

HIGHLAND LIGHTHOUSE AND KEEPER'S DWELLING

HISTORIC STRUCTURE REPORT

North Truro, Massachusetts

Completed in Conjunction with the
United States Coast Guard

Prepared by

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May 1994

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS AND CREDITS	viii
EXECUTIVE SUMMARY	xix
ADMINISTRATIVE DATA	xxi
I. <u>HISTORY OF DEVELOPMENT AND USE</u>	1
STATEMENT OF SIGNIFICANCE (<i>Lowenthal</i>)	3
THE FIRST CAPE COD LIGHT (<i>Lowenthal</i>)	4
Administrative Background	4
The Need for the First Light	5
Site Selection	7
Contracting	17
Construction	21
Distinguishing the Light	24
Subsequent Development	28
THE SECOND CAPE COD LIGHT (<i>Lowenthal</i>)	34
Administrative Background	34
The Need for a New Light	34
Site Selection	35
Contracting	40
Construction	40
Subsequent Development	41
THE THIRD (PRESENT) CAPE COD LIGHT (<i>Albee with Lowenthal and Binder</i>)	44
Administrative Background	44
The Need for a New Light	45
Site Selection	46
Construction	50

Subsequent Development	56
1857 to 1898	56
1898 to 1947	77
1947 to Present	118
Summary History of the Highland Light	130
II. <u>PHYSICAL DESCRIPTION</u>	133
EXISTING EXTERIOR APPEARANCE (<i>Binder</i>)	135
Keeper's Dwelling	136
West Elevation	136
North Elevation	143
East Elevation	143
South Elevation	147
Connector at the Keeper's Dwelling	149
Tower Connector	152
Tower	155
Shaft	155
Watch Deck and Gallery	155
Lantern and Lantern Gallery	156
EXISTING INTERIOR APPEARANCE (<i>Binder</i>)	162
Keeper's Dwelling	162
General Information	162
Basement	165
First Story	169
Second Story	178
Attic	189
Connector at the Keeper's Dwelling	190
First Story	190

Tower Connector	197
First Story	197
Tower	199
General Information	199
First Level and Stair	199
Half Deck	204
Weight Deck	206
Watch Deck	211
Lantern Deck	217
CONDITIONS ASSESSMENT AND REPAIR	
RECOMMENDATIONS (<i>Galland</i>)	222
Keeper's Dwelling	222
Exterior Elements	222
Interior Elements	230
Connector at the Keeper's Dwelling	234
Exterior Elements	234
Tower Connector	237
Exterior Elements	237
Interior Elements	238
Tower	239
Exterior Elements	239
Interior Elements	250
III. <u>RECOMMENDATIONS FOR TREATMENT</u>	265
GENERAL RECOMMENDATIONS FOR THE HIGHLAND LIGHT (<i>Albee</i>) ..	267
Significance	267
Character-Defining Features	268

Summary of Significant Periods of Alteration	269
Basic Treatment Recommendations	271
Exterior Recommendations	271
Interior Recommendations	273
CODE CONSIDERATIONS AND RECOMMENDATIONS (<i>Galland</i>)	274
IV. <u>APPENDICES</u>	279
A. Highland Light Station, Drawings, 1994 (<i>Galland</i>)	281
B. Paint Analysis (<i>Albee</i>)	291
C. Mortar Analysis (<i>Albee</i>)	333
D. Molding Profiles (<i>Galland</i>)	339
E. Contract for 1797 Cape Cod Lighthouse	343
F. Contract for Alterations to Lighthouse, 1812	349
G. Contract for the Construction of the Second Cape Cod Light, 1831	355
H. Report of Lieut. Edward W. Carpender, U.S.N., 1838	363
I. Report of I.W.P. Lewis, C.E., by Order of Hon. W. Forward, Secretary of Treasury, 1842	367
J. Map Section from "A Report upon the Military and Hydrographical Chart of the Extremity of Cape Cod, Including the Townships of Provincetown and Truro with Their Seacoasts and Ship Harbors, Projected from Surveys Executed During Portions of the Years 1833, 1834, and 1835," Under the Direction of James D. Graham, Major, U.S. Corps of Topographic Engineers, 1838	371
K. Cape Cod Light Station, Reservation Survey, 1885	375
L. Alteration of Single Dwelling at Cape Cod Light Station Mass., April 18, 1899	379

M.	Alteration of Single Dwelling at Cape Cod Light Station Mass., April 18, 1899	385
N.	Lantern and Watchroom at Cape Cod Light Station, circa 1900	391
O.	Details of Smoke Pipe and Smoke Pipe Support, 1901	395
P.	Location of Wireless Telegraph Station at Cape Cod Lighthouse, 1903	399
Q.	Lantern Lining and Cowl for Cape Cod Light Station, 1906	403
R.	Descriptions of Cape Cod Lightstation: 1908, 1910, 1922, 1927, and 1933	407
S.	Cape Cod Light Station, Keeper's Dwelling, Second Floor Alteration for Addition of Bathroom, 1909	443
T.	Cape Cod Light Station, Showing Location of Buildings, Etc., 1909	447
U.	Screen Doors & Windows for Dwellings at Cape Cod Light Station, 1910	451
V.	Cape Cod Light Station, Electrification of Station, 1932	455
W.	Cape Cod Light Station, Type of Lamp and Lamp Stand, 1945	459
X.	Cape Cod Light Station, Proposed Replacement of 1st Order Lens with 36-inch Drum Rotating Beacon, 1946	463
Y.	Highland Light, CAT II Automation Plans, 1987 (Sheets 1 and 2 of 24)	467
V.	<u>BIBLIOGRAPHY</u>	471

LIST OF ILLUSTRATIONS AND CREDITS

Figure 1. Map Section, U.S. Coast Survey, 1848. Cape Cod National Seashore, Eastham, MA	38
Figure 2. Illustration printed in <i>Gleason's Pictorial</i> , XI, 1856. Courtesy of Peabody Essex Museum, Salem, MA (neg. #27,756)	39
Figure 3. Design for Light House Tower at Highlands, Truro, Cape Cod (n.d.). U.S. Coast Guard (USCG) Civil Engineering Unit Providence, Archives, Warwick, RI	55
Figure 4. Cape Cod Light, looking northeast, between 1857 and 1868. Cape Cod National Seashore, Archives, Eastham, MA (#H14-54)	64
Figure 5. Cape Cod Light, looking north-northwest, between 1857 and 1868. Courtesy of Mystic Seaport Museum, Mystic, CT (#56.2121)	65
Figure 6. Cape Cod Light, looking northeast, between 1868 and 1881. Courtesy of Mystic Seaport Museum, Mystic, CT (#79.108.15)	66
Figure 7. Cape Cod Light, looking northeast, between 1868 and 1881. Courtesy of the Society for the Preservation of New England Antiquities, Boston, MA (#14162-B)	67
Figure 8. Cape Cod Light Station, 1885 survey. Microfilm, USCG Academy Library, New London, CT	68
Figure 9. Cape Cod Light Station, 1885 survey. USCG Civil Engineering Unit Providence, Archives, Warwick, RI	69
Figure 10. Cape Cod Light, looking northeast, September 13, 1886. Courtesy of Peabody Essex Museum, Salem, MA (#27,758)	70
Figure 11. Cape Cod Light, looking northeast, between 1886 and 1898. Courtesy of Mystic Seaport Museum, Mystic, CT (#60.150)	71
Figure 12. Cape Cod Light, looking east, between 1886 and 1898. Cape Cod National Seashore, Archives, Eastham, MA (#H14-59)	72
Figure 13. Cape Cod Light, looking east, between 1886 and 1898. Cape Cod National Seashore, Archives, Eastham, MA (#H14-58)	73

Figure 14. Cape Cod Light, looking south, between 1886 and 1898. Cape Cod National Seashore, Archives, Eastham, MA (#H14-60)	74
Figure 15. Cape Cod Light, looking east, between 1898 and 1900. Courtesy of the Society for the Preservation of New England Antiquities, Boston MA (#46245-A)	75
Figure 16. Cape Cod Light, looking northeast, between 1898 and 1900. Courtesy of the Society for the Preservation of New England Antiquities, Boston, MA (#46247-A)	76
Figure 17. Abstract of Information for Lens Apparatus, with corrections, 1900. USCG Civil Engineering Unit Providence, Archives, Warwick, RI	85
Figure 18. Abstract of Information for Lens Apparatus, corrected, 1900. USCG Civil Engineering Unit Providence, Archives, Warwick, RI	86
Figure 19. Postcard, "Highland Light," copyright 1905 by Rotograph Co. Cape Cod National Seashore, Archives, Eastham, MA (#H14-71)	87
Figure 20. Handrail for Cape Cod Light Tower, April 4, 1903. USCG Civil Engineering Unit Providence, Archives, Warwick, RI	88
Figure 21. Cape Cod Light Station, Showing Illumination Apparatus, March 1907. USCG Academy Library, Microfilm, New London, CT	89
Figure 22. Cape Cod Light, looking north, between 1910 and circa 1920. Courtesy of the Society for the Preservation of New England Antiquities, Boston, MA (#15974-B)	107
Figure 23. Ballplaying in field southwest of Cape Cod Light, between 1910 and circa 1920. Courtesy of the Society for the Preservation of New England Antiquities, Boston, MA (#16300-B)	108
Figure 24. Cape Cod Light, looking east, between 1910 and circa 1920. USCG Historian's Office, Washington, D.C.	109
Figure 25. Cape Cod Light, looking west, between 1910 and circa 1920. USCG Historian's Office, Washington, D.C.	110
Figure 26. Cape Cod Light, looking southwest, circa 1925. Courtesy of Peabody Essex Museum, Salem, MA (#27,757)	111
Figure 27. Cape Cod Light, looking north, between circa 1930 and circa 1935. USCG Historian's Office, Washington, D.C.	112

Figure 28. Cape Cod Light, looking south, between circa 1930 and circa 1935. USCG Historian's Office, Washington, D.C.	113
Figure 29. Cape Cod Light, looking east, circa 1935. USCG Historian's Office, Washington, D.C.	114
Figure 30. Cape Cod Light Station, looking south, between circa 1935 and 1946. USCG Historian's Office, Washington, D.C.	115
Figure 31. Cape Cod Light, looking north, before 1946. USCG Historian's Office, Washington, D.C.	116
Figure 32. Cape Cod Light, after 1944 and before 1946, based on the existence of the pilot-balloon observation platform and curtains in the Lantern. USCG Historian's Office, Washington, D.C.	117
Figure 33. Cape Cod Light, after 1946 and before 1956, based on the absence of Lantern curtains and the presence of the garage. USCG Historian's Office, Washington, D.C.	126
Figure 34. Cape Cod Light, looking north, 1959. Historic American Buildings Survey, Library of Congress (HABS Mass. 1-TRU,24-1, HABS No. MA-750-1, #46581)	127
Figure 35. Cape Cod Light, after 1958 and before 1961. Photograph by J. Sargent. Cultural Resources Center, Files, Lowell, MA	128
Figure 36. Cape Cod Light, aerial photograph looking north, between 1966 and 1977. USCG Historian's Office, Washington, D.C.	129
Figure 37. Keeper's Dwelling, west elevation. NPS photograph by R. Binder	139
Figure 38. Keeper's Dwelling, covered entry at south end of west wall. NPS photograph by R. Binder	139
Figure 39. Keeper's Dwelling, brick chimney with date of 1857. NPS photograph by R. Binder	140
Figure 40. Wraparound porch on Keeper's Dwelling ell. NPS photograph by R. Binder	141
Figure 41. Detail of porch column. NPS photograph by P. Albee	141
Figure 42. Keeper's Dwelling ell, west exterior elevation of north vestibule. NPS photograph by R. Binder	142

Figure 43. Keeper's Dwelling, second story of north elevation. NPS photograph by R. Binder	142
Figure 44. Keeper's Dwelling, east elevation. NPS photograph by R. Binder	145
Figure 45. Keeper's Dwelling ell, east exterior elevation of north vestibule. NPS photograph by R. Binder	145
Figure 46. Keeper's Dwelling ell, north vestibule, concrete steps with embedded disk. NPS photograph by R. Binder	146
Figure 47. Keeper's Dwelling ell, exterior south doorway of north vestibule. NPS photograph by R. Binder	146
Figure 48. Keeper's Dwelling, south elevation, seen from Tower. NPS photograph by M. Galland	148
Figure 49. Keeper's Dwelling, south elevation, bracket for missing downspout. NPS photograph by R. Binder	148
Figure 50. Connector at the Keeper's Dwelling, brick sizes and brush marks on east elevation. NPS photograph by R. Binder	150
Figure 51. Connector at the Keeper's Dwelling and Tower Connector, west elevation. NPS photograph by R. Binder	150
Figure 52. Connector at Keeper's Dwelling and Tower Connector, west elevation: blocked entryway, outlet tubes, and downspouts. NPS photograph by R. Binder	151
Figure 53. Concrete-block entry at junction of Connector at Keeper's Dwelling and Tower Connector, east elevation. NPS photograph by R. Binder	153
Figure 54. Tower Connector, blocked window on east elevation. Note larger brick size. NPS photograph by R. Binder	153
Figure 55. Tower Connector, west elevation. NPS photograph by R. Binder	154
Figure 56. Tower Connector, roof overhang at junction with Connector at Keeper's Dwelling. NPS photograph by M. Galland	154
Figure 57. Highland Light Station, west elevation. NPS photograph by R. Binder	157
Figure 58. Tower, south-elevation windows. NPS photograph by R. Binder	157

Figure 59. Tower, east elevation. NPS photograph by R. Binder	158
Figure 60. Tower, northwest elevation. NPS photograph by R. Binder	158
Figure 61. Tower, northwest elevation. NPS photograph by R. Binder	159
Figure 62. Tower, detail of joints in granite-block floor of Watch Gallery. NPS photograph by R. Binder	159
Figure 63. Tower at Watch Gallery: pipe support, tie rod, and underside of Lantern Gallery, showing ladder opening. NPS photograph by M. Galland	160
Figure 64. Tower, railing of Lantern Gallery. NPS photograph by M. Galland	160
Figure 65. Tower, detail of handrail along horizontal mullion of Lantern Gallery window wall. NPS photograph by M. Galland	161
Figure 66. Tower, vent cupola of Lantern. NPS photograph by M. Galland	161
Figure 67. Keeper's Dwelling, Room 105, showing typical walls, ceiling, and floor. NPS photograph by R. Binder	163
Figure 68. Room 103, typical doorway and door. NPS photograph by R. Binder	163
Figure 69. Room 102, typical baseboard heating unit. NPS photograph by R. Binder	164
Figure 70. Room B01, cistern area at northeast corner. NPS photograph by R. Binder	167
Figure 71. Room B01, floor bricks and raised concrete pads. NPS photograph by R. Binder	167
Figure 72. Room B01, doorway to bulkhead on south wall. NPS photograph by R. Binder	168
Figure 73. Room 102, ceiling beam. NPS photograph by R. Binder	171
Figure 74. Room 102, louvered doors to pantry closet (102a). NPS photograph by R. Binder	171
Figure 75. Room 104, baseboard with paint ghost. NPS photograph by R. Binder	174

