has enclosed the reservation for the 33 years last past.

In Dec. 1885, the magnetic declination 18°23' was determined by observation of Polaris, and by comparison of various authorities was estimated to have been 7°34' W. in 1796.

Kind of Light	Primary Sea Coast	Site Purchased	Aug. 5, 1796.
Order of Light	1st	Deed Recorded in Barnstable Co. Reg. Book 49 p. 65.	
Characteristic of Light	Fixed White	First Buildings, when built	1797.
Base of Tower above water level	142 ft.	When rebuilt or renovated	Rebuilt, 1857.
Focal Plane " " "	195 ft.	Area of Reservation as deed Nov. A.D. to M.H.W.	9.955 A
Kind of Fog Signal	1st Class Daboll Trumpet	Area enclosed, to edge of bluff	4.222 Acres
Characteristic " "	Blasts 8 sec. intervals 30s	" " by picket fence	0.383 "

EXPLANATIONS: Mag. Dec. in 1796 (est. 7°34'), det. at survey 12°29' W. Courses given on Plan are True bearings.

● Light Tower. A. Principal Keeper's Dwelling. B. First Assistant's Dwelling. C. Second Asst's Dwelling. D. E. F. Keepers' Wood Houses. G. Fog Signal House. H. Coal House. — Mean High Water Line. — — Boundary of Reservation. Line of Fence. ● Stone Bound 30 long, 6"×6" top cut thus: —. Stake set for True Meridian. I. Barn and Hen houses. J. Merchant Marine Telegraph.

C. J. Allen, L.H. Surveyor 1st & 2d Dists.

H. L. Stanton, Maj. of Engrs. Engr. 1st & 2d L.H. Dists.

US LHE

OFFICE OF L.H. ENGR., ROBBINS BOSTON MASS., MAR. 27, 1886.

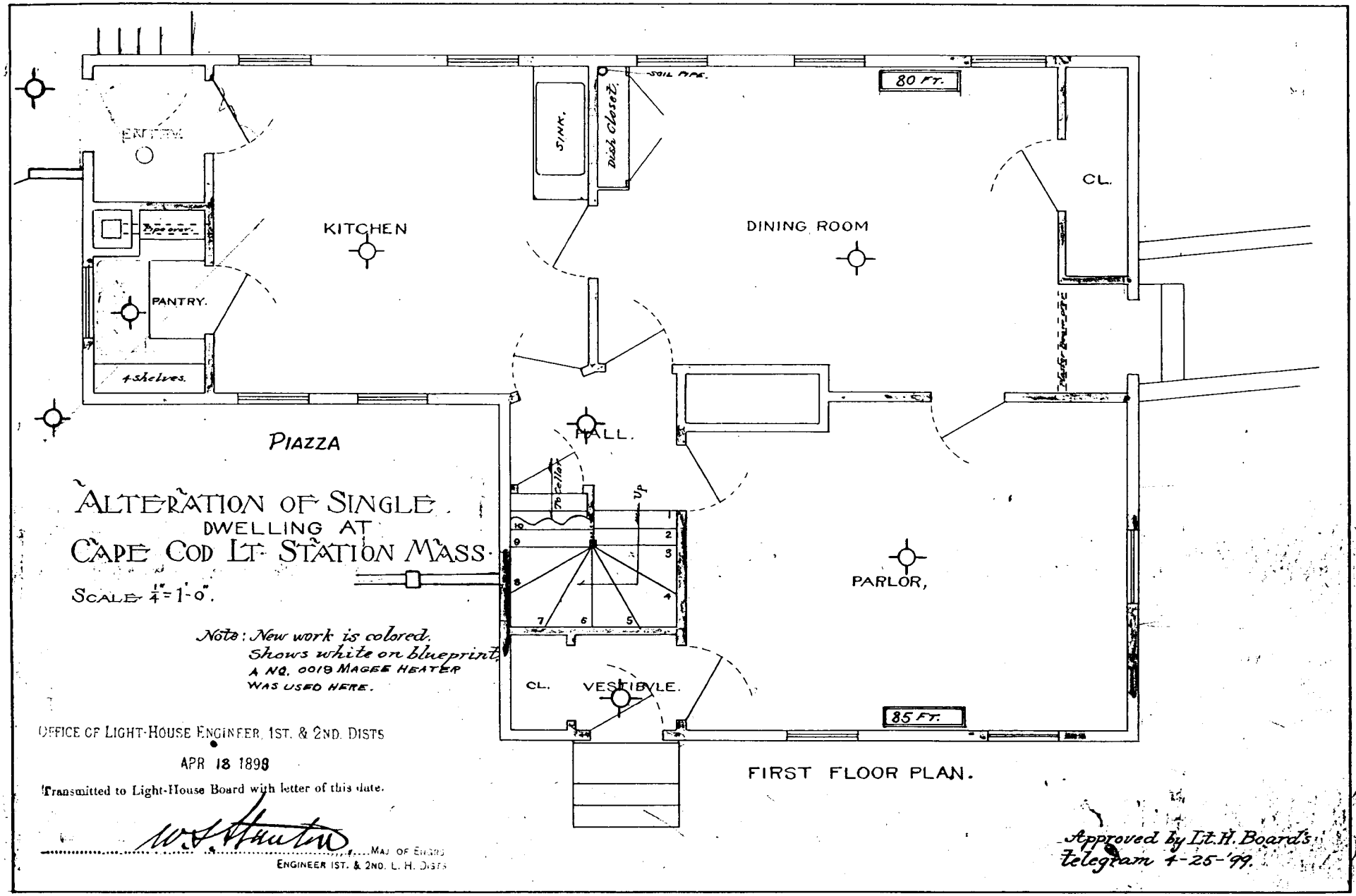
(P)

2-5C-23

APPENDIX L.

ALTERATION OF SINGLE DWELLING AT CAPE COD LIGHT STATION MASS. APRIL 18, 1899

(Archives, USCG Civil Engineering Unit Providence)



ALTERATION OF SINGLE DWELLING AT CAPE COD LT. STATION MASS.

SCALE $\frac{1}{4}$" = 1'-0".

Note: New work is colored. Shows white on blueprint. A No. 0019 MAGEE HEATER WAS USED HERE.

OFFICE OF LIGHT-HOUSE ENGINEER, 1ST. & 2ND. DISTS

APR 18 1898

Transmitted to Light-House Board with letter of this date.

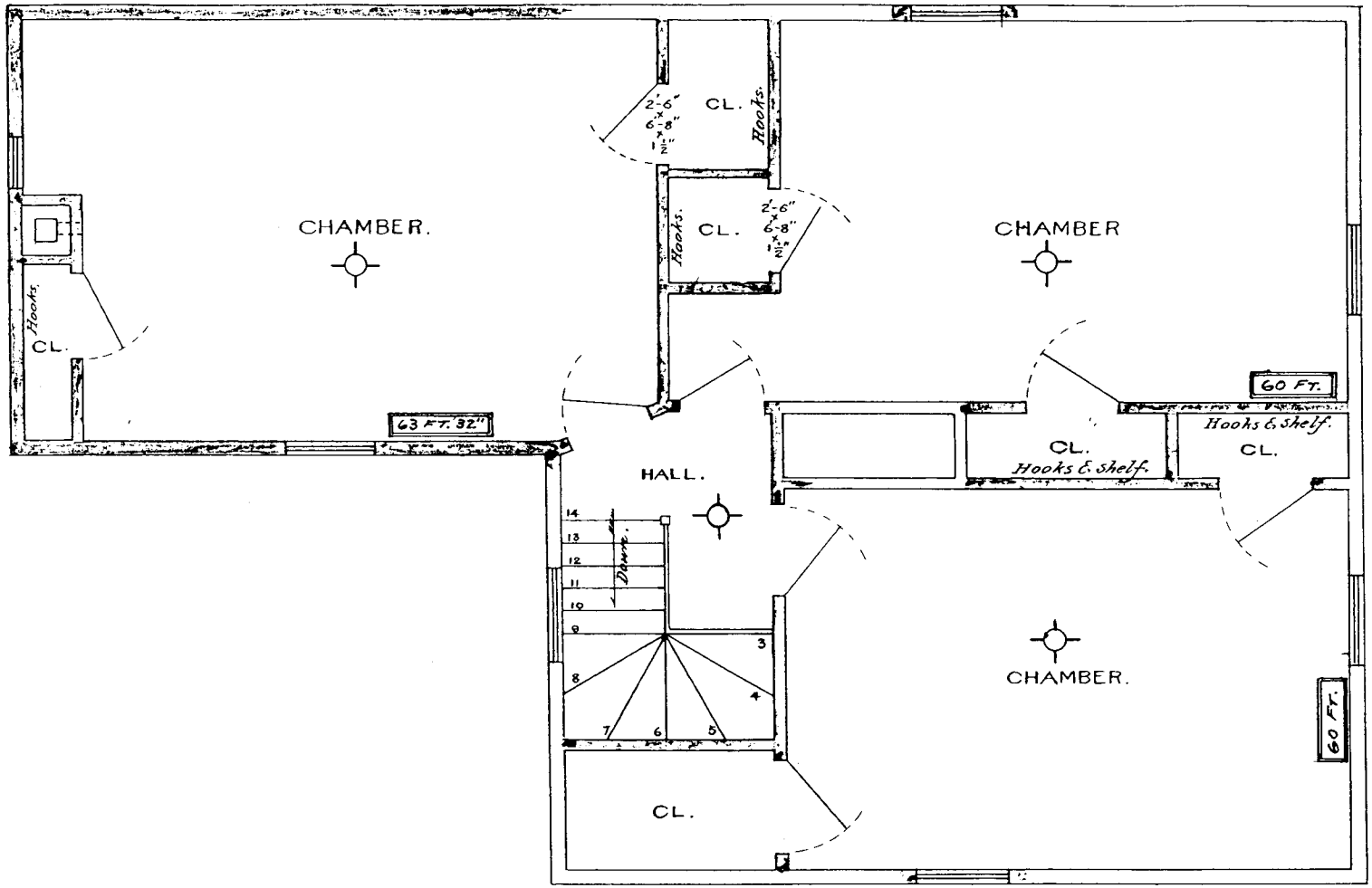
W. S. Hunter ..... MAJ. OF ENGRS
ENGINEER 1ST. & 2ND. L. H. DISTS

Approved by Lt. H. Board's telegram 4-25-'99.

(8)

No 21) S. 38.

No. 1577 Sheet 1



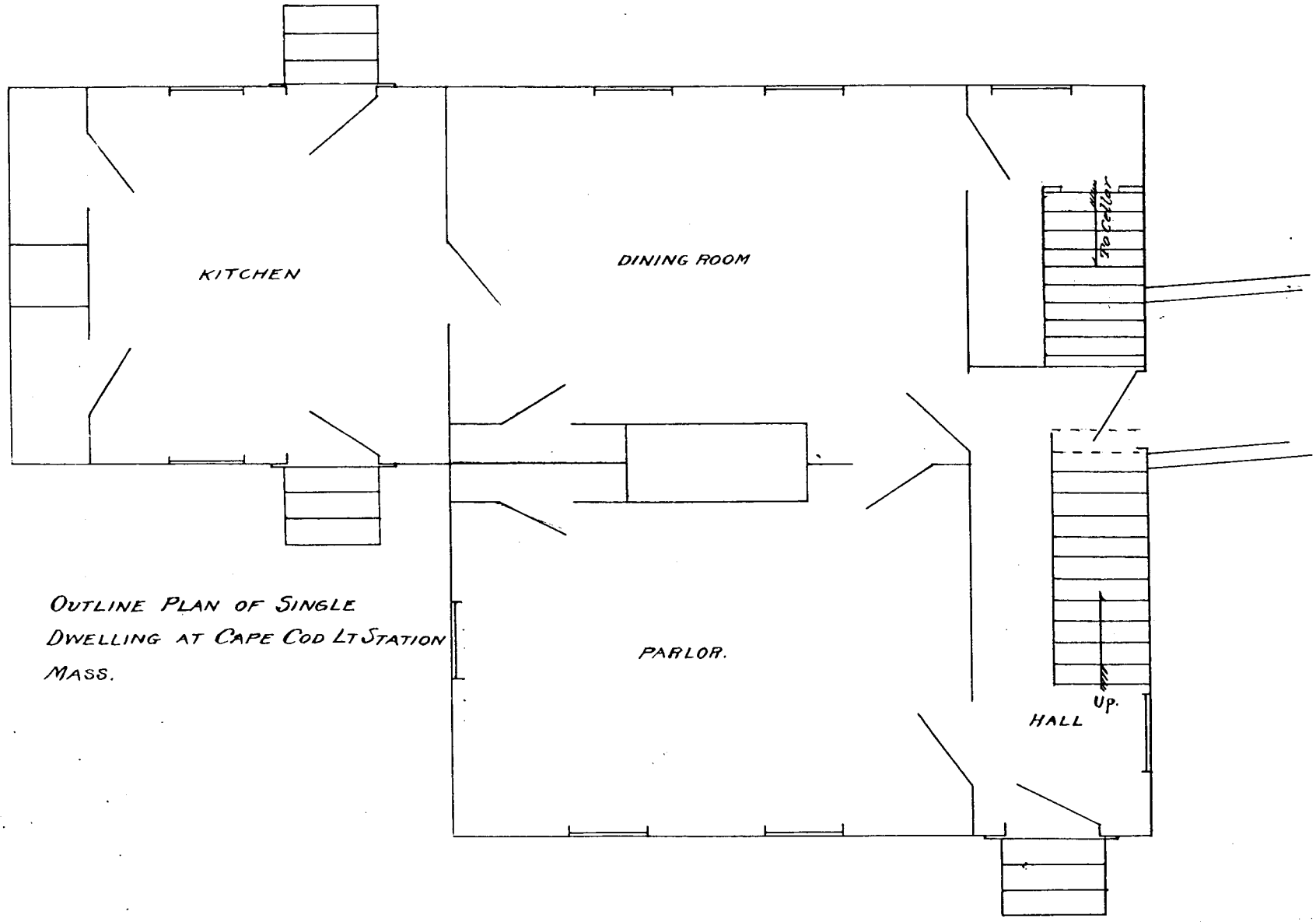
SECOND FLOOR PLAN.
SCALE $\frac{1}{4}$ = 1'-0".

CAPE COD 4/5

No. 1577 Sheet

ELEVATION.
SCALE $\frac{1}{4}$" = 1'-0".