Figure 76. Room 104, trim of doorway to basement. NPS photograph by R. Binder	174
Figure 77. Room 105, doorway to exterior. NPS photograph by R. Binder	176
Figure 78. Room 201, beaded fascia at stair landing. NPS photograph by R. Binder	179
Figure 79. Room 201, baseboard along east wall. NPS photograph by R. Binder	180
Figure 80. Room 201, layered doorway trim. NPS photograph by R. Binder	180
Figure 81. Room 202, southeast corner. NPS photograph by R. Binder	182
Figure 82. Room 204, ceiling and window of east-wall dormer. NPS photograph by R. Binder	185
Figure 83. Room 204, trim of north doorway (may date to 1900 renovation). NPS photograph by R. Binder	185
Figure 84. Room 204, trim of west closet doorway (may date to 1900 renovation). NPS photograph by R. Binder	186
Figure 85. Room 205, closet doorway at southeast corner. NPS photograph by R. Binder	188
Figure 86. Room 205, interior side of closet door. NPS photograph by R. Binder	188
Figure 87. Room 108, door to Room 107. NPS photograph by R. Binder	192
Figure 88. Room 109, west doorway to Room 110. NPS photograph by P. Albee	194
Figure 89. Room 110, south doorway to Room 111. NPS photograph by P. Albee	196
Figure 90. Room 111, Italianate molding at doorway to Room 110. NPS photograph by R. Binder	198
Figure 91. Room 111, iron door leading to Tower (Room 112). NPS photograph by R. Binder	198
Figure 92. Room 112, evenly spaced holes at base of wall, First Level of Tower. NPS photograph by P. Albee	201

Figure 93. Room 112, bolt holes and anchors visible east of window openings, First Level of Tower. NPS photograph by R. Binder 201

Figure 94. Room 112, window openings at south wall, First Level of Tower. NPS photograph by M. Galland 202

Figure 95. Room 112, curved stair installed in 1903, First Level of Tower. NPS photograph by R. Binder 202

Figure 96. Room 112, newel post and handrail of curved stair, First Level of Tower. NPS photograph by R. Binder 203

Figure 97. Room 112, underside of stair handrail at First Level of Tower, round holes at location of joint connector. NPS photograph by R. Binder 203

Figure 98. Room 112, underside of Half Deck. NPS photograph by R. Binder 205

Figure 99. Room 112, base of ladder ascending from Half Deck to Weight Deck. NPS photograph by R. Binder 205

Figure 100. Room 112, floor plates and stair balustrade at Weight Deck. NPS photograph by P. Albee 208

Figure 101. Room 112, granite sill of exterior Watch Deck doorway (above) interrupting corbeling of Weight Deck. NPS photograph by R. Binder 208

Figure 102. Room 112, Weight Deck ceiling (underside of Watch Deck). NPS photograph by R. Binder 209

Figure 103. Room 112, Weight Deck window opening in northwest wall. NPS photograph by R. Binder 209

Figure 104. Room 112, Weight Deck stair up to Watch Deck. NPS photograph by R. Binder 210

Figure 105. Room 112, tread detail of Weight Deck stair to Watch Deck. NPS photograph by R. Binder 210

Figure 106. Room 112, furred-out tongue-and-groove wall of Watch Deck, with recess at stair opening down to Weight Deck. NPS photograph by R. Binder 213

Figure 107. Room 112, Watch Deck ceiling (underside of Lantern Deck), showing original perimeter floor and later steel-plate circular floor added to support 1946 beacon. NPS photograph by R. Binder 213

Figure 108. Room 112, exterior doorway from Watch Deck to Watch Gallery, with three doors. NPS photograph by R. Binder	214
Figure 109. Room 112, middle door of doorway from Watch Deck to Watch Gallery. NPS photograph by R. Binder	214
Figure 110. Room 112, arched outer door of doorway from Watch Deck to Watch Gallery. NPS photograph by R. Binder	215
Figure 111. Room 112, telephone intercom system and electrical equipment on northeast wall of Watch Deck. NPS photograph by R. Binder	215
Figure 112. Room 112, stair on west wall of Watch Deck ascending to Lantern Deck. NPS photograph by R. Binder	216
Figure 113. Room 112, holes in floor of Lantern Deck made when beacon was changed in 1946. NPS photograph by R. Binder	218
Figure 114. Room 112, opening at west side of Lantern Deck floor for stair down to Watch Deck. NPS photograph by R. Binder	218
Figure 115. Room 112, horizontal mullion of Lantern Deck window wall. NPS photograph by R. Binder	219
Figure 116. Room 112, vent covers at base of Lantern Deck window wall. NPS photograph by R. Binder	219
Figure 117. Room 112, ventilation boxes at top of Lantern Deck window wall. NPS photograph by R. Binder	220
Figure 118. Room 112, iron pegs that pin vertical mullions of Lantern Deck windows to continuous perimeter lintel. NPS photograph by R. Binder	220
Figure 119. Room 112, ventilator at center of Lantern Deck ceiling. NPS photograph by R. Binder	221
Figure 120. Keeper's Dwelling ell, deteriorated flashing at north elevation. NPS photograph by M. Galland	226
Figure 121. Keeper's Dwelling, juncture of porch roof and north wall. NPS photograph by M. Galland	226
Figure 122. Keeper's Dwelling roof, north end of west elevation. NPS photograph by M. Galland	227

Figure 123. Keeper's Dwelling ell, north side of west dormer. NPS photograph by M. Galland	227
Figure 124. Keeper's Dwelling, water staining at west elevation. NPS photograph by M. Galland	228
Figure 125. Keeper's Dwelling, built-up grade against wood siding at east elevation. NPS photograph by M. Galland	229
Figure 126. Keeper's Dwelling, built-up grade against wood siding of east elevation. NPS photograph by M. Galland	229
Figure 127. Keeper's Dwelling, typical interior window sill with wind-blown sand. NPS photograph by R. Binder	231
Figure 128. Keeper's Dwelling, water penetration around pipes at east wall of basement. NPS photograph by R. Binder	231
Figure 129. Keeper's Dwelling, ponding of water on floor at east wall of basement. NPS photograph by R. Binder	232
Figure 130. Keeper's Dwelling, masonry cracks at northwest corner of basement. NPS photograph by R. Binder	232
Figure 131. Connector at Keeper's Dwelling, east elevation, south end of built-in roof gutter. NPS photograph by M. Galland	236
Figure 132. Connector at Keeper's Dwelling, built-in wood gutter at east elevation. NPS photograph by M. Galland	236
Figure 133. Tower, east elevation. NPS photograph by M. Galland	241
Figure 134. Tower base at east elevation. NPS photograph by M. Galland	241
Figure 135. Tower, east elevation. NPS photograph by M. Galland	242
Figure 136. Tower, detail of east-elevation masonry. NPS photograph by M. Galland	242
Figure 137. Tower, south elevation. NPS photograph by M. Galland	243
Figure 138. Tower, spalled brick face under west window of south elevation. NPS photograph by M. Galland	243
Figure 139. Tower, granite floor of Watch Gallery. NPS photograph by M. Galland	245

Figure 140. Tower, shifted granite section of Watch Gallery floor. NPS photograph by M. Galland	245
Figure 141. Tower, head of doorway from Watch Gallery into Watch Deck. NPS photograph by M. Galland	246
Figure 142. Tower, sill of doorway from Watch Gallery into Watch Deck. NPS photograph by M. Galland	246
Figure 143. Tower, corroded metal vent cover at base of Lantern. NPS photograph by M. Galland	248
Figure 144. Tower, underside of metal floor of Lantern Gallery. NPS photograph by M. Galland	248
Figure 145. Tower, east side of Lantern Gallery. NPS photograph by M. Galland	249
Figure 146. Tower, head of east window in south wall, First Level. NPS photograph by M. Galland	252
Figure 147. Tower, sill of east window in south wall, First Level. NPS photograph by M. Galland	252
Figure 148. Tower, detail of deteriorated metal lintels of south-wall windows, First Level. NPS photograph by M. Galland	253
Figure 149. Tower, water saturation below sill of east window in south wall, First Level. NPS photograph by M. Galland	253
Figure 150. Tower, corroded metal edge at underside of stair landing, east wall of First Level. NPS photograph by M. Galland	254
Figure 151. Tower, salt crystals on deteriorated brick faces, east wall of First Level. NPS photograph by M. Galland	256
Figure 152. Tower, deposits of salt crystals and brick dust at steps and stair landing, east wall of First Level. NPS photograph by M. Galland	256
Figure 153. Tower, beam pocket in south wall of Weight Deck. NPS photograph by M. Galland	258
Figure 154. Tower, corrosion at edge of metal deck and flanges of Weight Deck. NPS photograph by M. Galland	258

Figure 155. Tower, granite sill of Watch Deck doorway, as seen from Weight Deck. NPS photograph by M. Galland	259
Figure 156. Tower, iron eye set in east wall of Weight Deck. NPS photograph by M. Galland	259
Figure 157. Tower, stair ascending from Watch Deck to Lantern Deck. NPS photograph by P. Albee	261
Figure 158. Tower, corrosion staining at horizontal mullions of Lantern Deck window wall. NPS photograph by M. Galland	263
Figure 159. Tower, displaced pin at top of Lantern Deck window wall. NPS photograph by M. Galland	263
Figure 160. Modified north vestibule with ramp and relocated porch steps. NPS drawing by M. Galland, 1994	277

EXECUTIVE SUMMARY

The Highland Lighthouse complex, located in North Truro, Cape Cod, MA, is owned and operated by the United States Coast Guard. The lighthouse tower and unmanned beacon provide an aid to navigation, while the two other remaining primary structures on the property provide housing for Coast Guard families. One dwelling, which is connected to the tower by a series of two smaller structures, dates to the construction of the extant light tower (1856-57). The other structure, a duplex ranch-style house, was completed in 1963. The majority of structures once associated with the site have long since disappeared, most often demolished by the hand of man, but sometimes by the hand of nature.

Erosion of the adjacent cliffs, once called the "Clay Pounds," is constantly reducing the original size of the site. This reduction has prompted many concerned citizens, both private and public, to campaign for saving the lighthouse and its attached Keeper's Dwelling. (The duplex dwelling is not historic). The immediate result of this campaign is that the Coast Guard was directed by Congress to fulfill all regulatory requirements in preparation for the relocation of these historic structures, which are listed in the National Register of Historic Places.

This report was prepared in fulfillment of the Section-106 compliance process, which is required before federal funds can be expended on projects that might impact the condition or integrity of National Register properties. Since federal funds would be appropriated to relocate the lighthouse and keeper's dwelling, complete documentation both archival and physical is required. This is accomplished in the form of this historic structure report.

In some respects, this report became a collaborative effort between the U.S. Coast Guard and the National Park Service. In many cases the Coast Guard was the supplier of documents and other archival material needed to understand the history of the site and its structures. It also provided complete access to the structures so that a physical investigation could be completed, in spite of the fact that a Coast Guard family was residing in the Keeper's Dwelling.

The research conducted for this report was thorough; a large number of institutions and repositories were consulted for related documents. Within the Coast Guard's organization, valuable archival information came from the U.S. Coast Guard Historian's Office in Washington, D.C.; the Civil Engineering Unit Providence, located in Warwick, RI; and the U.S. Coast Guard Academy Library, New London, CT. The Coast Guard's Woods Hole Group Office on Cape Cod also was contacted for information relating to the site.

The Boston Public Library's Microtext and Government Records Sections, the American Antiquarian Society, the Massachusetts Historical Society, and the Massachusetts State Library's Special Collections Branch—all located in Boston—had archival deposits that were extremely useful for specific research. Cape Cod repositories included the Sturgis Library, the Cape Cod Community College Library, and the Barnstable County Hall of Records, all located in Barnstable; the Snow Library in Orleans; the Provincetown Public Library; the Truro Public Library; the Wellfleet Public Library; and the Cape Cod National Seashore's library. The United States Lighthouse Society in

San Francisco, CA, also forwarded information compiled from their extensive collection of *Light Lists*.

The National Archives—both their main facility in Washington, D.C., and their branch in Waltham, MA—held the bulk of the primary documentation pertaining to the earlier history of the site and administration of lighthouses. However, several archivists have surmised that the majority of the records from the 1850's and specific to the Highland site were lost in a fire. While references to documents written during that time period have survived, the majority of actual documents have not. The National Archives' Cartographic and Architectural Branch had no plans or drawings related to the site. The National Archives' Photographic Branch is closed for renovation, but it is believed that all of the historic photographs related to the site that are part of the Archives' collection were acquired from other institutions' collections. Historic photographs were obtained from the U.S. Coast Guard Historian's Office; The Library of Congress, Historic American Building Survey Collection, Washington, D.C.; The Society for the Preservation of New England Antiquities in Boston; the Mystic Seaport Museum, Inc., in Mystic, CT; the Peabody Essex Museum in Salem, MA; and the Building Conservation Branch's own collection in Lowell, MA. Finally, the majority of historic photographs were found in the curatorial collection of Cape Cod National Seashore, National Park Service, Eastham, MA.

The research connected with this report produced specific evidence for the construction of three different lighthouses within the same property boundaries, in what is now called North Truro, Cape Cod. The first was built in 1797, the second circa 1831, and the third and present structure—including the keeper's dwelling—in 1856-1857. In order to be preserved, the lighthouse tower and dwelling need to be relocated away from the eroding cliffs at their eastern boundary. Since the tower's beacon is to continue in the same capacity as an aid to navigation, the relocation site must be near the shoreline.

This report documents historically and physically the lighthouse tower, the two small connecting structures, and the keeper's dwelling. All four structures are connected. A duplex assistant keepers' dwelling that was constructed in 1857 was also connected, but was demolished circa 1961 to provide space for the extant housing duplex.

The four connected structures will be relocated to adjacent property administered by the Cape Cod National Seashore. The relocation should retain the same integrity of their orientation and connections to one another. Consideration should be given to the landscape siting and vista provided by the approach to the new location: while neither can be duplicated within the area selected for relocation, both contribute to the site's character-defining features. The tower will remain as an unmanned aid to navigation, and therefore will require space for supporting equipment. It is recommended that the small connecting structure immediately adjacent to the tower be retained as an equipment room, which is the same use it currently serves. Specific recommendations for treatment will be provided after the period of significance and use of the keeper's dwelling have been determined. These will be included in this historic structure report as an addendum.

ADMINISTRATIVE DATA

Originally, Highland Light was known as Cape Cod Light. Locals often referred to the site in the 19th century as the "High Land." An early 20th-century photograph exhibits a sign in front of the station that is partially obscured, but appears to bear the name "Highland." However, the official change in Cape Cod Light's name was not noted until the Annual Report of 1976, when the record showed that the name was changed to Highland LTSTA (lightstation).