Cape Cod 4/5 Nº 1577



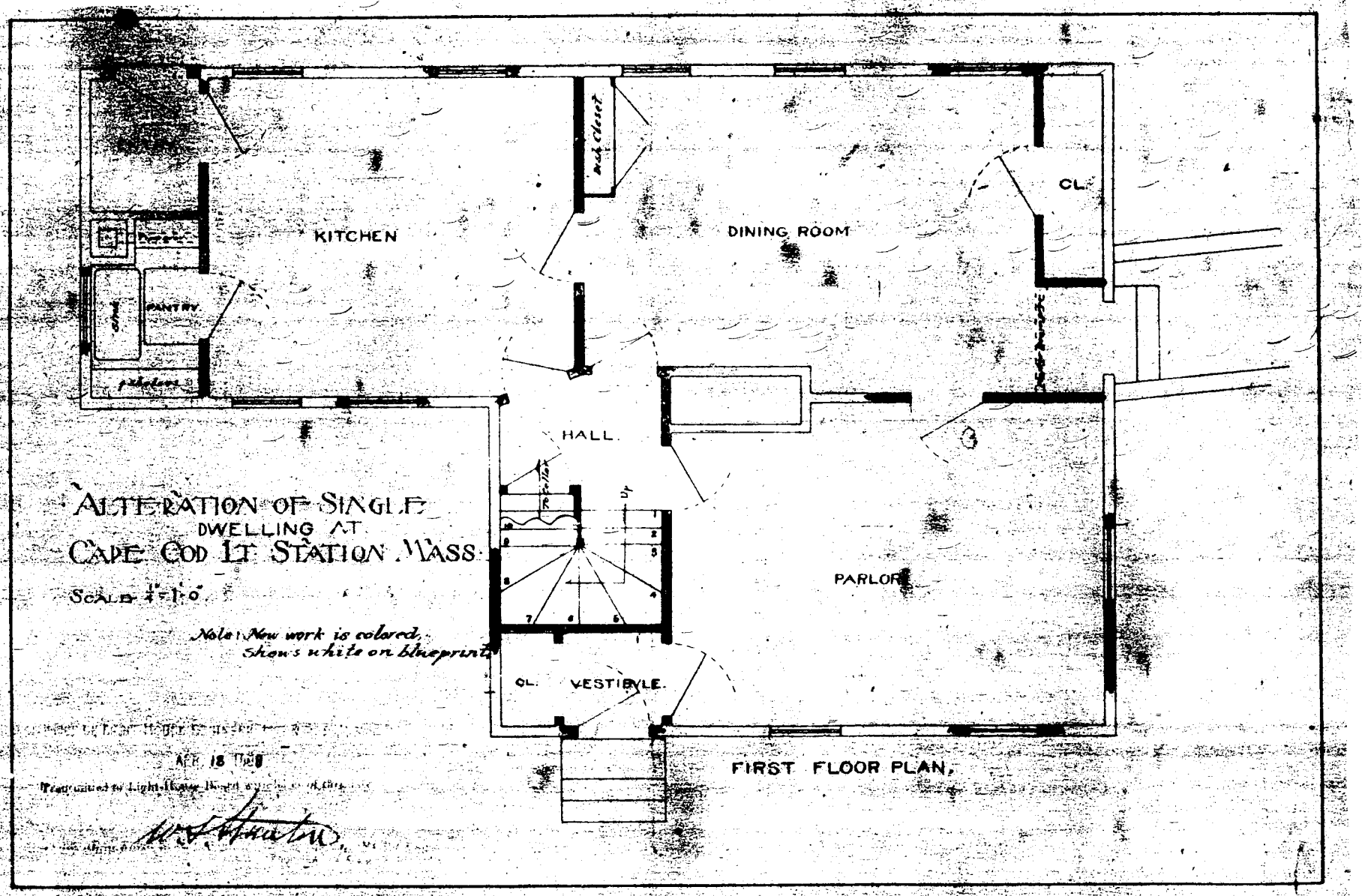
OUTLINE PLAN OF SINGLE DWELLING AT CAPE COD LT STATION MASS.

No 1577 sheet 3

APPENDIX M.

ALTERATION OF SINGLE DWELLING AT CAPE COD LIGHT STATION MASS. APRIL 18, 1899

(Microtext, U.S. Coast Guard Academy Library, New London, Connecticut)



ALTERATION OF SINGLE DWELLING AT CAPE COD LT STATION MASS.

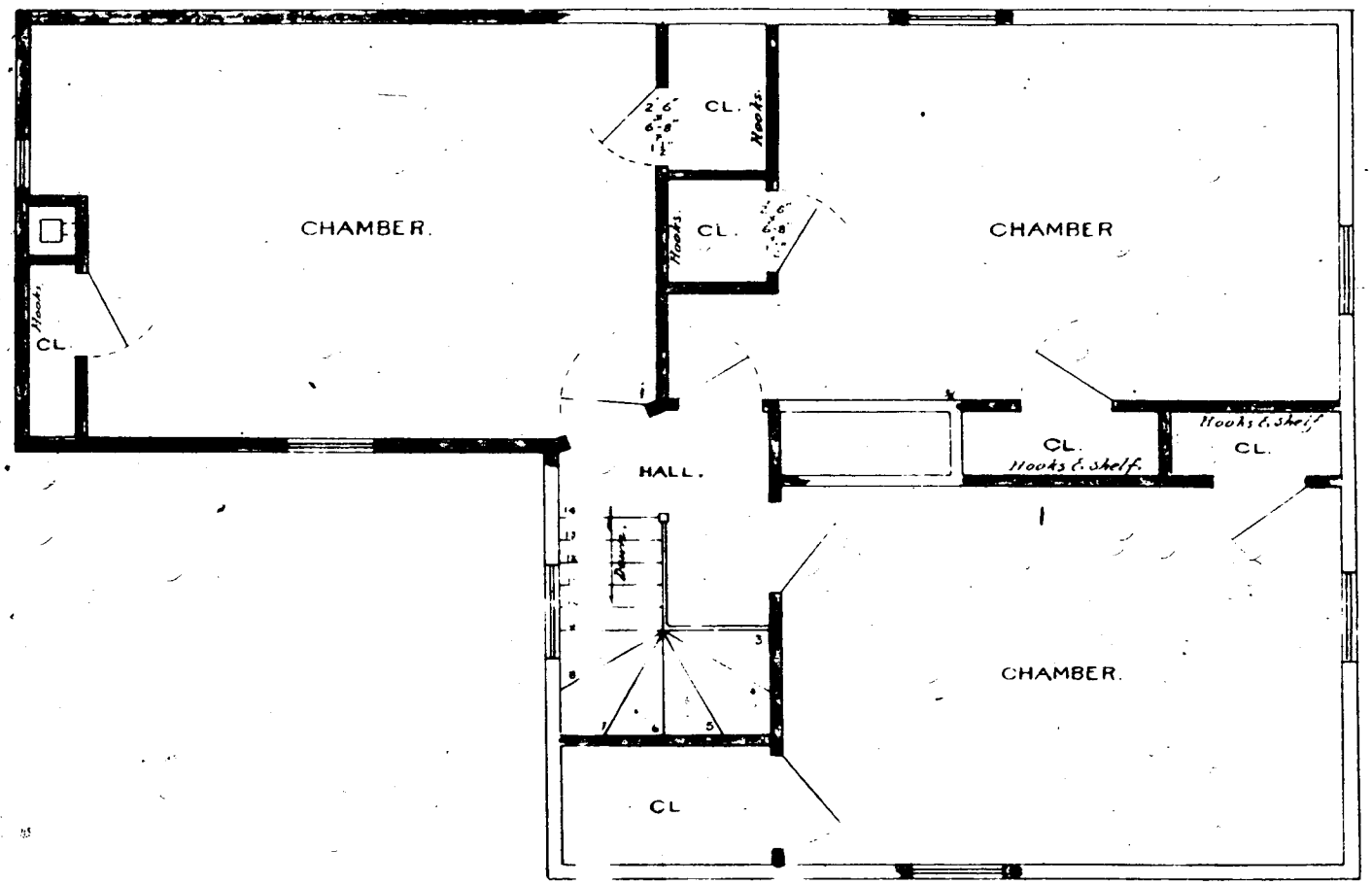
SCALE 1/4" = 1'-0"

Note: New work is colored, shows white on blueprint

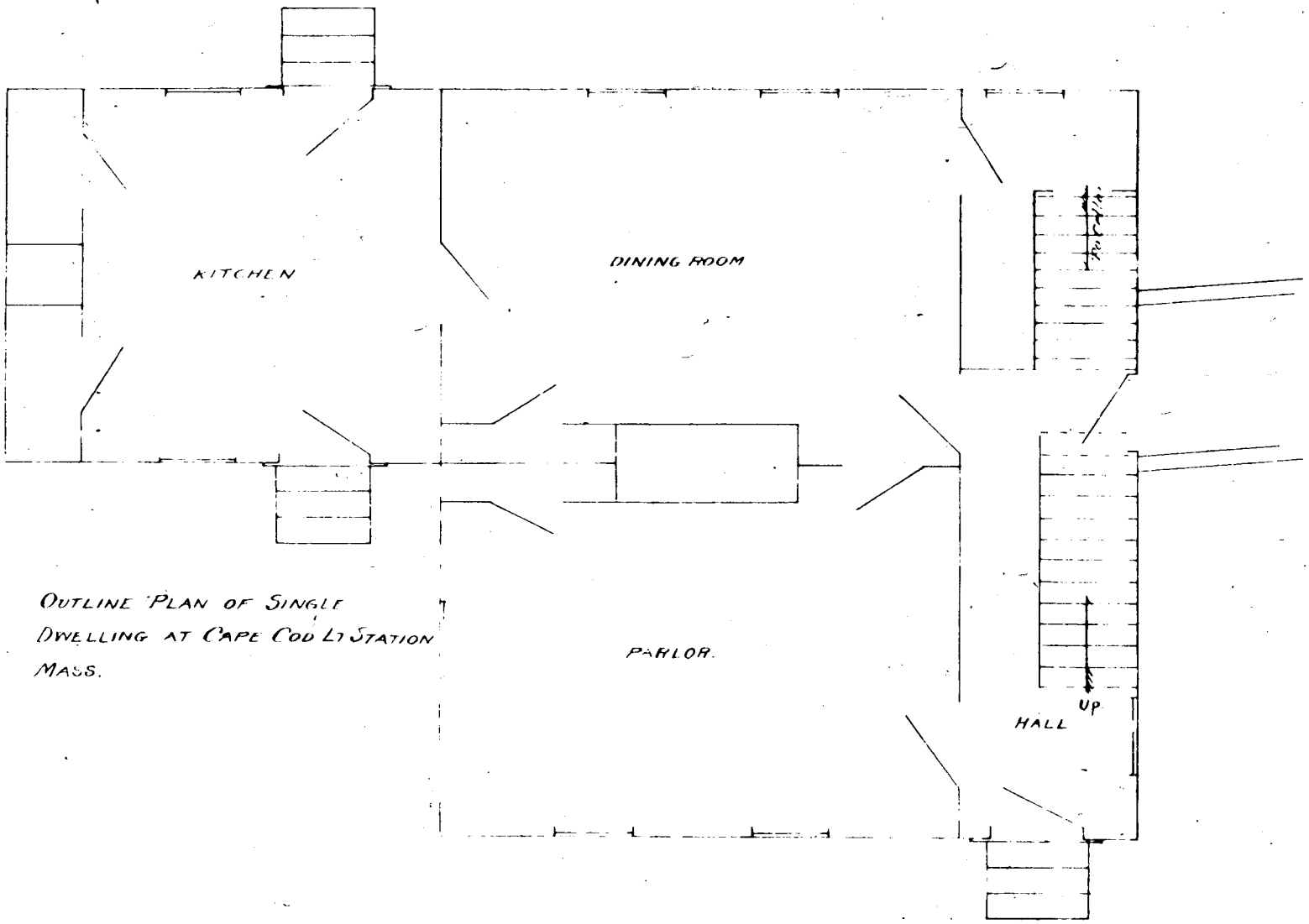
APR 18 1910

Transmitted to Light-House Board

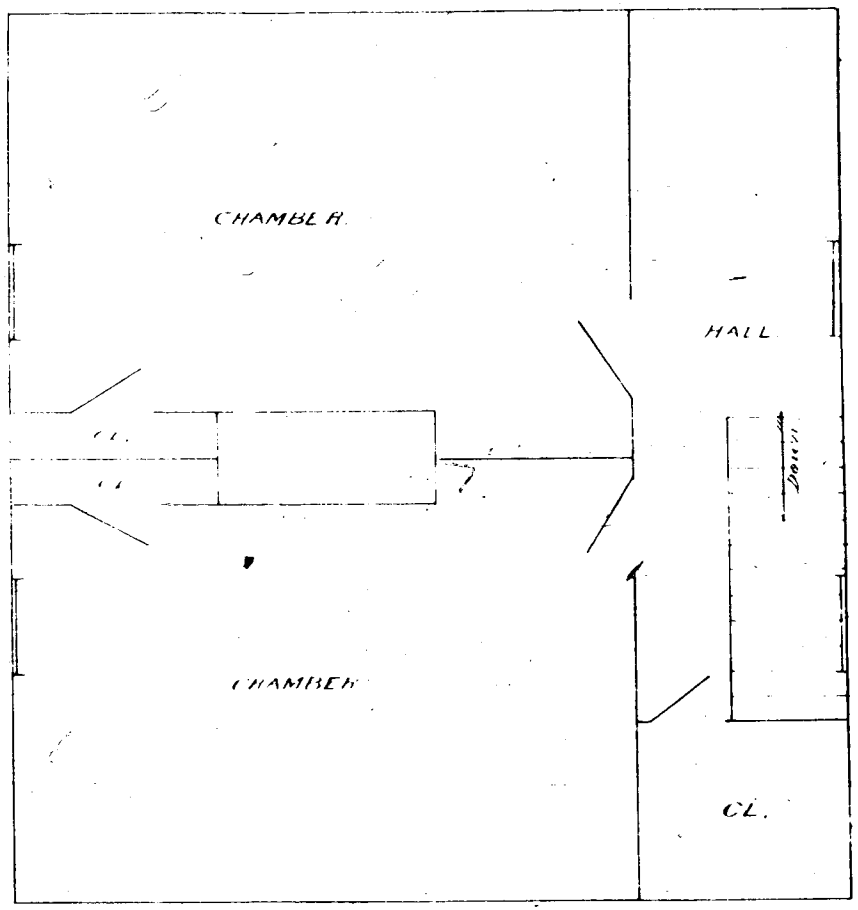
W. A. Atwater



SECOND FLOOR PLAN.
SCALE 1/4" = 1' 0"



OUTLINE PLAN OF SINGLE DWELLING AT CAPE COD L. STATION MASS.



SECOND FLOOR PLAN.

APPENDIX N.

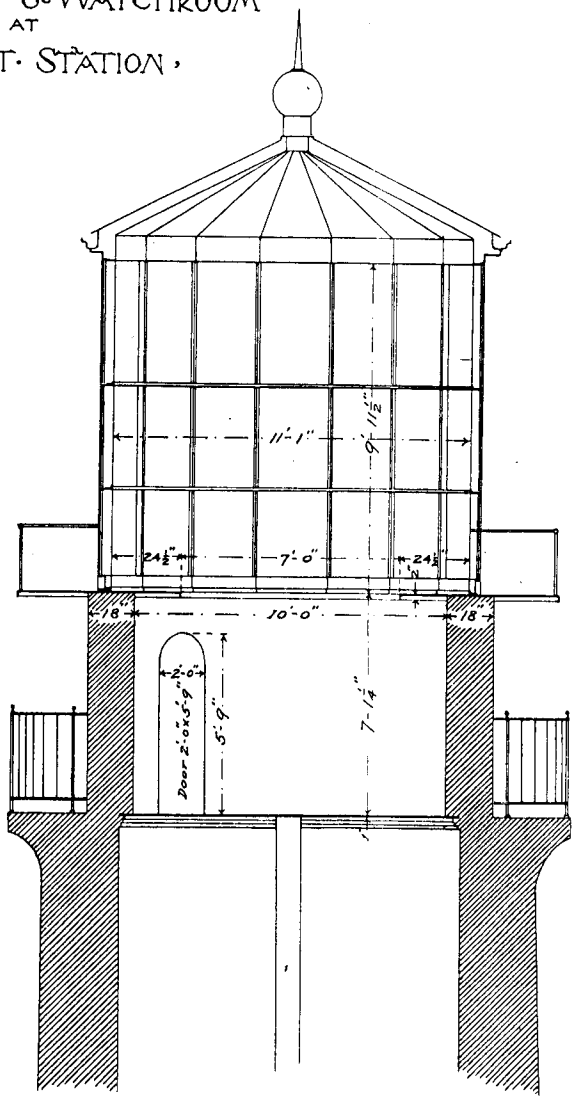
LANTERN AND WATCHROOM AT CAPE COD LIGHT STATION, CIRCA 1900

(Plate 1. - Archives, USCG Civil Engineering Unit Providence;
Sheet 1. - Mircotext, U.S. Coast Guard Academy Library)

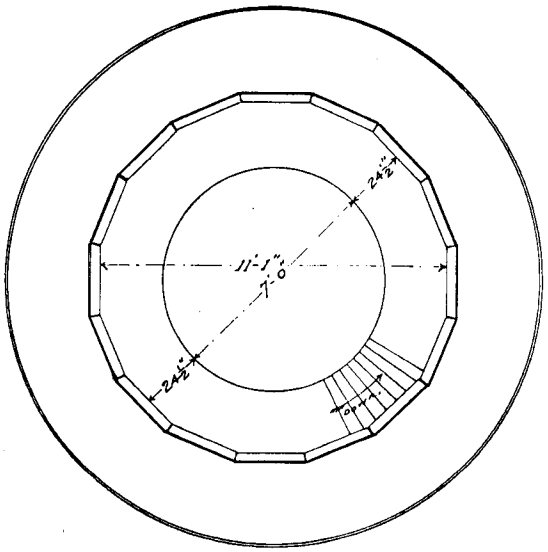
PLATE I.