Some confusion may have occurred early in the 19th century as more lighthouses were constructed on Cape Cod, and the use of "Highland" may have distinguished the site from other Cape Cod lighthouses. Both names were used interchangeably, but the exact date when this became common practice is unknown. The majority of official historical correspondence refers to the site as "Cape Cod," but references can also be found for "Highland." The use of both names may add confusion to this report: when one name was found in a historical reference, it was repeated in this document whether or not it was officially accurate. An attempt was made to use the official name of the station in contemporary references; however, this may not have been accomplished universally, since the researchers came to accept both names without question, and since the most modern nomenclature is accepted as "Highland." If an apology to the reader is required for this confusion, it is extended now. However, it is hoped that the reader will appreciate the ease of interchanging "Cape Cod Light" with "Highland Light" throughout the text, as the authors began to appreciate it while writing their assigned sections.

Highland Light is currently administered primarily by Group Woods Hole (MA). The U.S. Coast Guard's First District Office, headquartered in Boston, MA, has authority over aids to navigation issues, and the Civil Engineering Unit Providence (RI) is responsible for real property management. This administration has changed radically throughout the history of the lighthouse service, as this report will show.

Highland Light Station is located at the east end of Highland Road in North Truro, perched at the top of eroding clay cliffs. The lighthouse tower, keeper's dwelling, and connecting structures will be relocated to a site less susceptible to the dangers of the eroding cliffs. A recommendation as to the exact location of that new site is beyond the scope of this report. The tower is to remain as an unmanned aid to navigation, while its small connecting structure should be retained as a support space to house equipment. The keeper's dwelling should also be reused in order to assure maintenance, but a recommendation for a specific reuse is again beyond the scope of this report.

In 1970, a Development Concept Plan was prepared by the National Park Service regarding Highland Light. Since the relocation of the lighthouse was not a concern at that time, this plan is outdated. A "Preliminary Resource Assessment" for Highland Light was published in September 1992, recommending that the Coast Guard and National Park Service jointly develop a strategy for the light's relocation. A planning study and this historic structure report are a result of the assessment's recommendation.

The initial product of the Highland Light Relocation Planning Study was a draft document entitled "Relocation Alternatives Report," completed in April 1994 by a consortium of professionals. This group consisted of Goody, Clancy & Associates, Inc., Architects and Planners; Carol R. Johnson Associates, Inc., Landscape Architects; Shary Page Berg, Landscape Specialist; Ray, Spofford & Thorndike, Inc., Civil Engineers; and UMass Archaeological Services, Archaeologists.

Highland Light is listed in the National Register of Historic Places as part of the Lighthouses of Massachusetts, Thematic Group Nomination. The period of significance for the thematic study was designated as 1679 to 1940, with significant context attributed to architecture, engineering, maritime history, and transportation. The nomination was accepted by the Keeper of the Register on June 15, 1987. After their relocation, the four connected Highland Light structures will be treated as a rehabilitation.

The investigation for this historic structure report produced a variety of documents. All of the research materials, measured drawings (originals), and samples collected for materials analysis are filed and stored at the Building Conservation Branch, Cultural Resources Center, in Lowell, MA. In addition to copies of the final historic structure report, a full-size set of reproducible measured drawings will be forwarded to the U.S. Coast Guard's Civil Engineering Unit Providence, located in Warwick, RI. Any of these materials are available for inspection or future research at any time upon request.

I. HISTORY OF DEVELOPMENT AND USE

STATEMENT OF SIGNIFICANCE

The Highland Light is of historical significance both individually and representationally. The first Highland Light, called the Cape Cod Light, was one of the early major lighthouses on the east coast. The light also appears to have been outfitted with the first eclipsing mechanism used in the United States. In addition, the history of that light and its two successors clearly reflects many of the larger trends and controversies that have defined the history of the lighthouse service itself. Whether the issue is lighthouse site selection, contracting, construction, rebuilding, outfitting, or operating, Highland Light is broadly representative of lighthouses along the North Atlantic coast.

The present lighthouse is also significant as a scenic local landmark. This fact has prompted the current campaign to save it from collapse due to erosion, by moving it to a new site. It is worth noting that this effort to relocate a masonry lighthouse tower is largely without historical precedent. An exhaustive analysis on the subject of moving lighthouses is beyond the scope of this report. However, the secondary literature contains accounts of what happened when a lighthouse had to be replaced due either to functional inadequacy or danger from erosion. Most often, a new structure was erected on, or as close as feasible to, the site of its predecessor, with a temporary beacon being used to avoid an interruption in lighting. The literature indicates that the practice of moving an existing structure was relatively rare among the earliest wooden lighthouses. One of the few such was the wooden tower at Cape Poge on Martha's Vineyard, which was moved back from the sea in 1838 due to erosion.¹ There is no known historical instance of moving a masonry tower. Relocation was more common among the cast-iron lighthouses, and the occasional wooden lighthouse, used after the Civil War, which were intended to be moved. A case in point is the Three Sisters lighthouses at Nauset (Eastham, MA). The three original towers were built of brick in 1838. When they needed to be replaced in 1892, new movable wooden towers were built farther back from the sea, and the old brick towers were allowed to succumb to erosion.² In 1911, improved technology allowed two of the three wooden towers to be taken out of service. These were later moved away. The third was retained and moved back from the water. This tower was itself replaced in 1923 by the present cast-iron tower. (The latter was one of two that had been built in Chatham, but it was later declared surplus and made available for reuse.)

¹ Edward Rowe Snow, *The Lighthouses of New England* (New York: Dodd, Mead, 1973), p. 292.

² Annual Report of the Lighthouse Board to the Secretary of the Treasury for the Fiscal Year Ended June 30, 1892 (Washington, D.C.: Government Printing Office, 1892), p. 55.

THE FIRST CAPE COD LIGHT

Administrative Background

Even in Colonial times, Massachusetts was a leader in the establishment of lighthouses. Given the economic importance of its maritime activities, the enterprising reputation of its citizens, and the hazards of navigation along its coasts, the interest in marine safety is not surprising. The first lighthouse in the future United States, probably the first in the Western Hemisphere, was illuminated on Little Brewster (Lighthouse) Island at the entrance to Boston harbor in 1716. Of 15 lighthouses in operation or undertaken at the time the federal government was organized in 1789, seven were in Massachusetts (which then included Maine).¹

When Massachusetts transferred custody of its lighthouses to the federal government in 1790, it represented a significant expression of confidence in the new national government. Massachusetts apparently regarded its concession as something of an experiment, for the legislation contained a provision that "if the United States shall at any time hereafter neglect to keep lighted, and in repair, any one or more of the lighthouses aforesaid, that then the grant of such lighthouse . . . shall be void and of no effect."² During the 1790's the federal government gradually assumed operation of existing lighthouses, completed several that had been initiated by the states, and erected new ones. Administration of lighthouses became an accepted federal responsibility, located within the Treasury Department. (With the State Department as the only other civilian cabinet department, the choice was limited).

Local interests retained a significant voice in issues relating to lighthouses. In its early years, the federal lighthouse establishment operated without any overall plan or assessment of needs. Although attempting some standardization of practice, it was responsive to local pressures expressed through Congress. Lighthouse affairs received high-level attention in the infancy of the federal government. It was normal procedure for a member of Congress to introduce bills to establish lighthouses and for the President or Secretary of the Treasury to personally approve nominations of lighthouse keepers and contracts for building lighthouses.³ Cape Cod Light was established under

¹ Compiled from information in *America's Lighthouses* by Francis Ross Holland, Jr. (Brattleboro, VT: The Stephen Greene Press, 1972), and Malcolm F. Willoughby, *Lighthouses of New England* (Boston: T.O. Metcalf, 1929).

² June 10, 1790; Box 86; Lighthouse Site Files, 1790-1939 (Site Files); U.S. Coast Guard Lighthouse Service, Record Group 26 (RG 26); National Archives, Washington, D.C. (NA/DC).

³ The expense of the lighthouse establishment was perhaps a more visible component of the federal budget than it became later, although even in 1789 the total cost of supporting the entire lighthouse establishment was only \$37,161.

these conditions, in which lights were approved on an individual basis due largely to the representation of private interests.

The Need for the First Light

The antecedents of the present Highland Light can be traced at least to 1792. On February 6 of that year, the Humane Society of the Commonwealth of Massachusetts resolved:

That the President, the Vice-President, Treasurer, and Corresponding Secretary be a committee to wait upon His Excellency the Governor and request him to represent to such officers of the government as he may think proper, the necessity of having a Light House erected on some part of Cape Cod, in order to preserve the lives and property of those who navigate the Bay of Massachusetts; and to desire that such Light House may be erected at the charge of the Continent.⁴

The Humane Society had been formed in Boston in 1785, modeled on a similar British organization. It was joined in this request by the Boston Marine Society, and committees of the two organizations presented petitions to the governor.⁵

The theme was renewed by the Massachusetts Historical Society in a 1794 publication. In a description of Truro, one of an occasional series about towns in the Commonwealth, it was noted that:

The eastern shore of Truro is very dangerous for seamen. More vessels are cast away here than in any other part of the county of Barnstable. A light house near the Clay Pounds, should Congress think proper to erect one, would prevent many of these fatal accidents.⁶

⁴ Quoted in M.A. DeWolfe Howe, *The Humane Society of the Commonwealth of Massachusetts: An Historical Review 1785-1916* (Boston: Humane Society, 1918), p. 89.

⁵ William A. Baker, *A History of the Boston Marine Society, 1742-1967* (Boston: Boston Marine Society, 1968), p. 73.

⁶ "A Topographical Description of Truro," *Collections of the Massachusetts Historical Society, First Series, Vol. III, 1794*, p. 197.

The author was not identified, but the article may have been written by Rev. James Freeman, who was one of the founding members of the Humane Society. Rev. Freeman, then minister of the Stone Chapel in Boston, was a Truro native.

These representations are significant in several respects. On one level, they are typical of the process by which agitation for new lighthouses arose. More importantly, they make it clear that the initiative came from Boston, so that the Cape Cod Light was and has remained in essence an outlying light of Boston. By land the journey was long and tiresome, but by water the tip of Cape Cod is less than 50 miles from Long Wharf. Cape Cod and Cape Ann mark the limits of Massachusetts Bay, and the lighthouses on the Highlands and on Thatcher's Island off Cape Ann are the sentinels that guard the entrance to the bay. The light on Thatcher's Island, originally established in 1771, predates that on Cape Cod.⁷ Many Cape Cod mariners would have benefited from lights on their dangerous native shores, but they were not strong or well-organized enough to make their wants felt. Only Boston interests were capable of exerting sufficient pressure.

Advocating lights beyond the immediate limits of one's own harbor was by no means unprecedented. In the case of Cape Cod, the light—though distant—was within the same state. Sandy Hook Light in New Jersey, erected in 1764 and now the oldest lighthouse tower in the United States, was built through the efforts of New York City merchants.⁸ Shortly afterward, Cape Henlopen Light was erected at the entrance to Delaware Bay at the behest of Philadelphia commercial interests. Here the land on which the lighthouse was situated, though located in Delaware, was owned by Philadelphia commissioners.⁹

An even more far-reaching example of locating lighthouses beyond one's immediate jurisdiction almost occurred in 1788, when the Humane Society advocated building a lighthouse and possibly supporting a small settlement on Sable Island, off the south coast of Nova Scotia. This island belonged to Great Britain, although Massachusetts Governor John Hancock apparently owned most of it. In a message to the state legislature on November 10, 1788, Hancock went on record as supporting the idea. Not considering foreign ownership an insurmountable obstacle, he wrote that "it would be of the greatest utility to place a Light House, and a few families there."¹⁰

When it became apparent that the indirect approaches through the governor had not produced the desired results, the Marine Society renewed its efforts. This distinctive and prestigious

⁷ The name is also spelled Thacher's. Coast Guard records show 1771 as the date of construction for Thatcher's Island Light. Holland also says that it was built in 1771. George R. Putnam (*Lighthouses and Lightships of the United States* (Boston: Houghton Mifflin, 1917) gives the date as 1789, but his seems to be in error.

⁸ Holland, p. 11. New York's interest may have extended beyond building the Sandy Hook light to actual ownership. A compilation in the Lighthouse Annual Report dated April 14, 1800, states that the light was "ceded by New-York, being the property of that state" on February 3, 1790.

⁹ Box 86; Site Files; RG 26; NA/DC.

¹⁰ Quoted in Howe, p. 87.

organization had been founded in 1742, making it the oldest in America, perhaps the world. Composed largely of active and retired shipowners and sea captains, it combined the functions of social club, mutual aid society, information exchange, and lobbying forum. In February 1796 this body, after consultation with the Humane Society and with the Chamber of Commerce and the Marine Society of Salem, sent a petition for a lighthouse on Cape Cod directly to the Congress in Philadelphia.¹¹

The campaign to establish a light on Cape Cod culminated on May 17, 1796, when Congress approved a bill for this purpose. Another necessary step in the process of establishing the light took place on June 18, 1796, when Massachusetts passed legislation to cede jurisdiction to the United States of land for the lighthouses at Cape Cod and Baker's Island, at the approach to Salem.¹² The amount of land was limited to 10 acres in each case. This figure represented a compromise between the prevailing reluctance to grant the federal government too much control within the states, and the desire to permit lighthouse keepers to earn a portion of their livelihood by farming. It was felt that on 10 acres a keeper could provide some of his subsistence, thereby justifying a lower salary. During this period, cessions of Massachusetts land for lighthouse purposes ranged from four to 12 acres, with 10 acres close to the median.¹³

Site Selection

General Location

Winning approval for a lighthouse was an essential part of the process, but it had to be followed by selection and acquisition of a site. This was relatively simple in the case of lights at harbor entrances or on isolated rocks, like many in Maine. For those lights later classified as coastal, which marked large geographical features, there was more latitude for choice. No written instructions on siting existed, but accepted procedures had grown up. As the early correspondence indicates, the proponents of the Cape Cod Light assumed that the preferred location would be on the Highlands or Clay Pounds (Clay Ponds) of North Truro. Here the height of the cliffs facing the

¹¹ Baker, p. 73. In addition to assisting in the campaign for a light on Cape Cod, the Salem Marine Society continued to press for a light on Baker's Island and was ultimately successful [Snow, *The Lighthouses of New England* (New York: Dodd, Mead, 1973), p. 149.]

¹² Site Files; RG 26; NA/DC.

¹³ Site Files; RG 26; NA/DC. Other cessions in Massachusetts during this period include: Seguin Island (Maine)—10 acres; Gay Head—4 acres; Gloucester—7 acres; Cape Poge—4 acres; White Head Island (Penobscot Bay, Maine)—10 acres; Chatham Harbor—12 acres; Franklin Island (Maine)—12 acres; Scituate—6 acres.

ocean meant that a relatively low—and therefore inexpensive—structure could support a lantern that would be visible at a great distance.¹⁴

Beyond this general assumption, there were no specific instructions as to where to place the light, nor was there a formal system for selecting a site. In the 1790's, lighthouse affairs within the Treasury Department were administered by the Commissioner of Revenue, Tench Coxe. He relied heavily on the collectors of the various ports, who also held the title of superintendent of lighthouses in their districts. There were 11 such superintendents in 1792.¹⁵ In Boston this post was held for many years by General Benjamin Lincoln (1733-1810), presumably as a reward for his services in the War for Independence, and for crushing Shays' Rebellion in 1787, a campaign ardently supported by the Boston mercantile interests. Lincoln was directly responsible for far more lighthouses than any other superintendent. In 1800, for example, there were 25 lighthouses in the United States, of which 13 were in Massachusetts and 11 were supervised by Lincoln.¹⁶

In June 1796, immediately after being notified of the act to establish the Cape Cod Light, Coxe solicited advice about locating it from both Lincoln and Rep. Nathaniel Freeman of Plymouth, the sponsor of the legislation. In his letter to Rep. Freeman, Coxe observed that "Local knowledge and previous consideration may have led to results which will promote economy or increase the utility of the building."¹⁷ These letters indicate that Coxe had no preconceived ideas about the precise location of the light or the dimensions of the building. Likewise, there is no indication that Lincoln had definite ideas or information on the subject.