LANTERN & WATCHROOM AT CAPE COD LT. STATION, MASS.

SCALE - $\frac{1}{4}$" = 1'-0".



SECTION OF LANTERN & WATCHROOM.



PLAN OF LANTERN.

ACCOMPANYING SPECIFICATIONS FOR ILLUMINATING APPARATUS.

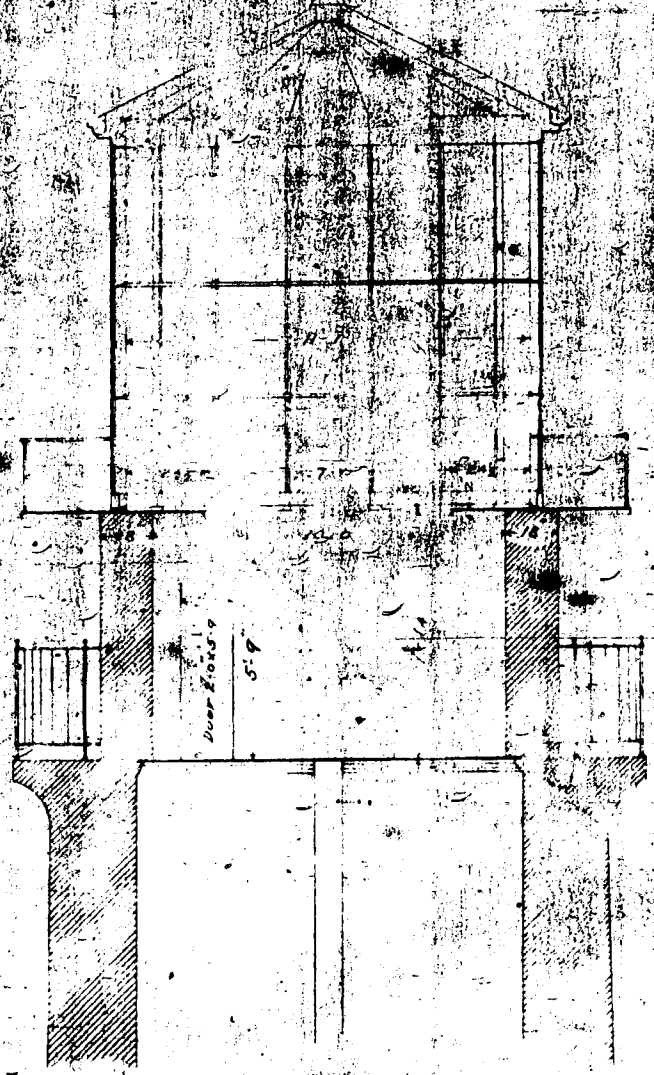
(No 12) S. 38

No 1569

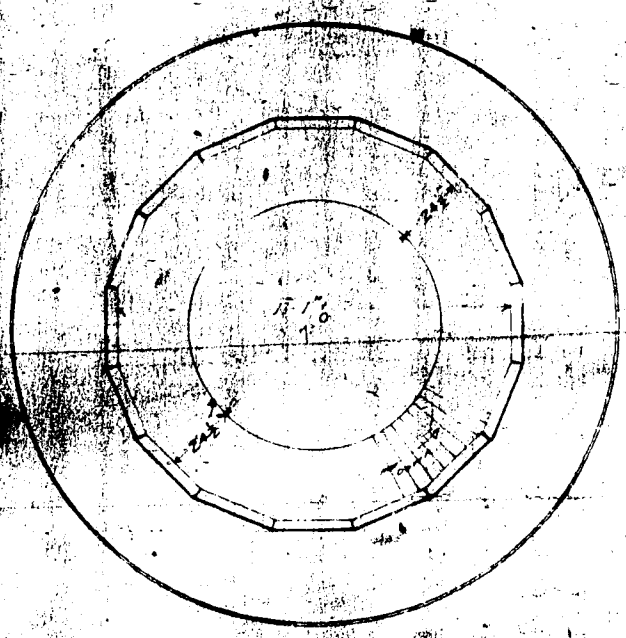
SHEET 1.

LANTERN & WATCHROOM AT CAPE COD LT. STATION MASS.

SCALE 1" = 1'-0"



SECTION OF LANTERN & WATCHROOM.



PLAN OF LANTERN.

2d Dist. 3 C. with Engr's Ltr. #81. of 29 Sept. 1900 — Lib 1 Dec. — 1

(P)

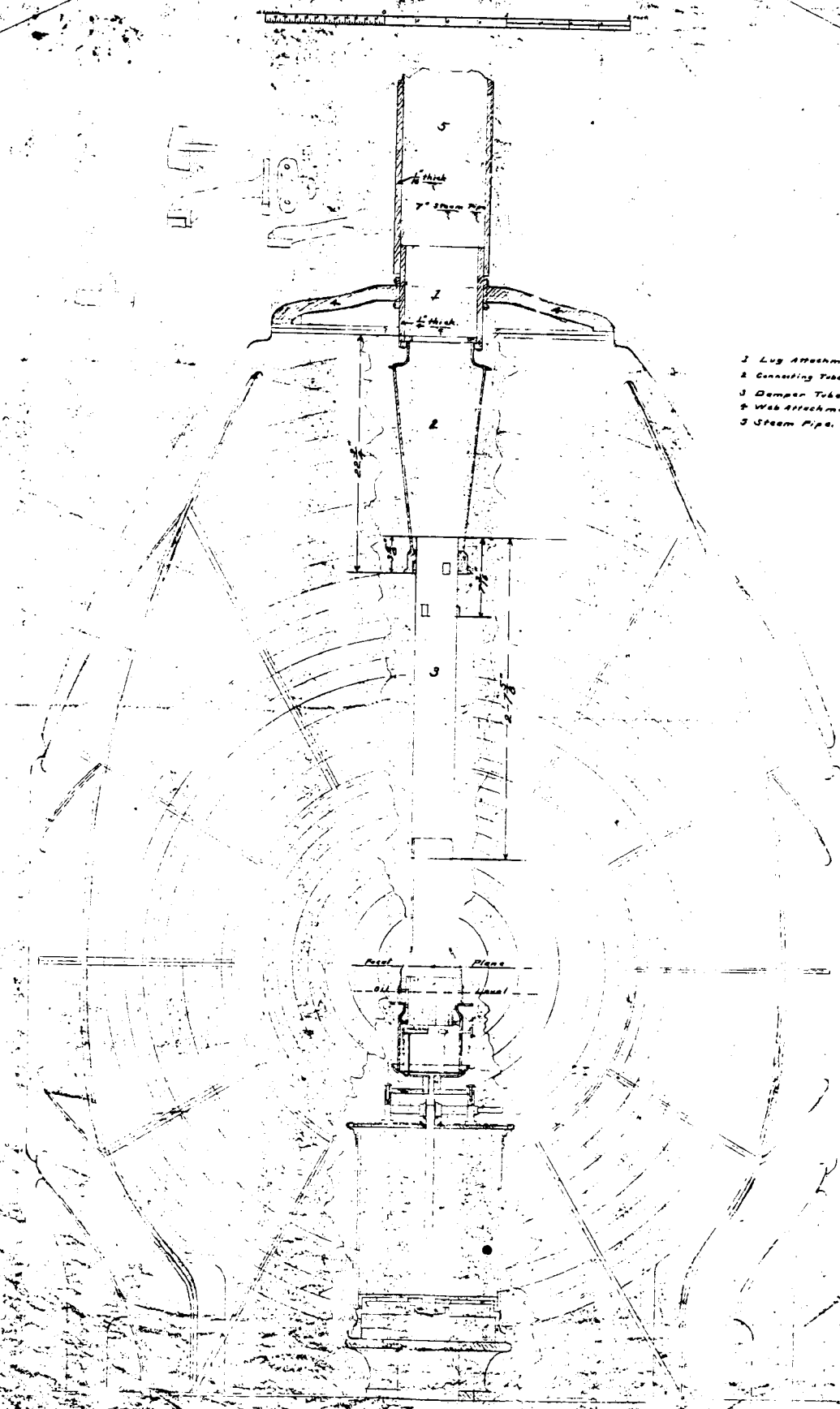
APPENDIX O.

DETAILS OF SMOKE PIPE AND SMOKE PIPE SUPPORT, 1901

(Archives, USCG Civil Engineering Unit Providence)

U.S. Lighthouse Machine Shop, Boston, Mass., September 6, 1901.

Cape Cod 1st Class Lens. — Details of Smoke Pipe.



No. 1580

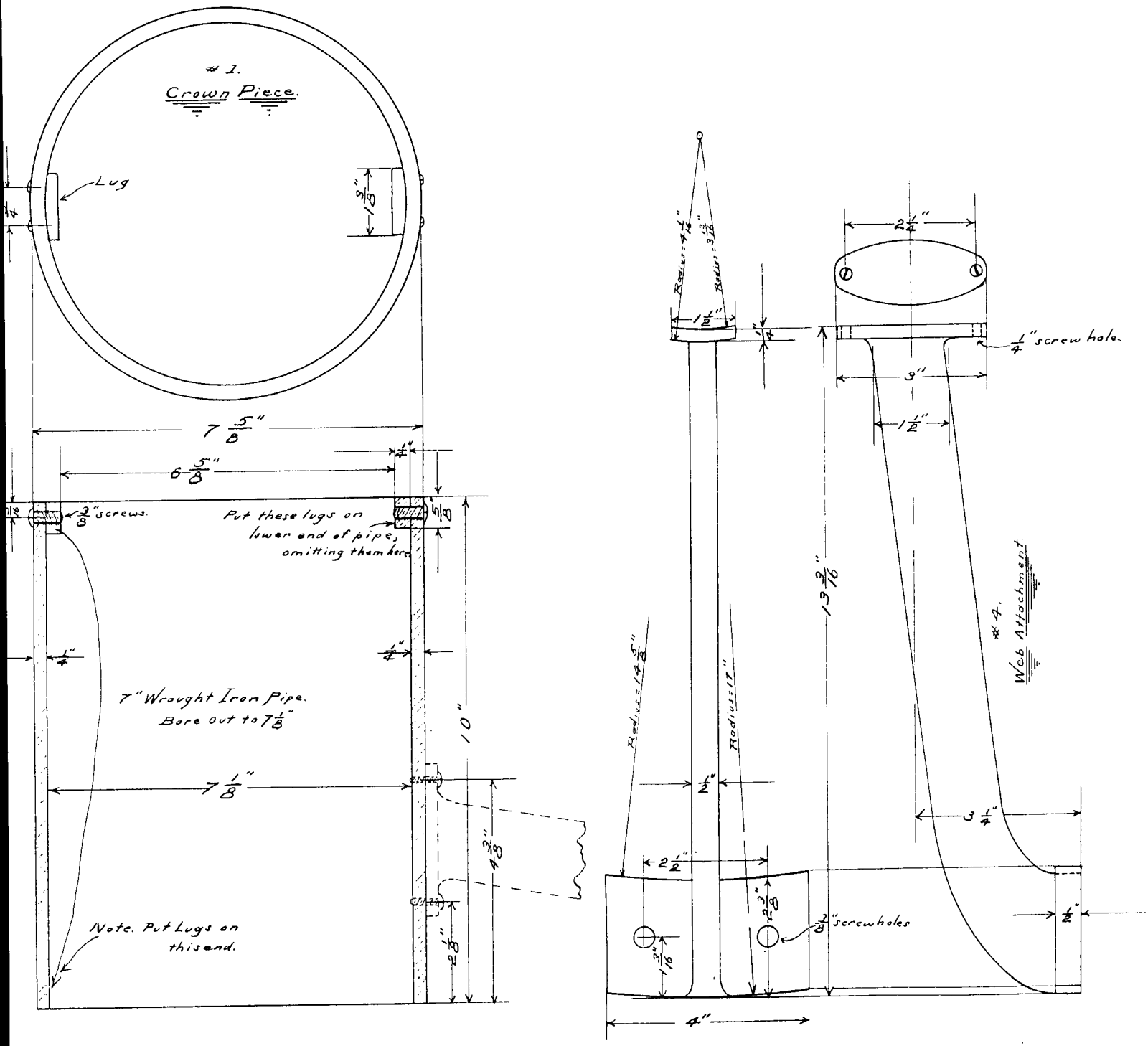
CAPE COD 1st CLASS LENS

SMOKE PIPE SUPPORT.

U.S. Light-House Machine Shop.

Boston, Mass. September 5, 1901.

Scale:— Half Size.



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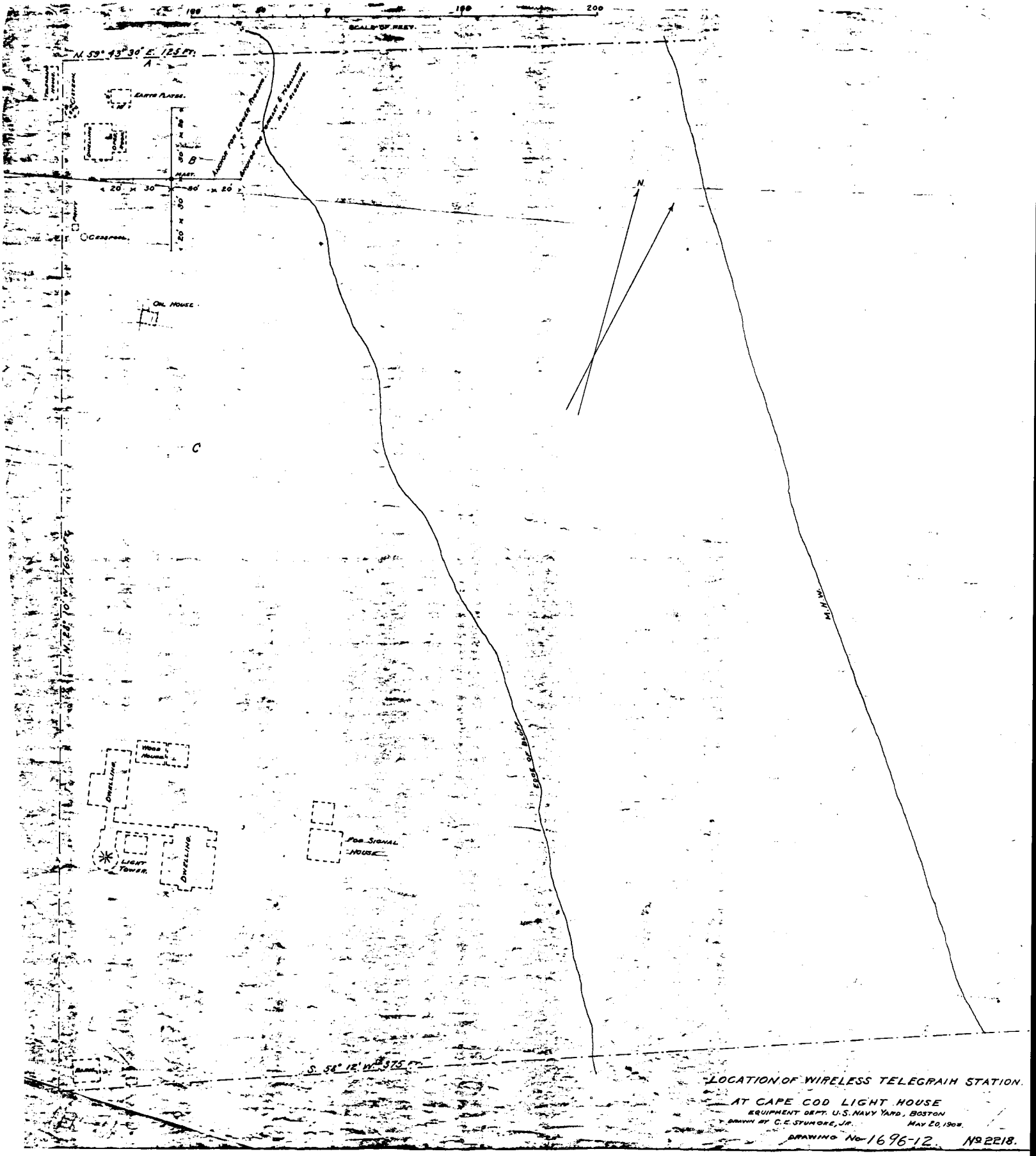
APPENDIX P.

LOCATION OF WIRELESS TELEGRAPH STATION AT CAPE COD LIGHTHOUSE, 1903

(Archives, USCG Civil Engineering Unit Providence)



LOCATION OF WIRELESS TELEGRAPH STATION.

AT CAPE COD LIGHT HOUSE

EQUIPMENT DEPT. U.S. NAVY YARD, BOSTON

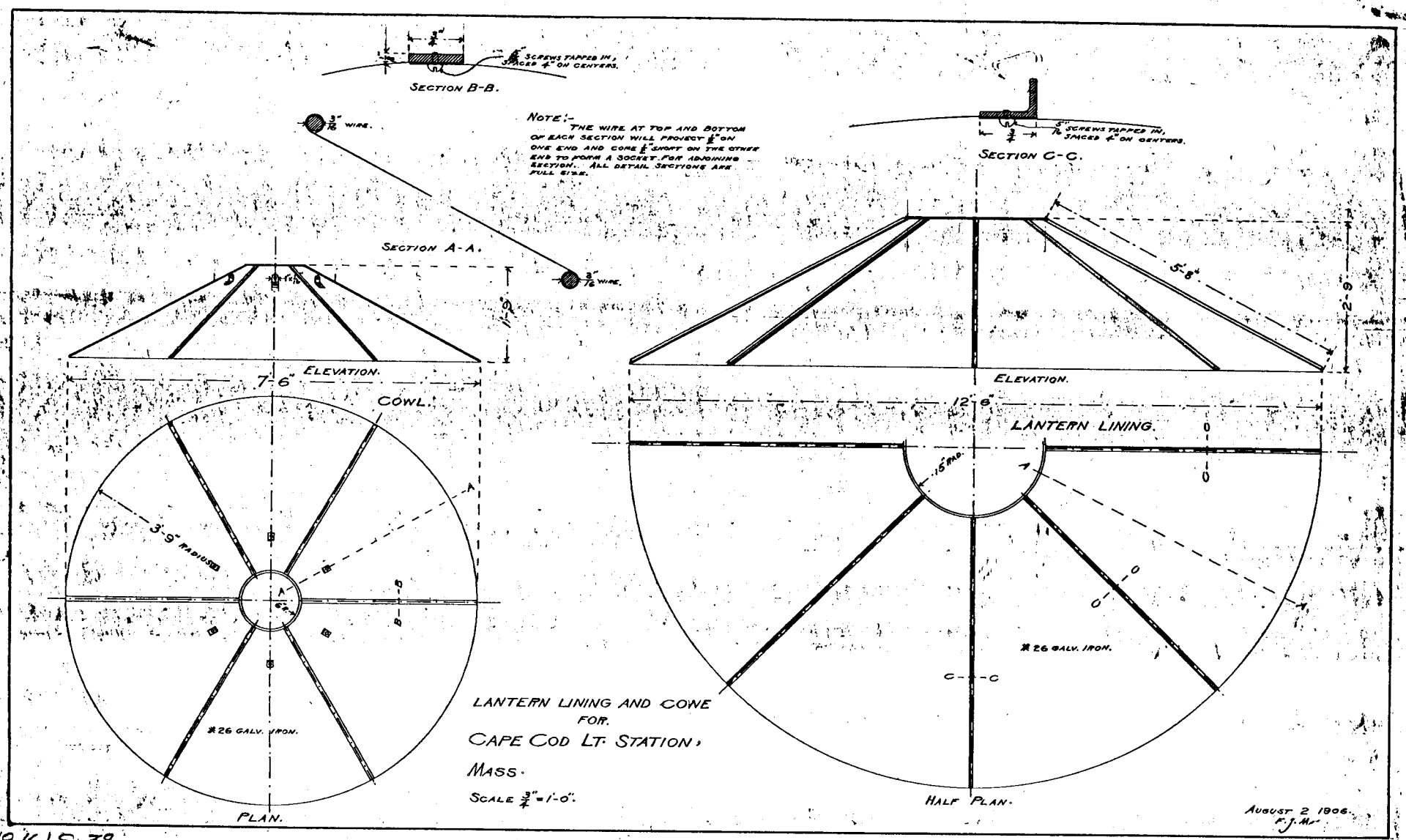
DRAWN BY C. E. STUMORE, JR. MAY 20, 1908.

DRAWING No 1696-12. No 2218.

APPENDIX Q.

LANTERN LINING AND COWL FOR CAPE COD LIGHT STATION, 1906

(Archives, USCG Civil Engineering Unit Providence)



(No 16) S. 38.

No 1556

APPENDIX R.

DESCRIPTIONS OF CAPE COD LIGHT STATION 1908, 1910, 1922, 1927 AND 1933

(Archives, USCG Civil Engineering Unit Providence)

Form 60

Second DISTRICT.

Department of Commerce and Labor

LIGHT-HOUSE ESTABLISHMENT

DESCRIPTION OF LIGHT-HOUSE TOWER,

BUILDINGS, AND PREMISES

AT

Cape Cod Light-Station,

Mass.

April 25, 1908

NOTE.

This Form is designed mainly to guide in preparing accurate descriptions of new light-stations, but will be used also in describing those that have been long established, when required. Screw-pile structures and lights on keepers' dwellings should be fully described without reference to this Form.

DEPARTMENT OF COMMERCE AND LABOR,
LIGHT-HOUSE BOARD, *February, 1906.*

NAME AND POSITION OF THE LIGHT-HOUSE AND LIGHT-STATION.

Cape Cod, on the highlands, on the northeasterly side of Cape Cod, seacoast of Massachusetts

1. By whom described, Lt Col. Edw. Burr, U.S.A. Engr. 2d Dist. District.
2. Date of description, April 25, 1908
3. Distinguishing character of light or lights, Flashing white every 5 seconds
4. Latitude of tower, 42° 02' 23" } Authority, Coast Chart #110
5. Longitude of tower, 70° 03' 40" } U.S. C. & G.S.

PREMISES—A DETAILED DESCRIPTION OF, EMBRACING—

6. Site of station—Public land, purchase, Military or Naval reservation, lease: Purchase
7. Date of reservation,
8. Date of deed, August 5, 1796.
9. Date of permission to occupy,
10. Date of lease,
11. Area of the entire site, (In deed) 10 acres
12. Area inclosed, 6 acres
13. Character of surface soil, Sandy
14. Distance of tower from nearest high-water mark, 600 ft
15. Inclosures to premises, Wire fence
16. Wharf or landing on premises, None
17. Road to landing or wharf, character of, and distance from tower, None
18. Means by which the light-station may be reached, Road

PREMISES—A DETAILED DESCRIPTION OF—CONTINUED.

ance to the nearest public road, railroad station, or steamboat landing, and to which:

tion is on public road 2 miles to RR station at North Truro, Mass.

ance to the nearest post-office, 1½ miles to North Truro, Mass

ance to the nearest village or town, do

ilities for reaching the light-station by public conveyance, None

ilities for reaching the light-station by private conveyance from the nearest village, town, railroad station r steamboat landing, and the distance: By horse & carriage from North Truro, Mass

er or other means used for supporting the lantern and apparatus, Tower

nber of separate lights, 1

en first built or established, 1798

en last thoroughly rebuilt, repaired, or renovated, 1857

dition at this date, Good

pe of tower in plan, Circular

m of tower, cylindrical, conical, or pyramidal, Conical

ght of tower from base to ventilator ball of lantern, 61 feet

ght of focal plane of lantern above mean high water (on sea and gulf coasts) or mean lake level on northern kes and rivers: 183

kground of the light-house, upon which it is projected, as seen from the sea or lake: Sky

r of tower, White

r of tower, how produced: Whitewash

er—connected with keeper's dwelling, and how, or detached: Connected to dwelling by covered way

ect—seacoast, lake coast, bay, harbor, channel, or range; for general or local navigating purposes: Seacoast

erials of which the tower is built: Brick

eral description, embracing—

Thickness of walls at base, 42"

Thickness of walls at parapet, 30"

Diameter of tower (inscribed, if polygonal) at base, 11' (inside)

PREMISES—A DETAILED DESCRIPTION OF—CONTINUED.

General description, embracing—Continued.

43. Diameter of tower (inscribed, if polygonal) at parapet, 11' (inside)
44. Kind of stairway and steps, Cast iron
45. Number of landings of stairway, 3
46. Size of glass for glazing tower windows, 8 x 10
47. Number of windows in tower, and size of sash, 3 - Lower 2' 3 3/4" x 2 2 Upper same
48. Number of doors, 1 in tower and 1 in parapet
49. Kind of foundation and depth below the surface, Brick - 6 feet
50. Character of soil at and surrounding the light-house, Sandy
51. Soil susceptible of being protected by grass, shrubbery, or trees: Grass
52. Miscellaneous remarks upon tower and site:

LANTERN AND LANTERN FIXTURES.

53. Order or class of lantern, First
54. Polygonal or cylindrical, Polygonal
55. Diameter, inscribed, to glass, 12 ft
56. Number of sides in plan, 16
57. Vertical or helical bars, Vertical
58. Height glazed, 9' 6"
59. Number of plates in height, 3
60. Number of plates in each side, 3
61. Thickness of plates, 1/4"
62. Size of different plates, 47 5/8 x 28 - 39 3/8 x 28 25 3/8 x 28
63. Number of storm panes of glass, None
64. Unglazed side of lantern in plates and degrees of arc, None ; between what bearings (magnetic and *from seaward*),
65. Materials of which the lantern is constructed, Cast iron

LANTERN AND LANTERN FIXTURES—CONTINUED.

66. Roof, Cast iron

67. Ventilator ball, Cast iron

68. Lightning-conductor spindle, Rough iron - copper tip

69. Lightning conductor, of what material; how attached to spindle; how led, and how far below the surface of dry earth, or otherwise, as the case may be: Copper to lantern, led down side of tower, 4 feet into ground.

70. Balustrade and outside gallery, Stone gallery deck 24" wide, with iron railing consisting of two rails and 18 round posts and 1/2" square balusters

71. Lantern doors, and how fitted: No door in lantern. Balcony reached from watchroom which has double doors.

72. Floor of lantern—of what materials: Cast iron

73. Watchroom door leading into the lantern, and how fitted: No door. Lantern entered by iron spiral stairs

74. Parapet, inside diameter (inscribed, if polygonal), 10' 4"

VENTILATORS.

75. In parapet, wall, or lower part of lantern: In lower part of lantern

76. Lantern ladders for cleaning plate glass, outside: None

77. Curtain-hooks inside of lantern—how fitted: Spring roller curtains

WATCHROOM.

78. How fitted: Revolving Cook stove

WATCHROOM—CONTINUED.

79. Bell wires, or speaking tubes, or telephones for calling relief keepers—kind: Speaking tube

80. Where led: To 3 dwellings

ILLUMINATING APPARATUS, ETC.

81. Name of maker, Barbier & Benard, Year made, 1901

82. Marks and number on apparatus, Phares & Balises Paris

83. Order of apparatus, 1st Inside diameter (inscribed circle) of central drum, 6'

84. Characteristic of light shown by apparatus, White flash every .5 seconds

85. If movable; time of revolution, 20 seconds

86. Intervals between flashes, .5 second

87. Duration of flash, 1/2 "

88. If fixed, or fixed varied by flashes; state arc of each fixed part in degrees:

89. Number of panels in the lens apparatus, 4

90. Number of flash panels, 4 ; arc of each, in degrees,

91. Number of elements in each panel of central drum of the lens, 9

92. Number of prisms in each panel *above* the central drum of the lens, 18

93. Number of prisms in each panel *below* the central drum of the lens, 8

94. How are the flashes produced—By the whole apparatus revolving Yes ; by revolving belt only if by panels of vertical elements revolving outside of fixed lens, state the number of such panels:

Describe how:

95. If by vertical elements, (*a*) state the number in each panel, ; (*b*) and the of elements of fixed lens covered by the panel:

ILLUMINATING APPARATUS, ETC.—CONTINUED.

96. Pedestal, Special pedestal with mercury float

97. Service table, None

98. Tube leading through the center of the upper metal ring of the lens into the ventilator ball, to carry off the gases of combustion and to assist in producing a proper draft in the lantern—of what material, diameter, and how fitted and connected with damper tube when in place:

Regular 1st order connecting tube.

99. If revolving, revolving machinery: Rotary carriage, with mercury float operated by clockwork.

100. Revolving on chariot, mercury float, or balls: Mercury

101. If a chariot, describe it and state the number and size of each pattern of wheels in it:

102. If on balls, describe the construction of the ball-raceways, whether flat surface, or semi-circular or V grooves:

103. State number of balls: ; diameter of balls,

104. Revolving cord or chain—how led: Cord, drops directly from drum

105. Length of drop tube, No tube open tower with guard for weight. 44' drop

106. Length of time revolving machinery will run after one winding: 2 ½ hours

107. How is the machinery protected: Iron frame with glass

ILLUMINATING APPARATUS, ETC.—CONTINUED.

108. How regulated; describe: Governor

IF COLORED LIGHT—

109. How is the color produced? Describe:

110. Red sectors—between what bearings (from seaward); magnetic, if on sea or gulf coasts; true on northern and rivers:

111. State where colored glass is attached, if to illuminating apparatus or to the lantern:

112. If colored glass is inside of illuminating apparatus, describe its form:

LAMPS AND BURNERS.