Coxe's letter to Lincoln, however, contains an informative summary of the general considerations that influenced the choice of lighthouse sites. Among these factors he listed "The nature of the soil for the Foundation, for fresh water, for gardening, pasturage and farming, and for fuel, the distance of the five nearest families, the necessity of a dwelling house and oil vault. . . ." He also stressed that the elevation of the site was "of great consequence" and should be "accurately ascertained by an instrument."¹⁸ Except for that, it is interesting to note that the factors cited were

¹⁴ It is important to keep in mind that during the period in question, Cape Cod was generally defined as the tip of the cape, comprising present Provincetown and North Truro. This is unlike the current usage, in which Cape Cod is largely synonymous with Barnstable County.

¹⁵ Willoughby, p. 17.

¹⁶ These figures include a light on Nantucket that was classified as a beacon. [Lighthouse Annual Report, 1800; roll 2, microfilm M63 (M63/2); Lighthouse Letters (LH Letters); RG 26; National Archives—New England Region, Waltham, MA (NA/MA).

¹⁷ Tench Coxe, Commissioner of Revenue, to Rep. Nathaniel Freeman, June 9, 1796; Letters Received by the Boston Collector (Letters BC); Correspondence, Series 17 (Correspondence); RG 26; NA/MA.

¹⁸ Coxe to Gen. Benjamin Lincoln, Boston Collector, June 11, 1796; Letters BC; Correspondence; RG 26; NA/MA. The reason for concern about the nearest families was not explained. Presumably the nearness of other people would make it easier for the keeper to obtain supplies and assistance, especially in an emergency.

all land-based, having to do with the support of the keeper. Another concern, though not noted specifically with reference to Cape Cod, was the cost of carting, which was liable to be considerable in constructing lighthouses at isolated locations.¹⁹

At that time, with the federal government under chronically severe financial constraints, every effort was made to control expenses of the lighthouse establishment. If money could be saved on land purchases and the construction of auxiliary buildings, more of the appropriation could be devoted to the lighthouse itself—as Coxe noted. If local conditions permitted the keeper to provide some of his food, then a lower salary could be justified. This was especially true at remote locations, which many lighthouses were by their very nature.

In transmitting a copy of the state legislation to Lincoln on July 8, 1796, Coxe requested him to take “immediate measures” to procure the full amount of ten acres by “gift or purchase.” Ever cost-conscious, Coxe explained “I say by gift, because it is possible that the sandy nature of the land at Cape-Cod may render it of as little value as that of other sites, which have been granted for only a formal consideration.”²⁰

Coxe added that Lincoln should “have the best spots carefully fixed on and endeavor to obtain each of the lots, upon the most favorable terms. . . .” This indicates that he had received no useful responses to his earlier inquiries and had developed no further ideas on the specific location of the Cape Cod Light. If Lincoln had thought further on the subject, he had apparently not communicated his findings to Coxe.

From his bases in Boston and Hingham, Gen. Lincoln had ready access to information and opinions of mariners on the subject of lighthouses—perhaps more ready than he sometimes wished. He personally owned a schooner that often sailed to Maine, where he—like his colleague General Henry Knox—possessed vast landholdings.²¹ Lincoln could also draw on the experience of the Boston Marine Society, which had granted him an honorary membership soon after he assumed the post of collector. In later correspondence, Lincoln informed Coxe that “our marine society is composed not only of old masters of vessels, but of those who are now masters, and more information is I think to be collected from them . . . than from any other source.”²²

¹⁹ This is stated explicitly by Coxe in a letter the following year concerning the lighthouse at Cape Hatteras, NC. Writing to Henry Dearborn, a potential contractor, he observed “The article of carting is put upon the footing you proposed. The island or long chain of Sand Hills is understood to be about two or three miles wide. A place half a mile from the Sea at the widest part would therefore be 2 1/2 miles from the Sound. If the landing should be equally good on the outside, there will be little carting and not much at most.” [Coxe to Dearborn, September 29, 1797; p. 493; roll 1, microfilm M63 (M63/1); LH Letters; RG 26; NA/MA.

²⁰ Coxe to Lincoln, July 8, 1796; p. 314; M63/1; LH Letters; RG 26; NA/MA.

²¹ Guide to microfilm of Benjamin Lincoln Papers (BL Papers); Massachusetts Historical Society, Boston, MA (MHS).

²² Lincoln to Coxe, December 7, 1796; microfilm roll 9 (M9); BL Papers; MHS.

Lincoln was also a founding member of the Humane Society, which shared responsibility for arousing interest in the light. The society had taken an interest in the outer Cape because of the hazard it represented to seamen. It had established a "hut of refuge" near Stout's Creek in 1792, the fifth in a series of huts on desolate shores initiated in 1787.²³ This focus on the Cape culminated in the publication of a pamphlet entitled "A Description of the Eastern Coast of the County of Barnstable from Cape Cod, or Race Point, to Cape Malebarre, or the Sandy Point of Chatham" in 1802. The pamphlet, written by Rev. Freeman, was printed in 2,000 copies and distributed to customs houses and insurance offices.²⁴ The information amassed by the Humane Society in its several years of involvement with Cape Cod would have been freely accessible to Lincoln in considering the site of the new lighthouse.

Finally, armed with Coxe's explicit instructions, Lincoln took direct action and journeyed to Cape Cod himself, accompanied by several "marine gentlemen." On the Cape he was joined by "gentlemen of that country," noting that Provincetown people owned "30 sail."²⁵ The Provincetown interests might not have been influential enough to generate a movement for a lighthouse, but they were happy to contribute to an initiative that had originated elsewhere.

"To say that a light-house should be built on Cape Cod was as indefinite as it would be to say that a light-house should be erected on the Delaware," and Lincoln feared a "diversity of opinion" about the location. He was therefore gratified to find complete unanimity among his advisers, whether from Boston or Cape Cod, as to a location at the "Clay Pounds" of Truro. In his report to Coxe, he recited the nautical considerations that led to their consensus:

They were induced to adopt this opinion from the height of the land, being one hundred and fifty feet above the highwater mark. Because vessels coming in from sea attempt to make high land. Because it has a bold shore. Because here is the greatest projection of the land eastward and a vessel off one league from the land may shape her course for Boston lights

²³ Annual Reports of the Humane Society; MHS. It is not certain whether this site was within the present limits of Truro or Provincetown. Stout's Creek was a familiar location in the 1790's, but has not been found on later maps. It is one of the transient features of Cape Cod, for even in 1802 Rev. James Freeman wrote "Many years ago there was a body of salt marsh on it, and it then deserved the name of a creek. But the marsh was long since destroyed; and the creek now scarcely exists, appearing only like a small depression in the sand, and being entirely dry at half tide." ["A Description of the Eastern Coast of the County of Barnstable, from Cape Cod, or Race Point...to Cape Malebarre, or the Sandy Point of Chatham . . ." (Boston Humane Society, 1802), p. 6.]

²⁴ Howe, p. 197. In addition to printing in pamphlet form, the "Description" appeared in *Collections of the Massachusetts Historical Society, First Series, Vol. VIII*, pp. 110-119. Freeman's authorship of this pamphlet is an additional reason for suspecting that he was responsible for the 1794 "Topographical Description" of Truro.

²⁵ Lincoln to Coxe, July 26, 1796; M9; BL Papers; MHS.

or for entering the shoals of Nantucket without a hazard of being taken up by any shoals whatever.²⁶

Within the area of the Clay Pounds, Lincoln had to select a specific piece of land on which to build the lighthouse. In this, too, he acted decisively and chose a site during his visit. Under a deed signed August 6, 1796, the government acquired the authorized 10 acres "near a place called the Clay Ponds" in Truro from Isaac Small of that town.²⁷ This was a critical decision in the history of the Cape Cod Light, for it established the lighthouse on land that it and its successors have occupied ever since.

Lincoln diplomatically referred to Coxe's letter of June 9, 1796, in describing the considerations that influenced his choice of a site:

Because here the lands are pretty good and are not so sandy as to be liable to be blown away by the high gales of wind too often experienced on this Cape. Because the Peninsula is but about one mile wide and on the west shores thereof all the materials may be landed and carted in a good road across.

As the light-house must be of wood the soil will be good for its foundation. . . . Fresh water can easily be obtained within the ten acres. The land will summer a cow after a garden shall be taken off for which there is some pretty good land. The flock is wintered there by salt hay. The fuel must be purchased from the inhabitants possessing the southerly part of the Town or from coasting vessels which frequently call there.

The five nearest families are about one fourth of a mile from the ground on which probably the light-house will stand.²⁸

Lincoln purchased the land at a price of \$110. Coxe seems not to have commented on the fact that this land cost the government \$110, not the "little or nothing" he had hoped for in his letter of July 8, 1796. Lincoln, however, must have felt some trepidation about his supervisor's response, for he explained that a direct purchase was preferable to going through condemnation proceedings. He pointed out that the Barnstable court house was 40 miles distant and implied that commissioners who would be appointed under such proceedings might not come up with a result much different.

²⁶ See footnote 25. Lincoln's figure of 150 feet for the height of the area offers grounds for interesting speculation. The same height is given in the sailing directions prepared by the Marine Society just before the lighthouse went into service, but this figure is approximately 20 feet greater than the highest point in the present lighthouse reservation. It is possible that portions of the land that have since eroded were higher. Alternatively, and more likely, the number given by Lincoln was a guess, not a measurement.

²⁷ Barnstable County Registry of Deeds (Deeds), book 49, p. 95.

²⁸ Lincoln to Coxe, July 26, 1796; M9; BL Papers; MHS. In a postscript, Lincoln listed the families as Widow Eldredge, Wd [Widow?] Snow, John Avery, Joseph Barry, and Isaac Small.

Small apparently conveyed all the ocean frontage he owned in that vicinity, since the tract was bounded by abutters on both the north and south. This indicates that he attached little value to access to the ocean; also, he did not retain a right of passage across the government land, although the government acquired such right from him.²⁹

The figure of \$110 was based on an allowance of \$100 for the land and another \$10 for the "right of passing" across Small's property to reach the lighthouse.³⁰ This clause provides additional confirmation, if any is needed, that the road to the lighthouse owes its existence to the lighthouse. There is no evidence that such a road existed before the building of the lighthouse, nor would there have been any discernible reason for one. Whether the road has always followed essentially the course of the present road, allowing for a greater length if the lighthouse was once located farther to the east, is more problematical. The main highway now known as South Highland Road cannot have been changed much in this vicinity, since an existing house on it predates the lighthouse and another is nearly as old.³¹ If a road leading from the main road to the lighthouse had been laid out much farther north, it would have lost the advantage of the high ground; farther south would have increased its length unnecessarily.

The issue of siting demands consideration because the location chosen, while elevated, is by no means the highest land in the vicinity. Within 2 to 3 miles to the south, elevations 20 or more feet higher are found. Due to the inherent limitations of lighting apparatus of the time, there may have been no significant advantage in raising the light another 20 feet. However, the prospect of contracting for a tower 20 feet lower presumably would have been appealing to the tight-fisted Treasury officials.³²

There appear to have been several reasons for selecting Isaac Small's land over other parcels. First, Lincoln was pleased that, after taking all of Small's ocean frontage as one boundary and going

²⁹ Other deeds from the period indicate that Small owned or had improved adjacent land to the south, and it is quite certain that he owned other tracts fronting on the ocean. The land records are more confusing than usual, for in addition to the customary problems with indefinite descriptions, many Barnstable County records were destroyed in a fire in 1827. Surviving records make it apparent, however, that lands on which salt hay could be cut were considered to be of greater value than land facing the Atlantic, or "back side sea" as it was often termed.

³⁰ Lincoln to Coxe, July 26, 1796; M9; BL Papers; MHS.

³¹ These are the Isaac Small house, believed to have been constructed in the 1780's, and the Thomas Kenney Small house, which appears to have been constructed circa 1820-1830. [Inventory forms at the Massachusetts Historical Commission.] An unimproved road to the lighthouse is shown in the 1831 John G. Hales Plan of Truro [Massachusetts State Archives].

³² A countervailing consideration is the fact that lighthouses also served as daymarks, which is one reason why most of them were painted white. A structure more squat than that actually built at Cape Cod might have been of little value for this purpose.

inland enough to encompass 10 acres, the parcel "will form nearly a square."³³ This was not literally accurate, but is a reasonable approximation. The 1885 E.P. Adams survey (see fig. 10), the earliest that has been found that gives specific measurements for the site, shows a land boundary on the west of 760.5 feet. The dimensions on the south and north are calculated as being 708 feet and 448 feet, respectively. Presumably this was done by extrapolation, measuring from the existing cliff edge to points then under water except perhaps at extremely low tide.³⁴

Another reason may have been related to Isaac Small himself. Keeping in mind the general considerations in siting a lighthouse that Coxe had listed in his letter of June 11, 1796, the advantages presented by Small were difficult to overlook. He was already a resident of the area, supporting himself largely by agriculture, so that if he were appointed keeper he would not have to depend exclusively on a government salary. Nor would an exceptional dwelling house be required. This part of Small's land, consisting of the unusual clay deposits, was rich by Truro standards. A later historian of Truro described it as "uniformly the best land in town, perhaps originally in the county."³⁵ The surviving Indian name for the area, "Tashmuit," supposedly meant "place of many springs," indicating that water supply would not be a problem.³⁶

There may have been an understanding that in return for conveying land to the government on reasonable terms, Isaac Small would be appointed keeper of the light. The practice of land grantors being hired as Keepers is found repeatedly throughout lighthouse history, especially in New England.³⁷ At the Gurnet Point Light in Plymouth, MA—first built in colonial times—the man on whose land it was situated became keeper. Under federal administration, the light (one of those within Lincoln's district) continued to be kept by the widow of the original keeper.³⁸

An arrangement with Small offered still other savings. Less fencing than usual would be needed, since the longest land boundary of the lighthouse tract adjoined Small's remaining land. Even a detailed survey could be avoided. Small's deed was bounded by abutters on the north and south sides and on the west simply came in sufficiently from the high water mark to enclose 10 acres. With Lincoln and the other superintendents under relentless pressure from Coxe to restrain the expense of the lighthouse establishment, these savings would have been appealing.

³³ Lincoln to Coxe, July 26, 1796; M9; BL Papers; MHS.

³⁴ "Cape Cod, Mass. Light Station," survey by E.P. Adams, Light House Surveyor, conducted December 18 to 23, 1885. One set of survey drawings found at the USCG Academy Library, microfilm, New London, CT; one set found in files of USCG Civil Engineering Unit (CEU), Providence, RI.

³⁵ Shebna Rich, *Truro, Cape Cod* (1883; reprinted Rutland, VT: Charles F. Tuttle, 1988), p. 208.

³⁶ Rich, p. 207. In deeds of the 1790's and early 1800's the name is commonly rendered as Tashmute. In this form, one may discern in the second syllable a resemblance to Shawmut, the peninsula on which Boston was founded, a name also supposedly derived from the presence of springs.

³⁷ Harland Hamilton, *Historical Lighthouse of Long Island Sound* (Wescott Publishing, 1987).

³⁸ Holland, p. 12; Snow, p. 233.

Despite the obvious hardships and disadvantages of a keeper's position, among them the fact that it was a political appointment and therefore subject to sudden termination, there was great competition for the appointments. It is known that there were several other candidates for the Cape Cod post.³⁹ Lincoln, however, must have made his preference clear. In acknowledging the inquiries, Coxe pointedly observed that "General Lincoln's wishes are in favor of Isaac Small. The land bought for the site of the Lighthouse was purchased of Mr. Small, who owns the adjoining grounds. It is probable therefore, that economy in regard to fencing and salary may be made by appointing him."⁴⁰

Specific Location

Only a portion of the total tract purchased was suitable for the construction of a lighthouse. The conveyance was calculated from the "high water mark," and therefore includes a small strip of beach and a considerable horizontal distance occupied by the slope of the cliff.⁴¹ Thus the statements made later by Isaac M. Small, John Grocier, and others to the effect that at a given time only three or four acres remained of the original 10 are misleading, since the government never owned 10 acres of land on top of the bluff. Beyond that, it is reasonable to suppose that even the 1797 structures were located some distance back from the edge of the cliff. In sum, the area in which former lighthouses could have been located was quite limited.

Given this limited range, it is still difficult to pinpoint the precise location of the first Cape Cod Lighthouse, due to the absence of explicit documentation on the matter. The contracts and other records related to the building of the lighthouse do not provide information about its exact location. However, other evidence suggests that the first lighthouse stood on about the same site as the second lighthouse (which, as will be shown subsequently, stood on about the same site as the present lighthouse).

One of the most emphatic statements on the matter came from Isaac M. Small. Small spent virtually his entire life (1845-1934) in the vicinity of the light, and was the son and grandson of keepers of the light. In his publication "Highland Light," he asserted that "The present tower stands upon the EXACT SPOT WHERE THE ORIGINAL TOWER STOOD, IT HAS NEVER BEEN MOVED OR THE LOCATION CHANGED."⁴²

³⁹ Coxe to Secretary of the Treasury, June 16, 1797; M63/1; LH Letters; RG 26; NA/MA.

⁴⁰ See footnote 39.

⁴¹ In the earliest estimate of the slope that has been found, Henry D. Thoreau in 1855 calculated that the bank at the lighthouse was 110 feet perpendicular and 175 feet "on the slope." He added that the "shelf slopes four and ordinary tide-fall is nine," making 123 feet in all. *The Journal of Henry D. Thoreau* (New York: Dover Publications, 1962), Vol. VII, p. 437, entry for July 11, 1855.

⁴² Isaac M. Small, *Highland Light*, 1927 ed., p. 5 (upper case in original).

Small's statement would seem to rule out any supposition that the first lighthouse occupied a different site than the subsequent ones. However, careful analysis suggests otherwise. In general, the accuracy of Small's writings about the lighthouse diminishes as he goes farther into the past. He is not reliable about the early history of the lighthouse, which makes it evident that he did not have access to documentary sources. He fails to mention in his pamphlets that his grandfather was the first keeper; this is the sort of human interest he probably would have exploited if he were aware of it.

More specifically, a careful reading of Small's pamphlets suggests that he was unaware that another lighthouse existed between the one built in 1797 and the present one. He thought that the lighthouse he saw being replaced by the present one was the one built in 1797. Thus, he was correct in asserting that no change in location had occurred *between those two*. His ignorance of the second lighthouse seems hard to believe, since Small's father James Small certainly knew about the intervening light. James Small was a literate man, judging by his letters, who became a leading member of his community. He was nearly 30 when his father Isaac Small (the first keeper of the light) died, and was well into his 40's when the second lighthouse was built. It seems inconceivable that he never told his son about the second lighthouse, even though there was a great age difference (58 years) between the two.

A more reliable source is Henry David Thoreau, who apparently visited the Cape Cod Light four times between 1849 and 1857, according to his journals. Thoreau's descriptions therefore apply to the second, circa-1831 lighthouse and keeper's dwelling. This is confirmed by an article by Thoreau that appeared in *The Atlantic Monthly* in 1864.⁴³ The article, which mentions the lighthouse, was published after Thoreau's death. The magazine felt compelled to add a footnote to the article, which stated that "The light-house has since been rebuilt, and shows a Fresnel light."⁴⁴ This clearly refers to the third lighthouse.

In one journal entry, Thoreau confirms—if in a rather offhand fashion—that the second lighthouse stood on the same site as the first: "[James] Small says the lighthouse was built about sixty years ago. He knows by his own age. A new lighthouse was built some twenty-five years ago. They are now building another still on the same spot."⁴⁵

Thoreau also records speaking with "Uncle Sam" Small, 66 years old in 1855, who remembered the building of the first lighthouse.⁴⁶ Probably referring to "Uncle Sam," Thoreau noted that "One old inhabitant told us that when the light-house was built, in 1798, it was calculated

⁴³ Thoreau, "The Highland Light," *The Atlantic Monthly* (Boston: Ticknor and Fields, Vol. XIV, December 1864 [annual binding]), p. 649.

⁴⁴ Thoreau, "Highland Light," p. 656.

⁴⁵ Thoreau, *Journal*, June 18, 1857 (Vol. IX, p. 441).

⁴⁶ Thoreau, *Journal*, July 8, 1855 (Vol. VII, p. 437).

that it would stand forty-five years, allowing the bank to waste one length of fence each year."⁴⁷ If a "length of fence" is considered to equal a rod, the resulting total would exceed 700 feet, or more than the available width of the government tract. Thoreau clearly examined the subject in considerable detail, and his conclusion that the two lighthouses were located near one another is strong evidence for that point of view.

On the opposite side of the ledger is a tradition of uncertain origin that has been passed down through the Coast Guard, to the effect that the original lighthouse was located "about 600 feet to the seaward of the present structure."⁴⁸ Lacking substantiation, this assertion could be easily dismissed, except that it may have indirect support in the writings of Benjamin Lincoln. When Gen. Lincoln returned from his initial visit to the Highlands in July 1796, he reported to Coxe that "This land which I have purchased is about fifty rods [825 feet] East of a public road, the light house will stand about eighty rods [1,320 feet] from the road."⁴⁹ Even allowing for the fact that these figures are only casual estimates, not based on measurement, the distance from the road is seriously mistaken. According to a 1945 survey, the measured distance from South Highland Road along Highland Road to the boundary of the lighthouse tract is more than 97 rods (1,600 feet). Highland Road is relatively straight, so that even calculating a straight line between the closest points on South Highland Road and the government boundary saves only about 75 feet.⁵⁰

Lincoln's assertion that the lighthouse would be 30 rods inside the property line may still be valid, however, since he would have been more careful with this estimate. Thirty rods equals nearly 500 feet—close to the tradition of 600 feet. However, there is no evidence that the lighthouse was actually built in the location Lincoln envisioned during his visit. Given the configuration of the government tract, a site 500 or 600 feet east of the west boundary would be perilously close to the edge of the cliff. It was evident even at that time that significant erosion was occurring at the site. (Thoreau's previously cited conversation with an "old inhabitant" who was alive at the time the first lighthouse was constructed indicates that the rate of erosion was then thought to be about one rod per year.) It is therefore likely that even if Lincoln initially contemplated building nearer the edge of the cliff, he reconsidered after further analysis.

⁴⁷ Thoreau, "Highland Light," p. 650.

⁴⁸ Robert E. Holbert, Officer in Charge, Cape Cod Light Station, to Commander, Coast Guard Group, Woods Hole, July 22, 1968 (memorandum in response to a request for information on unit histories), U.S. Coast Guard historical files, Washington, DC. It should be noted that this memorandum contains several inaccurate or confusing statements. Also, it is not clear that the writer was aware of the existence of a second lighthouse.

⁴⁹ Lincoln to Coxe, July 26, 1796; M9; BL Papers; MHS.

⁵⁰ John R. Dyer, "Plan of Land in North Truro belonging to Lillian M. Small, December 1945"; Barnstable County Plan Book 78, p. 113; Deeds.

Contracting

Once the location of the lighthouse had been determined, the next order of business was to contract for its construction. This responsibility, too, was generally assigned to the superintendent. At that time the procedure was less formal than it later became under a mature bureaucracy, although the practice of publicly advertising for bids was well established. There was, at a minimum, some standardization of design—if only because it made specifications easier to prepare. Coxe had informed Lincoln early in the process that “the sum granted limits us to a wooden building.”⁵¹

By then the government had gained considerable experience building lighthouses of this type. On December 7, 1796, Lincoln recommended to Coxe that the Cape Cod light should be from 40 to 45 feet high. He suggested that “the light-house on Nantucket will be a good model for this and the lantern and lamps of the light-house there, which is thought to be the best on the continent will also be a good model. . . .”⁵² This is a reference to the recently completed (1784) wooden lighthouse at Great Point, rather than to the older and much smaller light on Brant Point at the entrance to Nantucket harbor.

On January 24, 1797, Coxe responded by transmitting to Lincoln “a plan and detailed description of a Light-House, keeper’s house and Oil vault for Cape Cod.” He added that “If a barn or stable be necessary you will be pleased to add the description of one according to some moderate approved plan.”⁵³ Coxe’s letter indicates that he was unaware of the special circumstances presented by Isaac Small. In his letter of December 7, 1796, however, Lincoln had noted that the lighthouse “will be but one fourth of a mile from a number of Houses, consequently a small house will for the keeper answer all public and private purposes.”⁵⁴ Even though Small occupied one of these houses, a separate dwelling for the keeper was still needed: the lighthouse was expected to last longer than any one keeper’s tenure, and Small could not be expected to trudge a quarter of a mile daily through some of the violent weather experienced in the Highlands. For Small, with a fully functioning farm adjacent to the lighthouse, a large barn or stable would not have been necessary.

Soon after, Lincoln must have placed an advertisement for “propositions” to build the lighthouse. He also advised Coxe that he had made a few modifications in the specifications, changing such details as the size of the keeper’s house and the size of the glazing. He also revised some of the wording to “make it a little more explicit and more conformable to the language of the people in this part of the country.”⁵⁵

⁵¹ Coxe to Lincoln, June 11, 1796; Letters BC; Correspondence; RG 26; NA/MA.

⁵² Lincoln to Coxe, December 7, 1796; M9; BL Papers; MHS.

⁵³ Coxe to Lincoln, January 24, 1797; Letters BC; Correspondence; RG 26; NA/MA.

⁵⁴ Lincoln to Coxe, December 7, 1796; BL Papers; MHS.

⁵⁵ Lincoln to Coxe, February 8, 1797; M9; BL Papers; MHS.

For nearly a year, from the approval of the federal appropriation on May 17, 1796, the process of establishing Cape Cod Light had proceeded routinely, insofar as regular procedures existed in those tentative years of the lighthouse administration. However, the proposal signed on March 2, 1797, proved to be a shock. In that document, General Benjamin Lincoln—Collector of the Port of Boston and Superintendent of Lighthouses—contracted on behalf of the federal government to build the Cape Cod Lighthouse with one Theodore Lincoln, his son.

Coxe, though a suave individual, seemed to be jolted by this turn of events. He informed Treasury Secretary Alexander Hamilton that “It has appeared proper to scrutinize this case with more than common strictness, because the proposal is from . . . a son of the agent of the United States.” He went on to assure Hamilton that “the integrity and candor of General Lincoln rendered a satisfactory issue to the scrutiny highly probable.”⁵⁶

A week later Coxe wrote to Lincoln, advising with his customary diplomacy that “I feel myself influenced by personal regard and esteem and by a certain degree of delicacy in the situation of the Government, to suggest to you the expediency of a call upon Mr. Freeman [Nathaniel Freeman of Plymouth, the member of Congress whose district included Barnstable County] with an explanation of the circumstances of the case, price excepted.”⁵⁷ Coxe noted that he had received a letter from Rep. Freeman, and although he did not divulge its content, the implication is clear that the congressman was questioning the propriety of the award. Coxe added significantly, “Should no lower offer be made, all delicacy, both personal and official, will be perfectly saved and preserved.” This puzzling statement suggests that Gen. Lincoln had awarded the contract before the deadline, unless—as he stated in a nearly simultaneous letter to Rep. Freeman—Lincoln was prepared to receive new proposals.⁵⁸

In an earlier letter Lincoln had tried to assure Coxe that he had attempted to find a more conventional contractor, or at least to pave the way for the startling one he submitted. On March 8, 1797, he informed Coxe that “the gentleman . . . from Cape Cod who I supposed would probably contract for building the light-house if any person in that part of the country would do it . . .” had proved to be “totally out of the line of [the] business, which is confined to the fishery.”⁵⁹

Lincoln further sought to reassure Coxe in a letter dated March 28, which must have crossed Coxe’s admonition in the mail. He enclosed with this copies of letters he had received from and written to Rep. Freeman. Referring to Freeman’s letter, he added that “Besides what I learn from the letter I am told by the bearer that the writer appeared warm on the subject.” Lincoln believed that Freeman had actually hoped to build the lighthouse himself or to have “an interest in the

⁵⁶ Coxe to Hamilton, March 20, 1797; M63/1; LH Letters; RG 26; NA/MA.

⁵⁷ Coxe to Lincoln, March 27, 1797; Letters BC; Correspondence; RG 26; NA/MA. It is not known whether Rep. Freeman was related to Rev. James Freeman.

⁵⁸ Lincoln to Rep. Nathaniel Freeman, March 28, 1797; M9; BL Papers; MHS. No copy of an advertisement soliciting bids, which might clarify the point, has been found.

⁵⁹ Lincoln to Coxe, March 8, 1797; M9; BL Papers; MHS.

business" and had expressed this wish to Coxe.⁶⁰ It is easy to see where the provision found in many federal appropriations prohibiting members of Congress from having a direct interest in the subject originates. The general also expressed surprise at Mr. Freeman's complaint, "since it was on a business he has had long in contemplation & since the post passes every week by his door with the newspapers and probably saw the advertisement in two days after it came out."