113. Description of lamp in use and number of wicks to burner: First order plunger lamp 5 wicks

114. Number of spare lamps at the station, One

115. Number of spare lamp burners at the station, 3

CLOSETS IN TOWER.

116. How fitted and used: None.

OILHOUSE OR ROOM.

117. Describe where placed and how fitted: Brick oil house painted white 150 N. Easterly of tower. No inside fittings

CLOSETS AND STOREROOMS.

118. Where placed, how fitted and used: Close in service room, fitted with shelves used for storage of supplies for the light.

119. Damp or dry, suited or unsuited to the purposes for which they were designed:

Dry & suited

FOG SIGNAL.

120. Kind and character of apparatus: 1st class Daboll trumpet with oil engine & compressor.

121. How much time is required to start the signal? Ten minutes

122. Where, or by whom made: Made in U.S. Lt Machine Shop Boston, Mass.

Year made,

123. Characteristic distinction of:

Blast	Silent interval	Blast	Silent interval
8 sec.	30 sec.	8 sec.	30 sec.

124. What parts of the fog-signal machinery are in duplicate? Duplicate engine and timing device, and reeds.

125. If a bell, state (*a*) weight, lbs.; (*b*) metal, ; (*c*) diameter, ; (*d*) height, ;

(*e*) if struck by clockwork, state time it will run with one winding,

126. If a steam signal, (*a*) describe boiler:

(*b*) Kind:

(*c*) Flue-tube or water-tube,

(*d*) Dimensions: length, diameter,

(*e*) Number and length of tubes,

(*f*) Diameter of tubes,

(*g*) Furnace: Kind, ; length, ; width, ; height,

(*h*) Total heating surface in square feet,

(*i*) Grate surface in square feet,

(*j*) Number of grate bars,

FOG SIGNAL—CONTINUED.

(*k*) Kind of grate bars,

(*l*) Kind of coal or other fuel generally used,

(*m*) Kind of safety valve,

(*n*) Maximum pressure the boiler is capable of,

(*o*) Usual working pressure,

(*p*) Diameter of smokestack,

(*q*) Height of smokestack from grate,

(*r*) Height or length of steam drum, ; diameter,

(*s*) Kind of covering or jacket,

(*t*) Present condition of boiler,

(*u*) When built,

(*v*) Where built,

(*w*) By whom built,

(*x*) Is there a heater? ; what kind, ; what size,

How much does its use reduce the time of starting the fog signal?

127. If a steam engine is used, kind: Number of revolutions per minute,

(*a*) Diameter of cylinder,

(*b*) Stroke of piston,

(*c*) Size of steam pipe,

(*d*) When built,

(*e*) Where built,

(*f*) By whom built,

128. Whistle, trumpet, or siren, pressure at which blown,

129. Diameter of whistle, ; height, ; distance between orifice and edge of whistle,

single tone, ; chime,

130. Disk or cylindrical siren, ; diameter of revolving part,

when made, ; by whom made,

number, width and length of ports, ; revolutions per minute,

type of governor, ; condition of revolving part,

131. Daboll trumpet, . Reed, Steel ; length, 20" ; breadth, 5" ; thickness at base, 13/16"

thickness at tip, 3/8"

132. Trumpet: Length, 15' ; diameters, 5" x 14" ; material, Copper

133. Timing device: Gears & cams.

FOG SIGNAL—CONTINUED.

134. Height of whistle or trumpet above mean high water, 1112 feet

135. Direction, by compass, in which trumpet points, NE.

136. If signal is blown by compressed air, describe compressing machinery:

Kind of engine, Horsby Akroyd ; by whom made, DeLa Vergne Machine Co.

when made, 1899 ; nominal size, 4"x12" horsepower, 4 ;

kind of compressor, 7x7 horizontal, single acting; name of maker, American Air Compression Works.

State if compressor is on same bed and geared with engine, or separate and belt-driven: Gear driven

137. Location, with reference to the light-house, to a particular danger or channel, or to the special object for establishing it: To warn vessels of their approach to the coast

138. Distance and direction from the light-house, 150 feet NE.

139. Water supply for it, Rain water

140. How it is reached from the light-house: Path

141. Description of fog-signal building or buildings: Brick fog-signal house 18'x22' in plan with hip roof. Located about 150 ft. northeasterly from tower.

DWELLINGS FOR KEEPERS.

142. Location, with reference to the light-house tower: Connected by covered way to tower

143. Coloring: White

144. Materials of which built, Wood

145. Number of rooms in each dwelling, Keeper's 6 — Asst. Keeper's 5 each

146. Number of keepers and assistants to each dwelling, One keeper single dwelling; two assistant keepers double dwelling

147. Outhouses, 3 fuel houses & barn

148. Coloring: White

149. Paths or walks on the premises, Plank Walks connect dwellings & from front door of [illegible]

DWELLINGS FOR KEEPERS—CONTINUED.

150. Area of premises inclosed, and how: 6 acres, with wire fence

151. Area of garden,

152. Area in timber or shrubbery,

153. Area susceptible of profitable cultivation,

154. Area cultivated or prepared for cultivation,

None

155. Character of adjacent surrounding country—Soil, sandy, clay, marsh, swamp, wood, fast ground, or sl sands: Sandy

WATER FOR FOG SIGNAL, DRINKING, AND DOMESTIC USES GENERALLY.

156. How procured, Rain water from roofs of buildings

157. Quality, Good

158. Quantity ample or not for the station at all seasons of the year, No

159. Liable or not to be injured by the inroads of storm tides and seas, No

160. If rain water in tanks or cisterns, what precautions have been taken to insure its purity?

Cleaning cistern.

161. Capacity of tanks or cisterns, and where placed: 1500 gal. in cellar

162. Tanks or cisterns—of what material made: Brick

WATER FOR FOG SIGNAL, DRINKING, AND DOMESTIC USES GENERALLY—CONTINUED.

163. Is there a distilling apparatus at the station?

Name of maker:

Capacity, ; when installed, ; condition, ;

efficiency,

164. If from a well, describe and give depth:

165. Diameter,

166. Lined or not,

167. Water obtained by pump or bucket, Pump

168. Distance from keeper's dwelling, In dwelling

HEALTHFULNESS OF THE LIGHT-STATION AND VICINITY.

169. General opinion in regard to the healthfulness or unhealthfulness of the light-station and vicinity:

Healthful

170. Diseases—what are most prevalent at the station and in the vicinity? None

171. Do they prevail at particular seasons of the year, or not? No

172. Are there any local causes, such as swamps, marshes, etc., in the immediate vicinity of the light-house which are likely to be the cause of these diseases? No

HEALTHFULNESS OF THE LIGHT-STATION AND VICINITY—CONTINUED.

173. Would draining or other artificial means employed on the light-house premises be likely to improve the sa condition of the light-station?

No.

LANDING, WHARF, BOATHOUSE, AND ROAD TO THE LIGHT-HOUSE.

174. Describe: None

The station is situated on the public road.

175. Distance and direction from light-house:

176. Hoisting engine, what kind?

Number of revolutions per minute, ; diameter of cylinder, ; stroke,

Kind of boiler:

Second DISTRICT

Department of Commerce and Labor

LIGHT-HOUSE ESTABLISHMENT

DESCRIPTION OF

BUILDINGS, PREMISES, EQUIPMENT

AT

Cape Cod

LIGHT-STATION,

Mass.

March 2 1920

11—8921

NOTE.

This Form is designed mainly to guide in preparing accurate descriptions of new light-stations, but will be used also in describing those that have been long established, when required, and especially when changes have been made at a station which affect the replies to the questions herein. Screw-pile structures and lights on keepers' dwellings should be fully described, as nearly as practicable, with reference to this Form.

DEPARTMENT OF COMMERCE AND LABOR,
LIGHT-HOUSE BOARD, *February, 1909.*

11—2921

NAME AND POSITION OF STATION.

Cape Cod, on the highlands, on the northeasterly side of Cape Cod, ...
of Massachusetts

1. By whom described, Lt. Col. Edw. Burr, Corps of Engineers, U.S.A., Engineer Second L.H. ...
2. Date of description, March 21, 1910
3. Distinguishing character of light or lights, Flashing white every five seconds
4. Latitude of light, 42° 02′ 23″ | Authority, U.S. Coast and Geodetic ...
5. Longitude of light, 70° 03′ 40″ | Chart No 110

PREMISES—A DETAILED DESCRIPTION OF, EMBRACING—

6. Site of station—Public land, purchase, Military or Naval reservation, lease: Purchase
7. Date of reservation,
8. Date of deed, August 5, 1796.
9. Date of permission to occupy,
10. Date of lease,
11. Area of the entire site, [illegible]
12. Area inclosed, [illegible]
13. Character of surface soil, [illegible]
14. Distance of tower from nearest high-water mark, [illegible]
15. Inclosures to premises, [illegible]
16. Wharf or landing on premises, [illegible]
17. Road to landing or wharf, character of, and distance from tower, [illegible]
18. Means by which the light-station may be reached, [illegible]

11—2921

PREMISES—A DETAILED DESCRIPTION OF—CONTINUED.

Distance to the nearest public road, railroad station, or steamboat landing, and to which:

Distance to nearest post office,

Distance to nearest village or town, 17 miles

Facilities for reaching the light-station by public conveyance, stage

Facilities for reaching light-station by private conveyance from nearest village, town, railroad station, or steamboat landing, and the distance: Carriage from RR sta 1¼ mile

Tower or other means used for supporting the lantern and apparatus,

Number of separate lights, ✓

When first built or established, ✓

When last thoroughly rebuilt, repaired, or renovated, 185 ✓

Condition at this date,

Shape of tower in plan, Circular

Form of tower—Cylindrical, conical, or pyramidal, Conical

Height of tower from base to ventilator ball of lantern, 66-2"

Height of focal plane of lantern above mean high water (on sea and gulf coasts) or mean lake level on northern lakes and rivers: ✓

Background of the light-house, upon which it is projected, as seen from the sea or lake: Sky

Color of tower,

Color of tower, how produced:

Tower—Connected with keeper's dwelling, and how, or detached:

Object—Seacoast, lake coast, bay, harbor, channel, or range; for general or local navigating purposes: Primary

Materials of which the tower is built:

General description, embracing—

Thickness of walls at base,

Thickness of walls at parapet, 2'-2"

PREMISES—A DETAILED DESCRIPTION OF—CONTINUED.

General description, embracing—Continued.

42. Diameter of tower (inscribed, if polygonal) at base,
43. Diameter of tower (inscribed, if polygonal) at parapet,
44. Kind of stairway and steps, Circular
45. Number of landings of stairway,
46. Size of glass for glazing tower windows,
47. Number of windows in tower, and size of sash, 3 – 2'-3½" x 2'-2½" to each
48. Number of doors,
49. Kind of foundation and depth below the surface,
50. Character of soil at and surrounding the light-house,
51. Soil susceptible of being protected by grass, shrubbery, or trees:
52. Miscellaneous remarks upon tower and site:

LANTERN AND LANTERN FIXTURES.

53. Order or class of lantern,
54. Polygonal or cylindrical,
55. Diameter, inscribed (*a*) to glass, 12'-1" ; (*b*) in the clear,
56. Number of sides in plan, 16
57. Vertical or helical bars,
58. Height glazed, 9'-11½"
59. Number of plates in height, 3
60. Number of plates in each side, 3
61. Thickness of plates,
62. Size of different plates, 28" x 47½"
63. Number of storm panes of glass,
64. Unglazed side of lantern in plates and degrees of arc, ; between what bearings (*true* and *from seaward*),
65. Materials of which the lantern is constructed,

LANTERN AND LANTERN FIXTURES—Continued.

Roof, [illegible]

Ventilator ball, [illegible]

Lightning-conductor spindle, [illegible] copper-platinum tip

Lightning conductor, of what material; how attached to spindle; how led, and how far below the surface of dry earth, or otherwise, as the case may be: [illegible] 1/8 × 1/2" attached to lan[illegible] [illegible] 6 [illegible]

Balustrade and outside gallery, [illegible]

Lantern doors, and how fitted: [illegible]

Floor of lantern—Of what materials, [illegible]

Watchroom door leading into lantern, and how fitted: [illegible] and handle

Parapet, inside diameter (inscribed, if polygonal), Circular 10' in diameter

VENTILATORS.

In parapet, wall, or lower part of lantern: Large pair of Cowles

Lantern ladders for cleaning plate glass, outside: [illegible]

Curtain hooks inside of lantern—How fitted: [illegible]

WATCHROOM.

How fitted: Ceiling and heating [illegible] described

Good [illegible]

WATCHROOM—Continued.

79. Bell wires, or speaking tubes, or telephones for calling relief keepers—Kind: [illegible]

80. Where led: [illegible]

ILLUMINATING APPARATUS, ETC.

81. Name of maker, [illegible] Year made, 1901

82. Marks and number on apparatus, [illegible]

83. Order of apparatus, 1st Inside diameter (inscribed circle, tangent to *glass*) of central drum, 6'

84. Characteristic of light shown *by apparatus*, [illegible]

85. If movable; time of revolution, —

86. Intervals between flashes, 1/2 [illegible]

87. Duration of flash, 1/2

88. If fixed, or fixed varied by flashes, state arc of each fixed part in degrees: [illegible]

89. Number of panels in the lens apparatus, 28

90. Number of flash panels, 4 ; arc of each, in degrees, 15°

91. Number of elements in each panel of central drum of lens, 8

92. Number of prisms in each panel *above* central drum of lens, 18

93. Number of prisms in each panel *below* central drum of lens, 8

94. How are the flashes produced—By the whole apparatus revolving [illegible]; by revolving belt only if by panels of vertical elements revolving outside of fixed lens, state the number of such panels:

Describe how:

95. If by vertical elements, (*a*) state the number in each panel, ; (*b*) and ~~the number~~ of elements of fixed lens covered by the panel:

ILLUMINATING APPARATUS, ETC.—Continued.

light is occulting, state (*a*) the characteristic.

(*b*) Between what time limits may characteristic be varied without structural changes in mechanism,

(*c*) Are eclipses produced by sleeve, revolving screens, or valve (if gas light),

(*d*) Size of sleeve and amplitude of movement,

(*e*) Axis of rotation of screens, horizontal or vertical, ; (*f*) relation of axis to vertical axis of illuminating apparatus,

Screens: (*g*) Do they revolve as parts, or independently, of illuminating apparatus,

(*h*) If about vertical axis, how many in circumference, ; (*i*) time required for complete revolution, ; (*j*) form, ; (*k*) how mounted (see Questions 101–109), ; (*l*) if actuated by standard clockwork, state order, ; (*m*) date made,

If occultation is effected by valve (*n*) state name of maker, ;

(*o*) pattern, ; (*p*) does it operate reliably,

Pedestal, [illegible]

Service table, [illegible]

Tube leading through center of upper metal ring of lens into ventilator ball, to carry off gases of combustion and to assist in producing proper draft in lantern—Of what material, diameter, and how fitted and connected with damper tube when in place: [illegible] $7\frac{1}{8}$ [illegible]

If revolving, revolving machinery: [illegible]

Revolving on chariot, mercury float, or balls:

If a chariot, describe it and state the number and size of each pattern of wheels in it:

ILLUMINATING APPARATUS, ETC.—Continued.