Lincoln explained to Rep. Freeman that he "wished more time could have been given . . . for the reception of propositions," but supposed that "the public interest required an early decision . . . as the time for cutting the timber would be soon over and that a longer delay would give too little time to any contractor to provide & transport the materials & compleat the works before the inclement season of the year would commence."⁶¹ He further sought to conciliate Freeman by offering to surrender the contract if other proposals "from your quarter" would be found more favorable, provided that the new contractor would take from Theodore Lincoln the timber and other materials he had already prepared. This proviso is significant in revealing the Lincolns' main interest in the contract. Benjamin Lincoln owned vast tracts of wild land in Maine, and the only product that could quickly repay this speculation was timber. Letters from Theodore make it clear that the market for timber was then weak, and it was the opportunity to dispose of a shipload of timber, rather than the prospects of contracting as such, that attracted the Lincolns. The family did not go on to make a practice of building lighthouses, although another son—Martin—constructed the lighthouse on Gay Head, Martha's Vineyard, completed in 1799.⁶²

In a letter to Coxe not long afterwards, General Lincoln displayed considerably less equanimity on the possibility of losing the contract, and he tried to impress on the commissioner the need for urgency. "I cannot help observing," he noted, "that this delay throws into the hands of [a new] contractor advantages now which did not exist when my son made his proposition." This, he claimed, was due to a "general stagnation of business" that had ensued since the original bidding, which might enable a new entrant to come in with a lower offer.⁶³ Almost simultaneously Theodore was writing from Maine that he would "go on to prepare" (meaning the timber) "as if the contract was really confirmed," and Benjamin Lincoln's nervousness about the contract was probably intensified by his knowledge that the work in Maine was far advanced.⁶⁴

⁶⁰ Lincoln to Coxe, March 28, 1797; M9; BL Papers; MHS.

⁶¹ See footnote 60.

⁶² Treasury Secretary Wolcott to Benjamin Lincoln, October 4, 1799 (request to pay Martin Lincoln the balance due him); Entry 89; Correspondence of the Secretary of the Treasury with Collectors of Customs; Treasury Department Records, Record Group 56; NA/DC.

⁶³ Lincoln to Coxe, April 7, 1797; M9; BL Papers: MHS. These letters are from a letterbook or copybook kept by Lincoln. Much of this letter is crossed out, but even if it was not transmitted to Coxe as drafted, it reveals the direction of Lincoln's thinking.

⁶⁴ Theodore Lincoln to Benjamin Lincoln, April 6, 1797; roll 10, microfilm (M10); BL Papers; MHS.

Events justified Gen. Lincoln's decision, or at least prevented further embarrassment. No lower bids were received, or if made, were not accepted. At that time of limited government, the contract was approved directly by the President. Washington, who had a close relationship with Benjamin Lincoln during the War for Independence, had recently been replaced by John Adams. The new president, who—like Lincoln and Rep. Freeman—lived in a town on the shores of Massachusetts Bay, approved the contract with Theodore Lincoln on March 27, 1797.

The agreement as signed differed little from the proposal submitted by Theodore Lincoln (app. E). It called for an octagonal wooden tower 45 feet to the top of the floor of the lantern, supported on a stone foundation. The lantern was to be 6 feet in diameter and 8 feet high. The keeper's dwelling was to be a one-story structure measuring 25 by 27 feet. This was somewhat larger than the 34 by 16 feet Benjamin Lincoln had earlier believed would be adequate.⁶⁵ Included in the plan were a separate oil vault 12 by 16 feet and covered by a shed, a well and accessories, and a small barn 15 feet square.⁶⁶ An assistant keeper's dwelling was not part of this proposal.

No clauses referred to the specific location of the structures. The provisional agreement stated that the lighthouse would be built "on such part of sd land as the United States shall point out," but the actual contract did not even contain that language.

In April Coxe sent formal notices to two unsuccessful bidders for the lighthouse contract. Their bids of \$7,000 and \$9,500 were higher than Theodore Lincoln's proposal of \$6,500. This relieved any qualms Coxe might have felt, and on April 25, 1797, he transmitted to Benjamin Lincoln an approved copy of the contract for "the light house near the Clay ponds on Cape Cod."⁶⁷ Subsequent figures in the lighthouse records show that the cost of the Cape Cod installation was \$7,257.56. However, this includes items such as an eclipser that were not part of the original contract, and does not necessarily indicate that there was an overrun in Theodore's contract.

On the other side of the ledger, there should have been a saving due to the modifications the Lincolns made in the original contract. At an early date the Lincolns sought to amend the contract by substituting shingles for clapboards on the dwelling, and by placing the oil vault inside the dwelling and reducing its size. Coxe agreed that the original dimensions of the vault were in excess of need, but he displayed considerable uneasiness about the other modifications, or perhaps the way they seemed to be forced on him. "The alterations you propose would have been more agreeable in the original plan," he observed pointedly. He added that "The placing of the oil vault under the same roof with the dwelling House is against the practice heretofore observed."⁶⁸ Somewhat

⁶⁵ Lincoln to Coxe, December 7, 1796; M9; BL Papers; MHS.

⁶⁶ Maine-Mass. Box 003, Entry 153; Civil Contracts for Lighthouse Service, June 4, 1800 - March 17, 1903 (Civil Contracts); Records of the Accounting Officers of the Department of the Treasury, Record Group 217 (RG 217); NA/DC.

⁶⁷ Coxe to Lincoln, April 25, 1797; Letters BC; Correspondence; RG 26; NA/MA.

⁶⁸ Coxe to Lincoln, June 2, 1797; M63/1; LH Letters; RG 26; NA/MA. This letter does not specify Cape Cod, but the subsequent communication makes it clear that the reference is to this light.

grudgingly Coxe approved the changes, provided "Nothing, however, is to make the establishment cost more."⁶⁹

Construction

If the choice of contractor provided reason for consternation, the actual construction proved even more extraordinary. It developed that the contractor, Theodore Lincoln, had little to do with the construction of the lighthouse; instead his father, the collector, largely supervised the project. This situation is not evident in the official Treasury Department records, but is plainly visible in the Lincoln family papers.

Benjamin Lincoln's rise from yeoman of Hingham to major general in the Continental Army is an exceptional story, and it is surprising that it has not been chronicled in a full-length biography. The "American Cincinnatus" was a devoted family man, caring deeply for his wife and their 11 children. He had entrusted his son Theodore with the management of his lands in Maine, and Theodore remained there (in the "eastern district") during the entire time the Cape Cod Light was under construction. He was informed of the progress of the contract for which he was responsible only through his father's letters.

On May 27, 1797, Theodore wrote to his father "I am very happy to hear that the affairs of the light house are likely to turn out so well. . . ." ⁷⁰ Given the slowness of communications to the Maine coast, he was probably not yet aware of the final approval of his contract, but had been given an optimistic assessment of its prospects. He informed the General that the *Ranger*—the schooner they owned or chartered—"has now on board all the articles for the Cape & a quantity of wood & boards which will be landed at Hingham." He added that "boards are so very low that it is not an object to saw them," thereby explaining the urgency Benjamin Lincoln felt about retaining the contract, or at least the right to supply lumber for it.

The exterior of the lighthouse structure was largely complete by the time Theodore next heard from his father. In a long letter dated July 28, disjointed as a result of "frequent official interruptions," Benjamin brought his son up to date on the project. Despite his age (64) and extreme corpulence, the General had personally supervised the raising of the lighthouse during the preceding week—his third trip to the Cape that year. Obviously not disturbed by possible impropriety, he informed Theodore that he had borrowed the blocks and rigging from the Continental ship yard. He also took down "the cutter," presumably the official vessel to which he was entitled as collector.

⁶⁹ Coxe to Lincoln, June 14, 1797; M63/1; LH Letters; RG 26; NA/MA.

⁷⁰ Theodore Lincoln to Benjamin Lincoln, May 27, 1797; M10; BL Papers; MHS.

As a result, he concluded, "the cost of doing this will not exceed 50\$ on a hundred dollars we estimated the expense of it."⁷¹

General Lincoln reported that "We raised the light house without an accident and it came well together." He does not specify whether it was raised as a unit or in sections that were then fastened together, as was the usual method of erecting barns. He then made a new contract with the carpenters to perform interior work on the tower, the keeper's house, and the oil vault.

Lincoln boasted of another substantial saving in expenses as a result of bringing his own team of oxen over from Hingham. By this expedient he calculated the cost at only \$180, instead of a figure of at least \$450 the local residents would have charged for the same service. Lincoln was clearly concerned that he would have been vulnerable to gouging by the locals if they saw that he was dependent on them. The supply of building materials had been a source of concern to Lincoln, as he expressed in several of his letters, since lumber, brick, and even stone was not readily available on that part of the Cape. The nearly contemporary "Topographical Description," for example, depicted that part of Truro as "free from rocks and stones." By using his own vessel, General Lincoln had access to the fieldstones that were abundant in the Hingham and Braintree area.

The difficulties of supply and transport seem to have had a direct impact on the overall cost of the Cape Cod project. At \$7,258, Cape Cod Light cost about the same (\$7,170) as Seguin, built on a remote island off the coast of Maine. Other wooden lighthouses built in Massachusetts during this period cost considerably less: Baker's Island at \$4,602 and Gay Head at \$3,041. Several southern lighthouses were much more expensive, but they were built of stone and so are not comparable.⁷²

The use of his own equipment and that of the government helped Lincoln minimize the expense of materials and transportation, factors he had cited as making it difficult to obtain a low bid on the Cape Cod project. The problem of carting was at least as acute as that cited earlier at Cape Hatteras, because it was impossible to land cargo on the ocean side of Truro. Indeed, as the "Topographical Description" relates, it is questionable whether there was a usable port even on the bay side of Truro at that time.⁷³ Lincoln speaks of hauling "over the peninsula," but does not specify from where. Probably the small harbor at the Mouth of Pamet was adequate for the purpose.

Lincoln also informed his son that the "iron work of the lantern is nearly done." It was, he said, supposed to come to Boston to have "the roof covered, the ventilators put on &c" by the last of July or the first of August. As a result of this gratifying progress, the general predicted that the building would be entirely finished by the middle of September, instead of November as had been

⁷¹ Benjamin Lincoln to Theodore Lincoln, July 28, 1797; M10; BL Papers; MHS.

⁷² Lighthouse Annual Report, 1800; M63/2; LH Letters; RG 26; NA/MA.

⁷³ "A Topographical Description of Truro," p. 196; MHS.

expected.⁷⁴ In a letter dated August 15, Lincoln conveyed the same information to Coxe.⁷⁵ He seems to have remained on schedule, for on August 22 he informed Coxe that "I have the lantern on board the vessel for Cape Cod with the rods &c and am waiting for a wind. The workmen go to overlay the platform with copper and to paint the whole so that in a very short time the lamps may be lighted."⁷⁶

Theodore Lincoln, the ostensible contractor, may never have set foot on Cape Cod, and learned of the project only as the *Ranger* or some other vessel carried letters from Massachusetts Bay to Maine. For obvious reasons, the information he received was gratifying. On September 5, 1797, he wrote, "I am extremely pleased to hear that the affairs of the light house draw so nigh a close."⁷⁷ Later that month he told his father that "I am pleased to hear that you will probably have it in your power to forward me a statement of the affairs of the light house by the next trip."⁷⁸

Completion of the lighthouse apparently remained on its accelerated schedule. Lincoln informed Coxe on September 6 that "The lantern is up and there wants nothing to compleat it but setting the glass which is there. [T]wo or three days with the carpenters will compleat the whole of their work. The vault is done the cistern set in clay by the masons so that the whole might be compleated in four days at most."⁷⁹ Thus the lighthouse must have been essentially finished by mid-September, as Lincoln had predicted. It was definitely completed by November 8, 1797, the date upon which Isaac Small's service as keeper officially commenced. When Coxe informed Lincoln on June 22, 1797, of Small's appointment, he stipulated that the keeper's salary would "commence from the time the Light house shall be completed for lighting."⁸⁰ This occurred on November 8, when Lincoln sent formal notice of the appointment and transmitted the standing instructions to Small.⁸¹ However, the light was probably not illuminated until January 15, 1798, due to the difficulty of procuring an eclipser for it. As will be described in the following section, this mechanism was necessary in order to distinguish the Cape Cod Light from other lighthouses.

⁷⁴ Benjamin Lincoln to Theodore Lincoln, July 28, 1797; M10; BL Papers; MHS.

⁷⁵ Lincoln to Coxe, August 15, 1797; M9; BL Papers; MHS.

⁷⁶ Lincoln to Coxe, August 22, 1797; M9; BL Papers; MHS.

⁷⁷ Theodore Lincoln to Benjamin Lincoln, September 5, 1797; M10; BL Papers; MHS.

⁷⁸ Theodore Lincoln to Benjamin Lincoln, September 22, 1797; M10; BL Papers; MHS. The letter from Benjamin to which this seems to be a reply is not included in the collection.

⁷⁹ Lincoln to Coxe, September 6, 1797; M9; BL Papers; MHS.

⁸⁰ Coxe to Lincoln, June 22, 1797; Letters BC; Correspondence; RG 26; NA/MA.

⁸¹ Lincoln to Keeper, Cape Cod Light, November 8, 1797; Letters BC; Correspondence; RG 26; NA/MA.

At that time, structures on the site included the lighthouse tower, a principal keeper's dwelling with seven "strong" cisterns, a well, and a small barn.⁸² As explained previously, the separate oil vault included in the original proposal was not constructed. There was no dwelling for assistant keepers.

Distinguishing the Light

Cape Cod Light represented an important step in the gradual but somewhat random evolution of a coherent system of lighting the New England coast. Writing to Lincoln soon after learning of the appropriation to build the lighthouses at Baker's Island and Cape Cod, Coxe observed that when the two additions were completed, "There will be five lights in the great bay of Massachusetts, including Cape Cod and Barnstable bays as parts thereof." From his office in Philadelphia he was perhaps able to take a more detached strategic view of the situation. He noted that "The prominent headlands are the Capes Cod and Ann, and they may be well lighted. In the Bottom of the Bay is the Boston light, one of the first order. Hence it will follow that the Plymouth and Baker's Island lights . . . will be best as secondary lights."⁸³ Indeed, it was probably at Coxe's suggestion that the act establishing the Cape Cod Light also contemplated a reduction or alteration of Plymouth Light.⁸⁴

The increasing number of lights along the coast made the problem of differentiating them more acute. This is one of those issues that may puzzle landsmen. In the era of sail, and with radio direction-finding far in the future, a ship could emerge from a long spell of storm or fog without knowing its location within 50 or 100 miles. Discerning a light could be somewhat reassuring, but also confusing and even dangerous if it could not be definitely identified.

⁸² Contract for building lighthouse on Cape Cod March 2, 1797; Maine-Mass. Box 003, Entry 153; Civil Contracts; RG 217; NA/DC.

⁸³ Coxe to Lincoln, July 8, 1796; M63/1; LH Letters; RG 26; NA/MA.

⁸⁴ The Congressional act of May 17, 1796, that approved funds for constructing the Cape Cod Light included the following: ". . . and that the light or lights on Gurnet Head, at the entrance of Plymouth Harbor, be altered or diminished, if necessary." [Lighthouse Clipping File; RG 26; NA/DC.] Shortly thereafter, Coxe wrote that "The act contemplates an alteration of the present plan of the Plymouth light I think it probable that this may have been in consequence of a suggestion of mine, that a long dwelling House with a light at each end, might be expedient on Cape Cod, which would render it proper to reduce the two lights at the Gurnet to one. The existence of a good light in Boston bay and on Cape Cod will diminish the occasion for a great light at Plymouth." [Coxe to Freeman, June 9, 1796; Letters BC; Correspondence; RG 26; NA/MA.]