103. If on balls, describe the construction of the ball-raceways, whether flat surface, or semicircular or V grooves:

104. State number of balls: ; diameter of balls,

105. Revolving cord or chain—How led: By [illegible]

106. Length of drop tube, [illegible]

107. Length of time revolving machinery will run after one winding: [illegible]

108. How is the machinery protected? [illegible]

109. How regulated? Describe: [illegible]

IF COLORED LIGHT—

110. How is the color produced? Describe:

111. Red sectors—Between what bearings, true (from seaward):

112. State where colored glass is attached, if to illuminating apparatus or to lantern:

113. If colored glass is inside of illuminating apparatus describe its form:

ILLUMINATING APPARATUS, ETC.—Continued.

96. If light is occulting, state (*a*) the characteristic,

(*b*) Between what time limits may characteristic be varied without structural changes in mechanism,

(*c*) Are eclipses produced by sleeve, revolving screens, or valve (if gas light),

(*d*) Size of sleeve and amplitude of movement,

(*e*) Axis of rotation of screens, horizontal or vertical, ; (*f*) relation of axis to vertical axis of illuminating apparatus,

Screens: (*g*) Do they revolve as parts, or independently, of illuminating apparatus,

(*h*) If about vertical axis, how many in circumference, ; (*i*) time required for complete revolution, ; (*j*) form, ; (*k*) how mounted (see Questions 101–109), ; (*l*) if actuated by standard clockwork, state order, ; (*m*) date made,

If occultation is effected by valve (*n*) state name of maker, ;

(*o*) pattern, ; (*p*) does it operate reliably,

97. Pedestal, [illegible]

98. Service table, [illegible]

99. Tube leading through center of upper metal ring of lens into ventilator ball, to carry off gases of combustion and to assist in producing proper draft in lantern—Of what material, diameter, and how fitted and connected with damper tube when in place: [illegible]

100. If revolving, revolving machinery: [illegible]

101. Revolving on chariot, mercury float, or balls:

102. If a chariot, describe it and state the number and size of each pattern of wheels in it:

ILLUMINATING APPARATUS, ETC.—Continued.

103. If on balls, describe the construction of the ball-raceways, whether flat surface, or semicircular or V-g[illegible]

104. State number of balls: ; diameter of balls,

105. Revolving cord or chain—How led: [illegible]

106. Length of drop tube, [illegible]

107. Length of time revolving machinery will run after one winding: [illegible]

108. How is the machinery protected? [illegible]

109. How regulated? Describe: [illegible]

IF COLORED LIGHT—

110. How is the color produced? Describe:

111. Red sectors—Between what bearings, true (from seaward):

112. State where colored glass is attached, if to illuminating apparatus or to lantern:

113. If colored glass is inside of illuminating apparatus describe its form:

LAMPS, BURNERS, ETC.

1st Order

114. (a) Description of lamp in use and number of wicks, ~~or mantels~~, to burner, ; (b) diameter of outside wick, 4 7/8" ; (c) ~~diameter of mantel~~, ; (d) if more than one mantel, ~~also diameter of circumscribing circle~~, if gas light, (e) state kind, ; (f) number of burners, if more than one in group, ; (g) kind of burner, ; (h) candlepower per burner, ; (i) total candlepower of group, ; (j) consumption of gas per burner per hour, cubic feet; (k) total consumption per hour, cubic feet; (l) how is gas obtained? ; if generated at station, (m) describe generator, ; (n) state name of maker, ; (o) date of pattern, ; (p) maximum capacity per hour, cubic feet. If compressed gas is used, (q) describe container, ; (r) capacity, cubic feet of free gas; (s) to what pressure charged, lbs.; (t) how is supply renewed? ; (u) if by substitution of full for empty container, at what intervals,

115. Number of spare lamps at station,

116. Number of spare lamp burners at station, 2000

CLOSETS IN TOWER.

117. How fitted and used,

OILHOUSE OR ROOM.

118. Describe (a) where placed and how fitted, ; (b) inside dimensions, ; (c) materials of which built, ; (d) capacity in 5-gallon cans, 700

CLOSETS AND STOREROOMS.

119. Where placed, how fitted and used,

120. Damp or dry, suited or unsuited to the purposes for which they were designed,

FOG SIGNAL.

121. Kind and character of apparatus:

122. How much time is required to start the signal? ; how long may the signal sound characteristic with the quantity of air stored under pressure?

123. Where, or by whom, made:

Year made,

124. Characteristic distinction of:

Blast	Silent interval	Blast	Silent interval
8 sec.	30 sec.	8 sec.	30 sec.

125. What parts of the fog-signal machinery are in duplicate?

126. If a bell, state (a) weight, lbs.; (b) metal, ; (c) diameter, ; (d) height, (e) if struck by clockwork, state time it will run with one winding:

127. If a steam signal, (a) describe boiler:

(b) Kind,

(c) Flue-tube or water-tube,

(d) Dimensions: length, diameter,

(e) Number and length of tubes,

(f) Diameter of tubes,

(g) Furnace: Kind, ; length, ; width, ; height,

(h) Total heating surface in square feet,

(i) Grate surface in square feet,

(j) Number of grate bars,

(k) Kind of grate bars,

(l) Kind of coal or other fuel generally used,

(m) Kind of safety valve,

(n) Maximum pressure the boiler is capable of,

(o) Usual working pressure,

(p) Diameter of smokestack,

(q) Height of smokestack from grate,

(r) Height or length of steam drum, ; diameter,

FOG SIGNAL—CONTINUED.

(s) Kind of covering or jacket,

(t) Present condition of boiler,

(u) When built,

(v) Where built,

(w) By whom built,

(x) Is there a heater? ; what kind? ; what size?

How much does its use reduce the time of starting the fog signal?

128. If a steam engine is used, kind: Number of revolutions per minute,

(a) Diameter of cylinder,

(b) Stroke of piston,

(c) Size of steam pipe,

(d) When built,

(e) Where built,

(f) By whom built,

129. Whistle, trumpet, or siren, pressure at which blown, 4½ to 5½ lbs.

130. Diameter of whistle, ; height, ; distance between orifice and edge of whistle, ;

single tone, ; chime,

131. Disk or cylindrical siren, ; diameter of revolving part, ;

when made, ; by whom made, ;

number, width, and length of ports, ; revolutions per minute, ;

type of governor, ; condition of revolving part,

132. Daboll trumpet, yes. Reed, yes ; length, 20" ; breadth, 5" ; thickness at base, 1 3/16" ;

thickness at tip, 3/8"

133. Trumpet: Length, 15' ; diameters, 5" & 14" ; material, copper

134. Timing device, Automatic Clock

135. Height of whistle or trumpet above mean high water, 150 feet

136. Direction, *true*, in which trumpet points, 47°

137. If signal is blown by compressed air, describe compressing machinery:

Kind of engine, by whom made,

when made, 1899 ; nominal size, ; horsepower, ;

kind of compressor, ; name of maker, Air Compressor Works

State if compressor is on same bed and geared with engine, or separate and belt-driven:

Air Compressor

FOG SIGNAL—CONTINUED.

138. Location, with reference to light-house, to a particular danger or channel, or to the special object for which established: [illegible]

139. Distance and direction, *true*, from light-house, [illegible] 150 feet

140. Water supply for it, [illegible]

141. How is it reached from the light-house? [illegible]

142. Description of fog-signal building or buildings: [illegible]

DWELLINGS FOR KEEPERS.

143. Location, with reference to light-house tower: ~~One two~~ Single dwelling north, double dwelling East, of tower

144. Coloring: [illegible]

145. Materials of which built, [illegible]

146. Number of rooms in each dwelling, 6 [illegible] each in the two quarters

147. Number of keepers and assistants to each dwelling, [illegible]

148. Outhouses, ~~Three~~ Four

149. Coloring: [illegible] with [illegible]

150. Paths or walks on the premises, [illegible]

151. Area of premises inclosed, and how: About 63 acres by wire fence

152. Area of garden, [illegible]

153. Area in timber or shrubbery,

154. Area susceptible of profitable cultivation, [illegible] hay — 5 acres

DWELLINGS FOR KEEPERS—Continued.

55. Area cultivated or prepared for cultivation, [illegible]

56. Character of adjacent surrounding country—Soil, sandy, clay, marsh, swamp, wood, fast ground, or shifting sands: [illegible]

WATER FOR FOG SIGNAL, DRINKING, AND DOMESTIC USES GENERALLY.

57. How procured, [illegible]

58. Quality, [illegible]

59. Quantity ample or not for the station at all seasons of the year, [illegible]

60. Liable or not to be injured by the inroads of storm tides and seas, [illegible]

61. If rain water in tanks or cisterns, what precautions have been taken to insure its purity? [illegible]

62. Capacity of tanks or cisterns, and where placed: [illegible] 1200 gallons

63. Tanks or cisterns—Of what material made: [illegible]

64. Is there a distilling apparatus at the station? [illegible]

Name of maker:

Capacity, ; when installed, ; condition, ;

efficiency,

65. If from a well, describe and give depth: 4½" diam. [illegible]

66. Diameter, 4½"

67. Lined or not, [illegible]

68. Water obtained by pump or bucket, [illegible]

69. Distance from keeper's dwelling, 16 [illegible]

HEALTHFULNESS OF THE LIGHT-STATION AND VICINITY.

170. General opinion in regard to the healthfulness or unhealthfulness of the light-station and vicinity:

171. Diseases—What are most prevalent at the station and in the vicinity?

172. Do they prevail at particular seasons of the year, or not?

173. Are there any local causes, such as swamps, marshes, etc., in the immediate vicinity of the light-house which are likely to be the cause of these diseases?

174. Would draining or other artificial means employed on the light-house premises be likely to improve the sanitary condition of the light-station? [illegible]

LANDING, WHARF, BOATHOUSE, AND ROAD TO THE LIGHT-HOUSE.

175. Describe:

176. Distance and direction from light-house:

177. Hoisting engine, what kind?

Number of revolutions per minute, ; diameter of cylinder, ; stroke,

Kind of boiler:

MISCELLANEOUS REMARKS UPON THE GENERAL CHARACTER AND CONDITION OF THE PREMISES, TOWERS, BUILDINGS, AND ILLUMINATING APPARATUS AT THIS DATE.

All in Good Condition
A brick oil house used by the Navy Dep. is located 313 ft. ENE northeasterly from the tower

The premises, tower, buildings & illuminating apparatus are in good condition
A brick oil-house, used by the Navy Department, is located 313 feet northeasterly from tower.
~~Cedar Cove~~ There is a signal-display station on the reservation

Respectfully,

Edw. Burr.

Lt. Col. Corps of Engineers, *U. S. A.,*
Engineer, Second Light-House District.

Form 30

LIGHTHOUSE DISTRICT

[illegible]

[illegible]

[illegible]

[illegible]

INSTRUCTIONS

This form is to be filled out by your [illegible] for lighted stations which have not [illegible]. When changes are made in existing stations [illegible] tion previously given, pages containing the [illegible] be promptly forwarded. The use of this form should be limited to stations having resident keepers.

DESCRIPTION OF LIGHT STATION.

1. By whom described [illegible], date June 8, 1927.

STATION.

2. Name of station, Cape Cod
3. Characteristic of light, Flashing white every 5 seconds.
4. Geographical position of light: Latitude, 42° 02' 23"; longitude, 70° 03' 40".
5. Location, On Highlands north east side of Cape Cod, Mass.

PREMISES.

6. Origin of title to site of station (public land, purchase, lease, military or naval reservation), Purchase.
7. Date of reservation, deed, lease, or permission to occupy, [illegible]
8. Area of the entire site, 100478 sq. ft. (b) area inclosed, None; (c) type of fence, [illegible]
9. Distance of tower from nearest high-water mark, About 550 feet.
10. Wharf or landing on premises, None.
11. Means by which the light station may be reached and distance to nearest post office or town, with name, [illegible] road [illegible] Post Office Truro [illegible] Truro [illegible] 12 miles.
12. Tower or other means used for supporting the lantern and apparatus, Tower.
13. Number of separate lights, One.
14. When first built or established, 1798.

12/11/10 8 3/8 3 3/8

PREMISES—Continued.

15. When last thoroughly rebuilt, repaired, or renovated, 1888

16. Height of focal plane of lantern above mean high water (on sea and gulf coasts) or mean lake level on northern lakes and rivers, 183 ft

17. Background of the lighthouse, upon which it is projected, as seen from seaward, sky

18. Color of tower, and how produced, White – whitewash

19. Tower—Connected with keeper's dwelling, and how; or detached, Connected by covered way

20. Purpose of aid—Seacoast, lake coast, bay, harbor, channel, or range; for general or local navigation, ~~[illegible]~~ Primary Seacoast

21. Materials of which the tower is built, Brick and concrete

22. Kind of stairway and steps, Iron

23. Size of glass for glazing tower windows, 8"x10" and 7"x10½"

24. Number of windows in tower, and size of sash, Three 2'-3½"x2'-3½"

25. Number and size of doors, One – 3'-0"x7'-0"

26. General remarks upon tower and site, Tower stands on concrete foundation [illegible]

LANTERN AND LANTERN FIXTURES.

27. Order or class of lantern, 1st Order

28. If polygonal, state number of sides; if cylindrical, state diameter, Octagonal 16 sides

29. Vertical or helical bars, Vertical; thickness of bars, 1½"; height glazed, 9'-11½" 9'-5⅞"

30. Number of plates in height, Three; in each side, Three

31. Thickness and size of plates, 1" Top Row 28"x47 5/8" – 16 lbs; Middle Row 28"x37" – 16"; Bottom " 28"x25" – 16"

32. Unglazed side of lantern in plates and degrees of arc, None; between what bearings (true and from seaward), —

33. Materials of which the lantern is constructed, Iron

34. Roof, Iron

LANTERN AND LANTERN FIXTURES—Continued.

35. Ventilator ball, Iron

36. Lightning-conductor spindle, Copper, Vitreous tip, & grounded

37. Balustrade and outside gallery, Yes

38. Lantern doors, and how fitted, Swing hinged with latch

39. Floor of lantern—Of what materials, Iron

40. Watch-room door leading into lantern, and how fitted, Swing gear and handle

VENTILATORS.

41. In parapet, wall, or lower part of lantern, Lower part of lantern

42. Lantern ladders for cleaning plate glass, outside, None

43. Curtain hooks inside of lantern—How fitted, Spring rollers

WATCH ROOM.

44. How fitted, Painted ~~and varnished~~ sides sheathed

45. Bell wires, speaking tubes, or telephones for calling relief keepers—Kind, Telephone ~~Speaking tubes~~

46. Where led, To lower dwellings

ILLUMINATING APPARATUS, ETC.

47. Kind of apparatus, Flashing white; intensity in English candles, 350 000

48. Name of maker, Barbier & Fenestre and Lucenne; year made, 1891

49. Marks and number on apparatus, Paris

50. Order of apparatus, First; inside diameter (inscribed circle, tangent to glass) of central drum, 6'-0½"

51. **If the apparatus is a parabolic mirror,** state (*a*) diameter of opening, None; (*b*) depth of mirror, —; (*c*) its focal length, —; (*d*) material of which it is made, —

52. **If revolving,** time of revolution, 20 seconds

(*a*) duration of flash, 0.2 sec.; (*b*) duration of eclipse, 4.8 sec.

53. **If fixed,** or fixed varied by flashes, state arc of each fixed part in degrees, —;

(*a*) duration of fixed light, — sec.; (*b*) eclipse, — sec.; (*c*) flash, — sec.

ILLUMINATING APPARATUS, ETC.—Continued.

54. Number of panels in the lens apparatus, 25

55. Number of flash panels, 4; arc of each, in degrees, 22°

56. Number of elements in each panel of central drum of lens, 8

57. Number of prisms in each panel *above* central drum of lens, 18; are they fixed or flash? Fixed

58. Number of prisms in each panel *below* central drum of lens, 8; are they fixed or flash? Fixed

59. How are the flashes produced—By the whole apparatus revolving Yes; by revolving belt only —; if by panels or vertical elements revolving outside of fixed lens, state the number of such panels, —

60. **If by vertical elements,** state (*a*) the number in each panel, —; and (*b*) the number of elements of fixed lens covered by the panel, —

61. **If light is occulting,** state (*a*) the characteristic, —

(*b*) Between what time limits may characteristic be varied without structural changes in mechanism? —

(*c*) Are eclipses produced by sleeve, revolving screens, or valve (if gaslight)? —

(*d*) Size of sleeve and amplitude of movement, —

(*e*) Axis of rotation of screens, horizontal or vertical, —; (*f*) relation of axis to vertical axis of illuminating apparatus, —

(*g*) Do the screens revolve as parts, or independently, of illuminating apparatus? —

(*h*) If about vertical axis, how many in circumference, —; (*i*) time required for complete revolution, —; (*j*) form, —;

(*k*) how mounted (see Questions 62–65), —;

(*l*) if actuated by clockwork, state order and maker, —;

(*m*) date made, —

If occultation is effected by valve, state (*n*) name of maker, —;

(*o*) pattern, —;

(*p*) does it operate reliably? —

62. **If revolving,** does the apparatus revolve on chariot wheels, mercury float, or balls? Mercury float

63. **If a chariot,** describe it and state the number and size of each pattern of wheels in it, —

ILLUMINATING APPARATUS, ETC.—Continued.

64. **If on mercury float,** give (*a*) inside diameter of trough, 5' 1/4"; (*b*) inside depth of trough, 10"; (*c*) outside diameter of float, 5' 7"; (*d*) depth of float, 11 1/2"; (*e*) weight of mercury required, in pounds, about 600; (*f*) how often mercury is renewed? Have not been renewed since 1901

65. **If on balls,** (*a*) describe the construction of the ball-raceways, whether they are flat surface or semicircular or V grooves, None; (*b*) is a cage used to separate balls? —; (*c*) state number of balls, —; (*d*) diameter of balls, —

66. Clock cord or chain, kind, —; size, —; length, —; how led, —; diam. and length of clock drum, —

67. Length and inside dimensions of drop tube or weight box, No tube, weight goes in stairway; clock weight, about 200 pounds.

68. Length of time clock will run after one winding, 24 hours

69. Does clock drive apparatus while being rewound? Yes

70. How is the machinery protected? Glass case

71. How regulated? By friction by ball governor

72. Describe the pedestal, Cast iron

73. Lens protector—Is there one? No; kind, —

74. Draft tube leading into ventilator ball—Of what material, diameter, and how fitted and connected with damper tube when in place, Iron tube 7" diam. bolted in place by collar

75. **If colored light,** (*a*) how is the color produced? —

(*b*) state where colored glass is attached, if to illuminating apparatus or to lantern, —

76. If colored glass is inside of illuminating apparatus, describe its form, —

77. Red sectors—Between what bearings, true (from seaward), —

LAMPS, BURNERS, ETC.

78. Description of lamp: (a) give order, 55 m m IOV.; (b) kind of illuminant, Kero[illegible]
(c) intensity in English candles, 550 [illegible]

If oil, or oil vapor:

(a) number of wicks, or mantels, to burner, One mantle ✓;
(b) diameter of outside wick, —; (c) diameter of mantel, 2 1/8" ✓;
(d) if more than one mantel, also diameter of circumscribing circle, One only ✓

If gaslight:

(e) state kind, None; (f) number of burners, if more than one burner in group, —; (g) kind of burner, —;
(h) candlepower per burner, —; (i) total candlepower of group, —;
(j) size of burner in cubic feet of gas per hour, —;
(k) consumption of gas per hour, — cubic feet; (l) how is gas obtained?

If gas is generated at station:

(m) describe generator, None;
(n) state name of maker, —;
(o) date of pattern, —; (p) maximum capacity per hour, — — cubic feet.

If compressed gas is used:

(q) describe container and give number in service, None; spare —;
(r) capacity, — cubic feet of free gas; (s) to what pressure charged, — lbs.; (t) how is supply renewed? —;
(u) if by substitution of full for empty container, at what intervals? —

79. Number of spare lamps at station, Two
80. Number of spare lamp burners at station, —

CLOSETS IN TOWER.

81. How fitted and used, None

OIL HOUSE OR ROOM.

82. Describe (a) where placed and how fitted, About 150 feet N.E'ly from tower no fittings
(b) inside dimensions, 11'-10" X 13'-8"; (c) materials of which built, Brick;
(d) capacity in 5-gallon cans, 700

CLOSETS AND STOREROOMS.

83. Where placed, how fitted and used, None

84. Damp or dry, suited or unsuited to the purpose for which they were designed, —

FOG SIGNAL.

85. Kind and character of apparatus, 1st Class Daboll trumpet

86. How much time is required to sound the signal? 5 to 8 minutes; how long may the signal sound its characteristic with the quantity of air stored under pressure? One minute

87. Characteristic:

If ~~whistle~~, trumpet, ~~or siren~~:

Blast	Silent	Blast	Silent
8 sec.	30 sec.	8 sec.	30 sec.

~~If bell:~~ ____ strokes ____ Silent sec. ____ strokes ____ Silent sec.

88. What parts of the fog-signal machinery are in duplicate? All parts

89. Location, with reference to lighthouse, to a particular danger or channel, or to the special object for which established, To warn mariners from easterly side of Cape Cod

90. Distance and direction, true, from lighthouse, 140 feet 77°
91. Water supply for it, Cistern water
92. How is it reached from the lighthouse? Path

FOG SIGNAL—Continued.

93. **Description** of fog-signal building or buildings, Brick house with hip roof

94. **If a bell,** state (*a*) weight, None lbs.; (*b*) metal, —; (*c*) diameter, —; (*d*) height, —; (*e*) if struck by clockwork, state time it will run with one winding, —; (*f*) maker and date, —; (*g*) weights for operating, — lbs.

95. **If a steam signal,** describe boiler: (*a*) type, None; (*b*) length, —; (*c*) diameter, —; (*d*) horsepower, —; (*e*) maker and date, —; (*f*) Is there a heater? No; what kind? —; what size? —; how much does its use reduce the time of starting the fog signal?

96. **If a steam engine is used:** (*a*) kind, None; (*b*) number of revolutions per minute, —; (*c*) diameter of cylinder, —; (*d*) stroke of piston, —; (*e*) horsepower, —; (*f*) maker and date, —

97. **If internal combustion engines are used:** (*a*) kind of engine, Hornsby Akroyd; (*b*) maker, Gr. Co. Vern Refg. & Mch. Co.; (*c*) date, 1899; (*d*) nominal size, 7X8"; (*e*) horsepower, 4; (*f*) fuel used, Kerosene; (*g*) how started, Hot Tube; (*h*) kind of compressor, Single stage; (*i*) maker and date, Clayton Air Compressor Works 1899

State if compressor is on same bed and geared with engine, or separate and belt-driven, or both pistons on same rod, Separate bed geared if geared or belt-driven, state ratio, 1 to 2

Describe compressor machinery, (*a*) diameter of cylinder, 7"; (*b*) stroke of piston, 7"; (*c*) number of revolutions per minute, 150; (*d*) character and size of air-inlet valves, due 1½"; (*e*) kind of unloader, None safety valve on tank; (*f*) diameter of delivery pipe, 1½"

FOG SIGNAL—Continued.

98. (*a*) Number air receivers, Three; (*b*) diameter, Two 3-6, one 3-3; (*c*) height, Two 8-0, one 7-6; (*d*) capacity cubic feet, each, Two 80, one 65; (*e*) pressure in each, 5½; (*f*) make of reducing valve, if used, None; (*g*) remarks, These engines are ideal for fog signal purposes

99. **If whistle, trumpet, or siren,** pressure at which blown, 5½ lbs.

100. Diameter of whistle, None; height, —; distance between orifice and edge of whistle, —; single tone, —; chime, —

101. **If disk or cylindrical siren,** None; diameter of revolving part, —; when made, —; by whom made, —; number, width, and length of ports, —; revolutions per minute, —; type of governor, —; condition of revolving part, —

102. **If Daboll trumpet:** Class, 1st; reed: length, 20"; breadth, 5"; thickness at base, 1 3/16"; thickness at tip, 3/8"

103. **If trumpet:** Length, 15'-0"; diameters, 5" & 14"; material, Copper

104. Timing device, Automatic clocks

105. Height of whistle or trumpet above mean high water, 150 feet

106. Direction, *true*, in which trumpet points, 47°

107. Pressure and recording gauge, Yes

DWELLINGS FOR KEEPERS.

108. Location with reference to lighthouse tower, Keepers dwelling North, Asst's East of tower

109. Coloring, White, lead trimmings

110. Materials of which built, Wood

111. Number of dwellings, Two; number of rooms in each, Five single & bath. Keepers dwelling with bath each one

112. Describe heating plant, Direct hot water

113. Number of keepers and assistants in each dwelling, Keeper in single, two Asst's in double

114. Which keepers are furnished quarters? All

115. Which keepers are not furnished quarters? None

116. Outhouses, Two fuel houses & pump house; coloring, White lead trimmings

117. Paths or walks on the premises, Plank walks to fuel houses

118. Area susceptible of profitable cultivation, whole; area cultivated or prepared for cultivation, None

DWELLINGS FOR KEEPERS—Continued.

119. Character of adjacent surrounding country—Soil, sandy, clay, marsh, swamp, wood, fast ground, or shifting sands, Sandy

120. Furnish following data for stoves, kitchen sink, sink pump, and lamps in quarters:

Articles.	Keeper.	1st Assistant Keeper.	2d Assistant Keeper.	3d Assistant Keeper.
Stove, maker,	Magee Grand	Magee Grand	Magee Grand	
Stove, size,	7-18	7-18	7-18	
Sink, maker,	Not Known	Not Known	Not Known	
Sink, size,	22"x48"	22"x48"	22"x48"	
Pump, maker,	Douglas	Douglas	Douglas	
Pump, size,	No 2	No 2	No 2	
Lamps. (Give name, number, and make of all lamps in each set of quarters.)	1 brass hand and 1 brass table lamp from Dist. Depot	do	do	

WATER FOR FOG SIGNAL, DRINKING, ETC.

121. How procured, From deep driven well and from roofs

122. Quality, Good

123. Quantity ample or not for the station at all seasons of the year, Ample

124. Liable or not to be injured by the inroads of storm tides and seas, No

125. If rain water in tanks or cisterns, what precautions have been taken to insure its purity? Frequent cleaning

126. Capacity of tanks or cisterns, and where placed, Cisterns in each dwelling 1200 gals

127. Tanks or cisterns—Of what material made, Bricks cement plastered.

WATER FOR FOG SIGNAL, DRINKING, ETC.—Continued.

128. Is there a distilling apparatus at the station? None

Name of maker and date, —;

capacity, —; when installed, —; condition, —;

efficiency, —

129. If from a well, describe and give depth, Driven well 153 feet deep

130. Diameter, 4"; lined or not, Iron pipe

131. Water obtained by pump or bucket, Pump and pump; what power is used? Kerosene engine

132. Distance from keeper's dwelling, 16 feet

HEALTHFULNESS OF STATION.

133. General opinion in regard to the healthfulness of the light station and vicinity, Healthful

134. Diseases—What are most prevalent at the station and in the vicinity? None

135. Do they prevail at particular seasons of the year, or not? —

136. Are there any local causes, such as swamps, marshes, etc., in the immediate vicinity of the lighthouse which are likely to be the cause of these diseases? No

137. Would draining or other artificial means employed on the lighthouse premises be likely to improve the sanitary condition of the light station? No

BOATS.

138. Furnish following data for each boat at station: None

Number.	Type.	Length.	Width.	When Built.	Date Received at Station.	Is Boat Fitted with Sails?	Suited to Work Performed.

BOATS—Continued.

139. **If power boat,** kind of engine, None; horsepower, —;

maker of engine, shop number, and date, —

(*a*) type, size, number, and maker's name of spare coil, —

(*b*) type, size, number, and maker's name of magneto, —

(*c*) type and number of batteries, —

(*d*) propeller wheel, diameter, —; pitch, —

140. Where are boats kept at station? None

LANDING, WHARF, BOATHOUSE, AND ROAD TO THE LIGHTHOUSE.

141. Description, None

142. Distance and direction of landing from lighthouse, No suitable Track landing

143. Hoisting engine, what kind? None;

diameter of cylinder, —; number of revolutions per minute, —;

stroke, —; kind of boiler, —;

maker and date, —

144. General Remarks: The tower dwellings Fog Signal building and apparatus in good condition. There is a wireless station operated by Navy Dept located on northern end of reservation.

[illegible]

Form 60

SECOND LIGHTHOUSE DISTRICT

DEPARTMENT OF COMMERCE

DESCRIPTION

OF

LIGHT STATION

No. MASSACHUSETTS

1796
1798

580'

INSTRUCTIONS

This form is to be filled out for new stations as established [illegible] for present stations which have not heretofore been described. When changes are made at existing stations affecting the description previously given, pages containing the revised data should be promptly forwarded. The use of this form should be limited to stations having resident keepers.

DESCRIPTION OF LIGHT STATION.

1. By whom described ....., date .....

STATION.

2. Name of station, Cape Cod
3. Characteristic of light, Flashing white every 5 seconds.

4. Geographical position of light: Latitude, 42° 02' 23"; longitude, 70° 03' 40".
5. Location, On highlands northeast side of Cape Cod Mass.

PREMISES.

6. Origin of title to site of station (public land, purchase, lease, military or naval reservation), Purchase
7. Date of reservation, deed, lease, or permission to occupy, August 5, 1796
8. Area of the entire site, 10A. ~~47 Rods~~ (b) area inclosed, whole; (c) type of fence, Wire concrete posts.
9. Distance of tower from nearest high-water mark, About 580 feet.
10. Wharf or landing on premises, None
11. Means by which the light station may be reached and distance to nearest post office or town, with name, By public road: Post Office, North Truro, distant 1¼ miles.
12. Tower or other means used for supporting the lantern and apparatus, Tower
13. Number of separate lights, One
14. When first built or established, 1798

PREMISES—Continued.

15. When last thoroughly rebuilt, repaired, or renovated, 1857

16. Height of focal plane of lantern above mean high water (on sea and gulf coasts) or mean lake level on northern lakes and rivers, 183 feet

17. Background of the lighthouse, upon which it is projected, as seen from seaward, Sky

18. Color of tower, and how produced, White - whitewash

19. Tower—Connected with keeper's dwelling, and how; or detached, Connected by covered way

20. Purpose of aid—Seacoast, lake coast, bay, harbor, channel, or range; for general or local navigation, Primary seacoast.

21. Materials of which the tower is built, Bricks and cement.

22. Kind of stairway and steps, Iron

23. Size of glass for glazing tower windows, 8 x 10" and 9 x 10½"

24. Number of windows in tower, and size of sash, Three 2'-3½" x 22½"

25. Number and size of doors, One 3'-0" x 7'-0"

26. General remarks upon tower and site, Tower sets on concrete foundation - Land is sandy.

LANTERN AND LANTERN FIXTURES.