Early in the process of establishing the Cape Cod Light, Coxe toyed with the idea of making it a double light.⁸⁵ This was a common method of distinguishing lights; Plymouth and Baker's Island, among others, being double.⁸⁶ This technique suffered from obvious limitations, for under some conditions it was impossible to resolve visually the separate lights and if employed too frequently would defeat the purpose. Lincoln thereupon suggested creating a vertical double light, one above the other, to distinguish Cape Cod.⁸⁷ This proposal would only have created a different set of problems, and in the following months Coxe and Lincoln resorted to a wholly new approach.

After further consultation with the Marine Society, Lincoln reported to Coxe in December 1796 that they had decided a "blind" should pass before the light once a minute.⁸⁸ Obscuring the light at regular intervals would distinguish it from fixed lights in a similar latitude. Following up on his proposal, Lincoln informed Coxe four months later that he had discussed the subject with John Bailey, Jr., "whom I consider the first mechanical genius in this state." Bailey responded that he would take the matter into consideration.⁸⁹ Perhaps this letter served as an introduction, for on April 28, 1797, Coxe wrote to Lincoln that Bailey "exhibited at this office a complete working metallic model of the Machinery necessary to accomplish an alternate concealment and display of the lights in a lantern of from 4 feet to 11 feet diameter."⁹⁰

Coxe concluded that "If he will confidentially exhibit either a real working machine, or a description and specification of a machine, and the price at which he will make one for Cape Cod light house, a decision can be had upon it without delay. . . ." This apparently did not occur, and Coxe spent the succeeding months in an increasingly agonized quest to procure a satisfactory clockwork eclipsing mechanism for Cape Cod. Such devices existed in Europe, but Coxe was reluctant to purchase from a foreign source. There is something charmingly typical of the age in Coxe's search, since the clockwork mechanism seemed to embody the underlying assumptions of the 18th-century enlightenment. Philosophers believed that the universe operated as something of a self-regulating mechanism, and this concept influenced the design of the American Constitution.

In August, with the completion of Cape Cod Light approaching ahead of schedule, Lincoln wrote to Coxe to stress the urgency of acquiring an eclipser.⁹¹ Thereafter, a note of growing desperation is visible in Coxe's correspondence on the subject. On August 25 he gave Lincoln in effect permission to procure the equipment on his own. Several days later he asked Lincoln almost

⁸⁵ Coxe to Freeman, June 9, 1796; Letters BC; Correspondence; RG 26; NA/MA.

⁸⁶ Snow, p. 151.

⁸⁷ Lincoln to Coxe, July 26, 1796; M9; BL Papers; MHS.

⁸⁸ Lincoln to Coxe, December 7, 1796; M9; BL Papers; MHS.

⁸⁹ Lincoln to Coxe, April 19, 1797; M9; BL Papers; MHS.

⁹⁰ Coxe to Lincoln, April 28, 1797; Letters BC; Correspondence; RG 26; NA/MA.

⁹¹ Lincoln to Coxe, August 15, 1797; M9; BL Papers; MHS.

plaintively whether the Cape Cod Light might not be able to function "without Eclipsers for a time."⁹² Lincoln thereupon consulted again with the Marine Society and reported to Coxe "that there would be the utmost hazard in establishing a light on Cape Cod without something by which it could be distinguished from Boston Light."⁹³ It appears that public notice had been given that an eclipsing light would commence in November, and Lincoln advised that a late change would "operate as a decoy and greatly endanger the lives and the property of our citizens."

Lincoln then seized the opportunity provided by Coxe and promptly contracted with Bailey to manufacture an eclipser. Bailey must have been confident in his design and sources of materials, for he promised to deliver the mechanism to the dock at Hingham on October 16, at a cost not to exceed \$500.⁹⁴ Bailey must have delivered much as promised, for an inspection of Cape Cod Light in December confirms that the eclipser was in place.⁹⁵

Except for making the necessary public announcements, no further obstacles remained to putting Cape Cod Light into service. The time was already late, for the preference was to place new lights in service before the darkest time of the year. Lincoln requested the Marine Society to prepare sailing directions based on the new light, which it published on January 2, 1798.⁹⁶ This document states that the lamps were to be lighted on January 15, and presumably they were.⁹⁷ Lincoln obviously considered that one of his responsibilities was the dissemination of information about aids to navigation. In 1799 he received a request for information from Edmund Blunt, who was then in the early stages of publishing the *American Coast Pilot*. Blunt noted that Lincoln had "contributed

⁹² Coxe to Lincoln, August 31, 1797; Letters BC; Correspondence; RG 26; NA/MA.

⁹³ Lincoln to Coxe, September 6, 1797; M9; BL Papers; MHS. Also see Baker, p. 74. The Boston Marine Society had earlier expressed a preference for an eclipser that would reveal the light for one minute and obscure it for the same period. After a discussion with Lincoln on September 5, the Society voted "that 80 seconds was the proper time for the eclipser to make one entire revolution." Probably Baker is correct in surmising that "here is a case of changing a vote to suit available equipment." In the same letter, Lincoln reported that Bailey had committed to produce a device with that characteristic, in which the light would be concealed 30 seconds and "discovered" (uncovered) for 50.

⁹⁴ Lincoln to Coxe, September 6, 1797; M9; BL Papers; MHS.

⁹⁵ Ephraim Harding to Lincoln, December 6, 1797; Letters BC; Correspondence; RG 26; NA/MA.

⁹⁶ Baker, p. 74. The sailing directions are reproduced in Appendix VI of Baker's book, pp. 314-15.

⁹⁷ Isaac M. Small, the son and grandson of keepers of the Cape Cod Light, asserts in his booklet *Highland Light* (Truro, 1927) that the lamps "first flashed their broad and welcome rays over the wide and shimmering surface of the ever restless Atlantic on the night of June 12th, 1797." Furthermore, he maintains that a temporary beacon was erected on the site in 1796 while the permanent light was under construction. The concept of citing sources is alien to Small, and nothing has been found in contemporary documents to substantiate his claims. This date thus appears to be another example of the mistakes he made when writing of the early lighthouses.

very largely” and hoped that this support would continue.⁹⁸ Lincoln probably complied in person and at length; although his formal education was limited to the common schools of Hingham, he had become a capable writer. He produced pamphlets extolling Maine lands, and journals of his travels while on official business, such as negotiating treaties with the Indians.

Cape Cod probably has the distinction of housing the first eclipsing mechanism in an American lighthouse, making it the first successful effort to distinguish lights by a means other than using multiple lights.⁹⁹ It appears that the mechanism did not function perfectly at the outset. The inspector who visited Cape Cod in December 1797 observed that the “blind operates badly. Some times it runs down in 8 hours and some times in 7 & 5. [The keeper] tells me that he has tried all ways by taking out and putting in the waits[sic]. It seems that the weather governs it very much so that it will not keep time properly.” [punctuation added and most spelling corrected.]¹⁰⁰ Apparently the clock drive did not run as long as anticipated, so that on the long nights of winter it required two windings. The need to do this was one of the main justifications for an increase in Isaac Small’s salary from \$150 to \$200 a year in 1798.¹⁰¹ Except for this defect, Lincoln seemed fully satisfied with the operation of the eclipser.¹⁰² Several years later the Secretary of the Treasury asked Lincoln for a description of the Cape Cod machinery so that it might be used in a lighthouse planned for Watch Hill, RI.¹⁰³

⁹⁸ Blunt (or Blount) to Lincoln, March 18, 1799; M10; BL Papers; MHS.

⁹⁹ This researcher has not found any previous claim to this effect. Snow describes the device at length, apparently without recognizing its novelty (p. 252). It is quite clear from Coxe’s correspondence that no similar mechanisms were in use in America; otherwise, there would not have been so much anxiety about obtaining one. On August 31, 1797, for example, he wrote “There is great difficulty in making this unknown machinery here. If we had a few sets of these most improved, say two, from each of the Countries mentioned [France and England], our ingenious workmen would copy and improve upon them.” [Coxe to Lincoln, August 31, 1797; Letters BC; Correspondence; RG 26; NA/MA.]

¹⁰⁰ Ephraim Harding to Lincoln, December 6, 1797; Letters BC; Correspondence; RG 26; NA/MA.

¹⁰¹ William Miller, Jr., Commissioner of Revenue, to Lincoln, October 6, 1798; M63/2; LH Letters; RG 26; NA/MA.

¹⁰² Lincoln to Miller, March 17, 1798; M9; BL Papers; MHS.

¹⁰³ Albert Gallatin, Secretary of the Treasury, to Lincoln, July 22, 1806; Letters BC; Correspondence; RG 26; NA/MA.

Subsequent Development

When the Cape Cod Light was first illuminated, it was the 20th lighthouse in the country. All of the lighthouses that had been established previously were still in operation. Baker's Island, which had been authorized at the same time, went into service just two weeks before Cape Cod. Although the tower was unexceptional, the light on Cape Cod may have been the highest in the country because of the elevation of the ground on which it stood.¹⁰⁴ The light itself was not, as it became later, one of the brightest along the coast. In a letter of June 16, 1797 Coxe described it as a "lantern . . . of the second class."¹⁰⁵

If the choice of the lighthouse site was indeed influenced by prospects of saving money through the appointment of Isaac Small, the decision was validated by subsequent events. Once the lighthouse was in operation, and Small was the keeper, his salary was in the lowest category. Even after being raised to \$200 a year, his salary was the same as that of keepers at more settled places such as New London, Newport, Plymouth, and Portsmouth. An outsider at the isolated post on the Highlands of Truro, lacking Small's alternate sources of income, would surely have required a higher salary, and probably more and larger domestic buildings. By comparison, the keeper of Boston Light, where agriculture was impractical, received \$333.33 a year.¹⁰⁶ Another consideration in determining salary was the height of the lighthouse, since it was less laborious to maintain a light in a low tower like that on the Highlands.¹⁰⁷

There is some evidence that the construction of the first lighthouse was defective. A man apparently designated to conduct an inspection in December 1797 found serious problems, in addition to those noted previously concerning the eclipser. The inspector noted that 12 panes of glass had already fallen out because of the "woods leveling and srinking[sic]." He added that the copper dome was already leaking and that the ground "blows away verrey fast so that it is gone in some places 6 or 8 inches below the hewed stone." His alarming conclusion was that "there must be some repairs

¹⁰⁴ Accurate height figures are not available for every light then in existence, especially those built in colonial times, but most stood on much lower terrain and could not have attained a greater total elevation.

¹⁰⁵ Coxe to Secretary of Treasury, June 16, 1797; M63/1; LH Letters; RG 26; NA/MA.

¹⁰⁶ Lighthouse Annual Reports, 1799 and 1800; M63/2; LH Letters; RG 26; NA/MA. A striking illustration of the relationship between salary and lifestyle is the fact that the Boston keeper's salary had actually been lowered from \$400 because of "favorable conditions of living." Presumably this referred to possibilities of providing subsistence by fishing, and perhaps the potential to bring in money by pilotage, as had been done by the first keeper of the light. [Putnam, p. 36.]

¹⁰⁷ Heights are not accurately known for all of the colonial lighthouses, however, Beavertail (Rhode Island,) 64 feet; Sandy Hook, 103 feet; and Boston, 75 feet after rebuilding in 1783, are known to have been higher. Cape Ann was about the same height as Cape Cod. [Holland, pp. 11, 69.]

made soon or the Light will be in danger before spring."¹⁰⁸ It would be interesting to know whether the writer of this dismal assessment was aware that the recipient of his letter was the builder of the lighthouse.

Apparently some problem also arose with the oil storage vault, because in the first weeks of the new lighthouse's operation, Isaac Small wrote Lincoln, "I do not think tis worth while to Do any thing with the volt [vault] move till you come Down for it gets so bleak in the winter seson that it will be very bad to [haul?] oil to the Lite from it."¹⁰⁹

These defects must have been repaired sufficiently to allow the lighthouse to go on functioning adequately. Official records indicate that its first decade was generally uneventful. Keepers were subject to criticism for real or imagined problems with their lights, and on at least one occasion Small encountered difficulties of this sort. In 1804, having been informed by his brother that there was a complaint against his light, he wrote to Lincoln, "I beg the favor of you to let me No[sic] what the Complaint was. I don't no of any thing Defishent[sic]. . . ."¹¹⁰

By the end of the decade, physical problems at the light had become too acute to be ignored. In his regular report for 1809, Isaac Small noted that 12 squares of glass in the lantern "was broke out by the wind last winter." In addition to needing putty to set the glass, he noted that "The Lighthouse has been built 11 years this Summer and has not been painted since it was first built. [T]he paint is wore of[f] very much. . . ."¹¹¹ This letter coincided with the departure of Small's patron Benjamin Lincoln, who resigned his post as collector on March 1, 1809, just before the arrival of a new national administration. The lighthouse administration itself did not change at this time; the activist Secretary of the Treasury Albert Gallatin, who had assumed direct control of lighthouses in 1802, retained this responsibility until the end of his tenure in 1813.

Small's report also coincided with increasing complaint about the Cape Cod Light. In a petition to Gen. Henry Dearborn, who had replaced Lincoln, many inhabitants of Provincetown and Truro defended Small's management of the light while agreeing that the light was inadequate. They blamed the trouble on the eclipser, which "reduces the Light in a very considerable degree, adding to the situation on which the Light House stands, upon a high bank, which from the water side of said Light, there is almost always a Vapour which intervenes to obstruct the Light."¹¹²

The defects of the eclipser are confirmed by the writings of Edward A. Kendall, an English traveler who passed through the area in 1808. After a visit to the Cape Cod Light, he described the eclipsing mechanism as "a semi-circular skreen, placed on a circular frame, which being moved by

¹⁰⁸ Ephraim Harding to Lincoln, December 6, 1797; Letters BC; Correspondence; RG 26; NA/MA.

¹⁰⁹ Small to Lincoln, February 2, 1798; Letters BC; Correspondence; RG 26; NA/MA.

¹¹⁰ Small to Lincoln, June 23, 1804; Letters BC; Correspondence; RG 26; NA/MA.

¹¹¹ Report of Isaac Small, 1809 [n.d., probably June]; Letters BC; Correspondence; RG 26; NA/MA.

¹¹² Petition to Henry Dearborn, February 23, 1810; Letters BC; Correspondence; RG 26; NA/MA.

clock-work, performs continual evolutions about the lanthorn.”¹¹³ He identified the problem as being due to the fact that “As the skreen is continually turning, the light is full only for a single moment in the course of each evolution; it is also totally eclipsed but for a single moment; but, during all the time between, it is no more than an obscure and imperfect light, with greater or less difficulty distinguished.”