27. Order or class of lantern, 1st order

28. If polygonal, state number of sides; if cylindrical, state diameter, Polygonal-16 sides

29. Vertical or helical bars, Vertical; thickness of bars, 1 1/8"; height glazed, 9'-5 7/8"

30. Number of plates in height, Three; in each side, Three

31. Thickness and size of plates, 1/4" - Top Row 28" x 47 3/8" - 16 Lts.
Middle " 28" x 39" - 16 "
Bottom " 28" x 25" - 16 "

32. Unglazed side of lantern in plates and degrees of arc, none, between what bearings (true and from seaward), —

33. Materials of which the lantern is constructed, Iron

34. Roof, Iron

LANTERN AND LANTERN FIXTURES—Continued.

35. Ventilator ball, Iron

36. Lightning-conductor spindle, Copper, platinum tip and grounded

37. Balustrade and outside gallery, yes

38. Lantern doors, and how fitted, Iron hinged with latch

39. Floor of lantern—Of what materials, Iron

40. Watch-room door leading into lantern, and how fitted, Hinges and handle

VENTILATORS.

41. In parapet, wall, or lower part of lantern, Lower part of lantern

42. Lantern ladders for cleaning plate glass, outside, Iron

43. Curtain hooks inside of lantern—How fitted, Spring rollers

WATCH ROOM.

44. How fitted, Pedestal and sides sheathed.

45. Bell wires, speaking tubes, or telephones for calling relief keepers—Kind, None

46. Where led, —

ILLUMINATING APPARATUS, ETC.

47. Kind of apparatus, Flashing white; intensity in English candles, 4,000,000

48. Name of maker, Barbier, Benard & Turenne; year made, 1901

49. Marks and number on apparatus, Paris

50. Order of apparatus, First; inside diameter (inscribed circle, tangent to glass) of central drum, 6'-0 ½"

51. **If the apparatus is a parabolic mirror,** state (*a*) diameter of opening, None; (*b*) depth of mirror, —; (*c*) its focal length, —; (*d*) material of which it is made, —

52. **If revolving,** time of revolution, 20 seconds
(*a*) duration of flash, 0.2 sec.; (*b*) duration of eclipse, 4.8 sec.

53. **If fixed,** or fixed varied by flashes, state arc of each fixed part in degrees, —;
(*a*) duration of fixed light, — sec.; (*b*) eclipse, — sec.; (*c*) flash, — sec.

ILLUMINATING APPARATUS, ETC.—Continued.

54. Number of panels in the lens apparatus, 28

55. Number of flash panels, 4; arc of each, in degrees, 90°

56. Number of elements in each panel of central drum of lens, 8

57. Number of prisms in each panel *above* central drum of lens, 18; are they fixed or flash? Flashing

58. Number of prisms in each panel *below* central drum of lens, 8; are they fixed or flash? Flashing

59. How are the flashes produced—By the whole apparatus revolving yes; by revolving belt only —; if by panels or vertical elements revolving outside of fixed lens, state the number of such panels, —

60. **If by vertical elements,** state (*a*) the number in each panel, —; and (*b*) the number of elements of fixed lens covered by the panel, —

61. **If light is occulting,** state (*a*) the characteristic, —

(*b*) Between what time limits may characteristic be varied without structural changes in mechanism? —

(*c*) Are eclipses produced by sleeve, revolving screens, or valve (if gaslight)? —

(*d*) Size of sleeve and amplitude of movement, —

(*e*) Axis of rotation of screens, horizontal or vertical, —; (*f*) relation of axis to vertical axis of illuminating apparatus, —

(*g*) Do the screens revolve as parts, or independently, of illuminating apparatus? —

(*h*) If about vertical axis, how many in circumference, —; (*i*) time required for complete revolution, —; (*j*) form, —;

(*k*) how mounted (see Questions 62–65), —;

(*l*) if actuated by clockwork, state order and maker, —;

(*m*) date made, —

If occultation is effected by valve, state (*n*) name of maker, —;

(*o*) pattern, —;

(*p*) does it operate reliably? —

62. **If revolving,** does the apparatus revolve on chariot wheels, mercury float, or balls? Mercury float

63. **If a chariot,** describe it and state the number and size of each pattern of wheels in it, —

ILLUMINATING APPARATUS, ETC.—Continued.

64. **If on mercury float,** give (*a*) inside diameter of trough, 5'-7¼"; (*b*) inside depth of trough, 10"; (*c*) outside diameter of float, 5'-7"; (*d*) depth of float, 11½"; (*e*) weight of mercury required, in pounds, about 600; (*f*) how often mercury is renewed? Never has been renewed since 1901

65. **If on balls,** (*a*) describe the construction of the ball-raceways, whether they are flat surface or semicircular or V grooves, None; (*b*) is a cage used to separate balls? —; (*c*) state number of balls, —; (*d*) diameter of balls, —

66. Clock cord or chain, kind, —; size, —; length, —; how led, —; diam. and length of clock drum, —

67. Length and inside dimensions of drop tube or weight box, No tube, weight goes in stair well; clock weight, about 200 pounds.

68. Length of time clock will run after one winding, 2¼ hours

69. Does clock drive apparatus while being rewound? yes

70. How is the machinery protected? Glass case

71. How regulated? By friction fly ball governor. The above clock is now used as standby—use motor and speed reducer unit for driving lens

72. Describe the pedestal, Cast iron

73. Lens protector—Is there one? no; kind, —

74. Draft tube leading into ventilator ball—Of what material, diameter, and how fitted and connected with damper tube when in place, yes—black iron 7½" dia. held in space by cellar

75. **If colored light,** (*a*) how is the color produced? —

(*b*) state where colored glass is attached, if to illuminating apparatus or to lantern, —

76. If colored glass is inside of illuminating apparatus, describe its form, —

77. Red sectors—Between what bearings, true (from seaward), —

LAMPS, BURNERS, ETC.

78. Description of lamp: (a) give order, 1000 watt P.S.52-clear C-T filament elec. incandescent; (b) kind of illuminant, Electric

(c) intensity in English candles, 1670

If oil, or oil vapor:

(a) number of wicks, or mantels, to burner, —;

(b) diameter of outside wick, —; (c) diameter of mantel, —;

(d) if more than one mantel, also diameter of circumscribing circle, —

If gaslight:

(e) state kind, none; (f) number of burners, if more than one burner in group, —; (g) kind of burner, —;

(h) candlepower per burner, —; (i) total candlepower of group, —;

(j) size of burner in cubic feet of gas per hour, —;

(k) consumption of gas per hour, — cubic feet; (l) how is gas obtained? —

If gas is generated at station:

(m) describe generator, none;

(n) state name of maker, —;

(o) date of pattern, —; (p) maximum capacity per hour, — cubic feet.

If compressed gas is used:

(q) describe container and give number in service, none; spare —;

(r) capacity, — cubic feet of free gas; (s) to what pressure charged, — lbs.; (t) how is supply renewed? —;

(u) if by substitution of full for empty container, at what intervals? —

79. Number of spare lamps at station, Four

80. Number of spare lamp burners at station, —

CLOSETS IN TOWER.

81. How fitted and used, none

OIL HOUSE OR ROOM.

82. Describe (a) where placed and how fitted, About 150 ft. N.E'ly from tower (no fittings)

(b) inside dimensions, 11'-10" x 13'-8"; (c) materials of which built, Bricks;

(d) capacity in 5-gallon cans, 700 - 56 cell battery installed in oilhouse to supply current for station needs

CLOSETS AND STOREROOMS.

83. Where placed, how fitted and used, none

84. Damp or dry, suited or unsuited to the purpose for which they were designed, —

FOG SIGNAL.

85. Kind and character of apparatus, 1st class Daboll trumpet standard Type 325 Sub Signal & air oscillator main fog signal Installed 1929

86. How much time is required to sound the signal? 5 to 8 minutes; how long may the signal sound its characteristic with the quantity of air stored under pressure? One minute

87. Characteristic:

If ~~whistle~~, trumpet, ~~or siren~~:

Blast	Silent	Blast	Silent
8 sec.	30 sec.	8 sec.	30 sec.

~~If bell~~:

..... strokes ..... Silent sec. ..... strokes ..... Silent sec.

88. What parts of the fog-signal machinery are in duplicate? All parts

89. Location, with reference to lighthouse, to a particular danger or channel, or to the special object for which established, To warn mariners from easterly side of Cape Cod.

90. Distance and direction, true, from lighthouse, 140 feet N°

91. Water supply for it, Cistern water

92. How is it reached from the lighthouse? Path

FOG SIGNAL—Continued.

93. Description of fog-signal building or buildings, Brick house with hip roof.

94. **If a bell,** state (*a*) weight, None lbs.; (*b*) metal, —; (*c*) diameter, —; (*d*) height, —; (*e*) if struck by clockwork, state time it will run with one winding, —; (*f*) maker and date, —; (*g*) weights for operating, — lbs.

95. **If a steam signal,** describe boiler: (*a*) type, None; (*b*) length, —; (*c*) diameter, —; (*d*) horsepower, —; (*e*) maker and date, —

(*f*) Is there a heater? —; what kind? —; what size? —; how much does its use reduce the time of starting the fog signal? —

96. **If a steam engine is used:** (*a*) kind, None; (*b*) number of revolutions per minute, —; (*c*) diameter of cylinder, —; (*d*) stroke of piston, —; (*e*) horsepower, —; (*f*) maker and date, —

97. **If internal combustion engines are used:** (*a*) kind of engine, Hornsby-Akroyd; (*b*) maker, De La Vergne Refg. & Mch. Co. and Novo Engine; (*c*) date, 1899; (*d*) nominal size, 7x8"; (*e*) horsepower, 4; (*f*) fuel used, Kerosene; (*g*) how started, Hot ball; (*h*) kind of compressor, Single stage; (*i*) maker and date, Clayton Air Compressor Works 1899.

State if compressor is on same bed and geared with engine, or separate and belt-driven, or both pistons on same rod, Sep. bed geared; if geared or belt-driven, state ratio, 1 to 2

Describe compressor machinery, (*a*) diameter of cylinder, 7"; (*b*) stroke of piston, 7"; (*c*) number of revolutions per minute, —; (*d*) character and size of air-inlet valves, disc 1½"; (*e*) kind of unloader, safety valve on tank; (*f*) diameter of delivery pipe, 1½"

FOG SIGNAL—Continued.

98. (*a*) Number air receivers, Two; (*b*) diameter, Two 3'-6" one 3'-3"; (*c*) height, Two 8'-0" one 7-6; (*d*) feet, each, Two 8'-0" one 6-5; (*e*) pressure in each, 5½; (*f*) make of reducing valve, if used, None; (*g*) remarks, These engines are ideal for fog signal purposes

99. **If whistle, trumpet, or siren,** pressure at which blown, 5½ lbs.

100. Diameter of whistle, None; height, —; distance between orifice and edge of whistle, —; single tone, —; chime, —

101. **If disk or cylindrical siren,** —; diameter of revolving part, —; when made, —; by whom made, —; number, width, and length of ports, —; revolutions per minute, —; type of governor, —; condition of revolving part, —

102. **If Daboll trumpet:** Class, 1st; reed: length, 20"; breadth, 5"; thickness at base, 1 5/16"; thickness at tip, 3/8"

103. **If trumpet:** Length, 15'-0"; diameters, 5" and 14"; material, Copper

104. Timing device, Automatic clocks

105. Height of whistle or trumpet above mean high water, 150 feet

106. Direction, *true*, in which trumpet points, 47°

107. Pressure and recording gauge, yes

DWELLINGS FOR KEEPERS.

108. Location with reference to lighthouse tower, Keepers' dwelling North-Asst's East of tower

109. Coloring, White lead trimmings

110. Materials of which built, Wood

111. Number of dwellings, Two; number of rooms in each, Six single & bath - ten double with bath each side

112. Describe heating plant, Direct hot water

113. Number of keepers and assistants in each dwelling, Keeper in single, two Asst's in double.

114. Which keepers are furnished quarters? All

115. Which keepers are not furnished quarters? None

116. Outhouses, Two fuel houses & pump house; coloring, White lead trim.

117. Paths or walks on the premises, Cement walks to fuel houses.

118. Area susceptible of profitable cultivation, whole; area cultivated or prepared for cultivation None

DWELLINGS FOR KEEPERS—Continued.

119. Character of adjacent surrounding country—Soil, sandy, clay, marsh, swamp, wood, fast ground, or shifting sands, sandy

120. Furnish following data for stoves, kitchen sink, sink pump, and lamps in quarters:

Articles.	Keeper.	1st Assistant Keeper.	2d Assistant Keeper.	3d Assistant Keeper.
Stove, maker,	Magee-Grand	Magee-Grand	Magee-Grand	
Stove, size,	7-18	7-18	7-18	
Sink, maker,	Don't know	Not known	not known	
Sink, size,	22x48"	22x48"	22x48"	
Pump, maker,	Douglas	Douglas	Douglas	
Pump, size,	No. 2	No. 2	No. 2	
Lamps. (Give name, number, and make of all lamps in each set of quarters.)	1 brass hand and 1 brass table lamp from Gen. Depot.	do	do	

WATER FOR FOG SIGNAL, DRINKING, ETC.

121. How procured, from deep driven well and from roofs.

122. Quality, Good

123. Quantity ample or not for the station at all seasons of the year, Ample

124. Liable or not to be injured by the inroads of storm tides and seas, No

125. If rain water in tanks or cisterns, what precautions have been taken to insure its purity? Frequent cleaning

126. Capacity of tanks or cisterns, and where placed, Cisterns in each dwelling 1200 gals.

127. Tanks or cisterns—Of what material made, Bricks cement plastered.

WATER FOR FOG SIGNAL, DRINKING, ETC.—Continued.

128. Is there a distilling apparatus at the station? None

Name of maker and date, —;

capacity, —; when installed, —; condition, —;

efficiency, —

129. If from a well, describe and give depth, Driven well 155 feet deep.

130. Diameter, 4"; lined or not, Iron pipe

131. Water obtained by pump or bucket, Pump; what power is used? Kerosene engine and pump.

132. Distance from keeper's dwelling, 16 feet

HEALTHFULNESS OF STATION.

133. General opinion in regard to the healthfulness of the light station and vicinity, Healthful

134. Diseases—What are most prevalent at the station and in the vicinity? None

135. Do they prevail at particular seasons of the year, or not? —

136. Are there any local causes, such as swamps, marshes, etc., in the immediate vicinity of the lighthouse which are likely to be the cause of these diseases? No

137. Would draining or other artificial means employed on the lighthouse premises be likely to improve the sanitary condition of the light station? No

BOATS.

138. Furnish following data for each boat at station: None

Number.	Type.	Length.	Width.	When Built.	Date Received at Station.	Is Boat Fitted with Sails?	Suited to Work Performed.

BOATS—Continued.

139. **If power boat**, kind of engine, None; horsepower, —;

maker of engine, shop number, and date, —

(*a*) type, size, number, and maker's name of spare coil, —

(*b*) type, size, number, and maker's name of magneto, —

(*c*) type and number of batteries, —

(*d*) propeller wheel, diameter, —; pitch, —

140. Where are boats kept at station? —

LANDING, WHARF, BOATHOUSE, AND ROAD TO THE LIGHTHOUSE.

141. Description, None

142. Distance and direction of landing from lighthouse, No suitable beach landing.

143. Hoisting engine, what kind? None;

diameter of cylinder, —; number of revolutions per minute, —;

stroke, —; kind of boiler, —;

maker and date, —

144. General Remarks: The tower dwellings, fog signal building and apparatus in good condition. There is a wireless station and compass station operated by Navy Dept. located on northerly end of reservation. Light changed to electric Oct. 28, 1933.