The history of the early lighthouse service, like an ocean voyage, is characterized by long periods of routine interrupted by occasional stormy spells of upheaval and controversy. Cape Cod Light provides an excellent example of these trends and issues. A phase of rapid change around 1810 is associated with Winslow Lewis (1770-1850), a shrewd Boston sea captain with entrepreneurial inclinations. Lewis, without ever holding an official position, exerted an immense influence on the American lighthouse establishment for almost 40 years. He obtained a patent on an improved lighting device, which most specialists consider to be a copy—and a copy of a version already obsolete, at that—of the Argand lamp, invented in Europe nearly 30 years earlier.¹¹⁴

Lewis was an active member of the Boston Marine Society and from 1818-20 its president, which gave him an influential base.¹¹⁵ He also won the backing of Henry Dearborn. Although the national government was less friendly to New England’s maritime interests than it had been during the administrations of Washington and Adams, Dearborn—who had made a respected name for himself during the War for Independence—retained good connections. At Dearborn’s recommendation, Lewis was given a contract to convert all the nation’s lighthouses to his new system. This was advantageous to the government because the Argand-type lamp consumed less than half as much oil as the older “spider” lamps.¹¹⁶ An ideal situation was thus created, in which Lewis received a handsome payment while the government saved money overall.

In April 1811 Lewis reported that he had prepared the new “apparatus” for installation in the Boston and Cape Cod lights.¹¹⁷ In consequence, Isaac Small notified Dearborn that he had removed the “Elipses” as he called them from his light on May 20.¹¹⁸ The enormous effort and anxiety that had accompanied the installation of the eclipser was thus negated when the light was converted to a fixed aspect. Lewis had tested his lamps in the Boston light, where they proved to be an unqualified success. An examination left the Marine Society so impressed that they could describe the contrast between the new and old lights only in terms of the difference between the sun and the moon. The society—perhaps not an altogether disinterested observer—concluded that “when

¹¹³ Edward Augustus Kendall, *Travels through the Northern Parts of the United States in the Years 1807 and 1808* (New York: I. Riley, 1809), Vol. 2, p. 161.

¹¹⁴ See Sarah C. Gleason, *Kindly Lights* (Boston: Beacon Press, 1991), Chapter 3, for a fuller discussion.

¹¹⁵ Baker, p. 75.

¹¹⁶ Holland, p. 15.

¹¹⁷ Dearborn to Gallatin, April 15, 1811; Letters BC; Correspondence; RG 26; NA/MA.

¹¹⁸ Small to Dearborn, June 1, 1811; Letters BC; Correspondence; RG 26; NA/MA.

all of the lights in Boston Bay are fitted on Capt. Lewis's improvement . . . in almost any weather a ship may run into Boston Bay with safety and shall always be in sight of some one of the lights."¹¹⁹

Lewis had expected to install his lighting apparatus at Cape Cod, but other problems intervened. An examination of that light by another committee of the Marine Society revealed that the structure was so defective as to be unable to accommodate the new equipment:

On examining the lantern, they found it much too small and very badly constructed, and very much out of repair the sashes are so constructed that the glass cannot be kept in them, the joints between the octagons part are a half inch open, and the whole lantern is in that situation as not to be able to keep a light in it, and it is our opinion, that there ought to be a new lantern of ten feet diameter, and the Light house cut down seventeen feet as we are of an opinion that the Light house now is much to[sic] high and would be seen at a much greater distance if the light was lower, and we are of an opinion that the alteration ought to be made as soon as possible . . . as we do not think a light can be kept in the lantern another winter.¹²⁰

In transmitting this report, Dearborn added that "I am satisfied that [Cape Cod Light] was wretchedly constructed."¹²¹ Dearborn may not have been aware that his predecessor was responsible for this "wretched" structure, but Lincoln had died the year before.

It is probably no coincidence that the recommendation of the Marine Society was similar to the plan proposed by Winslow Lewis, one of its prominent members. It seems contradictory to conventional wisdom to improve the performance of a lighthouse by reducing its height. In the specific situation of Cape Cod, subsequent correspondence makes it evident that one of the main complaints was that the light could not be seen "over the hills back of Provincetown" by ships crossing Massachusetts Bay. Whether or not due to "vapors," this condition is proof of the inadequacy of the light. The Gay Head Light, which—whether or not by coincidence—was built by another member of the Lincoln family, was lowered for similar reasons.¹²² However, it would seem that the greater brilliancy of the Argand lamps would have been able to overcome this problem without reducing the height of the tower.

¹¹⁹ Dearborn to Gallatin, June 27, 1811; Letters BC; Correspondence; RG 26; NA/MA.

¹²⁰ Dearborn to Gallatin, June 27, 1811, transmitting the Report of Committee Appointed by Boston Marine Society respecting Cape Cod Lighthouse. The committee, consisting of Michael Hopkins, Aquilla Rich, and Henry Atkins, conducted its inspection June 15, 1811. [Letters BC; Correspondence; RG 26; NA/MA.

¹²¹ See footnote 120.

¹²² Willoughby, p. 201.

Lewis' proposal for modifying Cape Cod Light was too large to be funded out of existing appropriations. After further negotiation with Dearborn, Lewis signed an agreement on June 17, 1812, to perform the work, which consisted primarily of reducing the tower by 17 feet and installing a lantern 10 feet high, at a cost of \$2000 (App. F).¹²³ Lewis had apparently made some changes in the lighting before undertaking his full contract, for keeper Small reported in February 1812 that Lewis had "fixt" his light with patent lamps.¹²⁴ Probably due to the War of 1812, the light was extinguished in October 1814.¹²⁵

Another part of Lewis' agenda seemed to be to replace Isaac Small, and Small in turn began to feel threatened. After Lewis had installed the new lights, Small complained that they "require a great deal more attention & time to tend." In this letter Small, although determined to "get a good name by a good light," observed that "Capt Mikel Hopkins of Boston is underminen[sic] me to take the light from me for his brother Constant Hopkins."¹²⁶ Michael Hopkins was a member of the committee that had examined Cape Cod Light, and was therefore an associate of Winslow Lewis in the Marine Society. Lewis further undermined Small later in 1812, when he reported that "Mr Small's various pursuits will not allow him to pay any attention to the Light House."¹²⁷

This campaign culminated soon after when Constant Hopkins was indeed appointed keeper, effective October 16, 1812.¹²⁸ Small had warned that Hopkins was "near seventy years of age which is no more fitting to tend the light than a child in the winter storms." In fact, Hopkins survived less than five years. The removal of Small after 15 years at his post necessitated a reversal of some of the considerations that had probably influenced his selection. While still fighting for his job, he reminded Dearborn that "As the road goes through the best of my land the United States and I must make a hundred or two lengths of fence to part my land from the [United] states['] if it is taken from me."¹²⁹ Some of this concern proved to be well taken; in 1817 John Grocier, who had replaced Hopkins as keeper, reported soon after assuming his position that "I wish the land to be measured and fenced as there is so many cattle round the Light they brake the ground up that it

¹²³ Lewis to Dearborn, June __, 1812; Letters BC; Correspondence; RG 26; NA/MA. Contract in Lighthouse Deeds and Contracts, 1790-1853; roll 2, microfilm M94 (M94/2); RG 26; NA/MA.

¹²⁴ Small to Dearborn, February 23, 1812; Letters BC; Correspondence; RG 26; NA/MA.

¹²⁵ Constant Hopkins to Henry A.S. Dearborn, October 4, 1814; Letters BC; Correspondence; RG 26; NA/MA. Henry A.S. Dearborn to Samuel Smith, Commissioner of Revenue, April 12, 1815; Correspondence; RG 26; NA/MA.

¹²⁶ Small to Dearborn, February 23, 1812; Letters BC; Correspondence; RG 26; NA/MA.

¹²⁷ Lewis to Dearborn, October 8, 1812; Letters BC; Correspondence; RG 26; NA/MA. The English traveler Edward A. Kendall had noted several years earlier that "I took shelter in the house of a farmer, who is also a miller, and the keeper of the light-house." (Kendall, p. 159.)

¹²⁸ Gallatin to Dearborn, October 16, 1812; Letters BC; Correspondence; RG 26; NA/MA.

¹²⁹ Small to Dearborn, February 23, 1812; Letters BC; Correspondence; RG 26; NA/MA.

blows away & there is no more than six acres for ten there ought to Bee."¹³⁰ This confirms that erosion was already a matter of concern, and also that there had never been a careful survey.

¹³⁰ Grocier to Henry A.S. Dearborn, May 21, 1817; Letters BC; Correspondence EL; RG 26; NA/MA. The new keeper's name is also given as Grozier or Grosier. He may have been a son-in-law of Constant Hopkins. Simeon L. Deyo in *History of Barnstable County* (New York: H.W. Blake, 1890), p. 947, notes that a John Grosier, born in 1791, was married to Mercy, a daughter of Constant Hopkins.

THE SECOND CAPE COD LIGHT

Administrative Background

A government reorganization in 1820 had long-lasting consequences for the lighthouse establishment. The administration of aids to navigation was placed under the jurisdiction of the Fifth Auditor of the Treasury, at that time Stephen Pleasonton. Historians of lighthouses have given Pleasonton generally poor reviews. Primarily a functionary, he emphasized controlling expenses. One of his proudest boasts was that American lighthouses cost less than half as much to maintain as those in Britain, disregarding widely perceived differences in quality. The number of lighthouses expanded greatly under Pleasonton, but he has been condemned for reluctance to adopt organizational and technical changes that would have made the system more effective. In particular, he has been criticized for resisting conversion to the more efficient Fresnel lens, as will be discussed subsequently.

Lacking experience with lighthouses, or indeed with any maritime matters, Pleasonton relied heavily on Winslow Lewis. This further strengthened Lewis' already powerful influence on lighthouse affairs. Certainly Lewis was unlikely to advocate replacing his Argand lamps with an entirely new technology, and Pleasonton saw little reason to challenge the views of his expert adviser. The careers of the two men became thoroughly interdependent, and as the years passed they fought together to hold back a rising tide of opposition.

Lewis favored standardized installations in the lighthouses he worked on, partly for his own convenience. This gave him an advantage in bidding for contracts, but neither he nor Pleasonton took a systematic approach to lighthouse needs. Decisions continued to be made on an individual basis, often subject to political pressure.

The Need for A New Light

By the late 1820's, the wooden lighthouse at Cape Cod had weathered severe conditions for 30 years. It was nearing the end of its useful life. Winslow Lewis's renovations had probably extended its career, but had only postponed the inevitable. In his report for 1828, the Boston superintendent reported that "The whole structure is very imperfect—is easily wracked by the winds,

which shakes the lantern so much as to break out the glass very frequently."¹ Interestingly, erosion was not cited as a reason for rebuilding the light.

A new superintendent, David Henshaw, advised Pleasonton in July 1829 that the old lighthouse should be replaced with a brick structure. As early as 1816 the Commissioner of Revenue had suggested to the superintendent at Boston that new lighthouses be constructed of brick or stone.² This had become standard practice, and by 1830 it is unlikely that any new wooden lighthouses were being built. Wooden lighthouses were largely a New England phenomenon. Despite its harsh environment, Cape Cod Light actually lasted longer than many of its wooden contemporaries: Nantucket Great Point, Seguin, and Baker's Island had all been rebuilt with stone before 1820.³ Pleasonton delayed for a time, probably concerned about costs, but in 1831 obtained the Secretary's approval for the rebuilding.⁴

Site Selection

General Location

As described previously in connection with the first Cape Cod Light, it is clear that the decision was made to build the second lighthouse on the same tract of land as the first.

Specific Location

A consideration of all of the evidence pertaining to the siting of the three Cape Cod Lights indicates that: (a) the second lighthouse may have been built very near the former location of the first lighthouse; and (b) that the second lighthouse stood very near the location of the present lighthouse.

¹ Annual Report, 1828; Box 2; Lighthouse Annual Reports, 1820-1853, Series 6 (Annual Reports); US Coast Guard Lighthouse Service, Record Group 26 (RG 26); NA/DC.

² Samuel Smith, Commissioner, to Dearborn, August 3, 1816; Letters Received by the Boston Collector (Letters BC): Correspondence, Series 17 (Correspondence); RG 26; NA/MA.

³ Francis Ross Holland, Jr., *America's Lighthouses* (Brattleboro, VT: The Stephen Greene Press, 1972); Edward Rowe Snow, *The Lighthouses of New England* (New York: Dodd, Mead, 1973).

⁴ Pleasonton to Henshaw, July 29, 1829; Pleasonton to Hon. Thomas Newton, February 8, 1830; Pleasonton to Henshaw, June 27, 1831; Letters Sent Regarding Lighthouse Service, 1792-1852, Series 18 (Letters Sent), RG 26; NA/DC.

Two pieces of evidence support the first contention, as stated previously in connection with the first lighthouse. First, only a limited part of the tract was actually suitable for lighthouse construction. Second, Henry David Thoreau visited the second lighthouse at least twice in the mid-19th century, and remarked in his writings on the proximity of the two locations.

Other evidence confirms that the second lighthouse was built very near the location of the present lighthouse. Two careful surveys conducted during the period of the second lighthouse indicate that it was located well back from the edge of the bank, which would have put it in close proximity to the location of the present structure. A survey in 1835 by Major J.D. Graham of the U.S. Topographical Engineers indicates that the lighthouse was approximately 440 feet from the edge (app. J).⁵ Another survey, performed in 1848 by A.D. Bache, Superintendent of the U.S. Coast Survey (fig. 1), is even more persuasive.⁶ This map shows a setback of approximately 440 feet for the lighthouse, and also depicts a fence line that indicates the lighthouse was situated at the extreme west edge of the government tract. The map seems to concur with the only known illustration of the second lighthouse (fig. 2), although it is not certain that the fence shown in the illustration marks the boundary of the government lot.⁷

Thoreau's writings support the close proximity of the second and third lighthouses, as well. He recorded during his 1855 visit that the second lighthouse stood "about twenty rods [total of 330 feet] from the edge of the bank, which is here formed of clay. . . . According to the light-house keeper, the Cape is wasting here on both sides, though most on the eastern. In some places it has lost many rods within the last year, and ere long the light-house must be moved. . . ."⁸ (He does not, regrettably, state how close it was to the property line, which may not have been marked at the time.) This is almost the exact distance between the third lighthouse and the cliff edge shown on the 1885 survey. Some erosion probably took place in the intervening years, but Thoreau was making only a rough estimate. For example, the lighthouse itself was more than one rod in diameter, and Thoreau does not state where his measurement began. If one or even two rods had eroded in that period, it would not affect the underlying assumption that the lighthouse he was describing was adjacent to its replacement.

⁵ "A Report upon the Military and Hydrographical Chart of the Extremity of Cape Cod, Including the Townships of Provincetown and Truro with their Seacoasts and Ship Harbor, Projected from Surveys Executed during Portions of the Years 1833, 1834 and 1835, Under the direction of James D. Graham, Major, United States Corps of Topographical Engineers." Graham complained (p. 8) about the inadequacy of his instruments for calculating latitude and longitude, but this would not have affected his measurements on the ground.

⁶ A.D. Bache, "Cape Cod from Highland to Nausett Lt. Topographical Survey made during part of July, August, September and October 1848"; Cape Cod NS files.

⁷ "Highland Light, Truro, Mass.," from *Gleason's Pictorial*, Vol. XI, 1856; in the collection of Peabody Essex Museum, Salem, MA.

⁸ Henry David Thoreau, "The Highland Light," *The Atlantic Monthly* (Boston: Ticknor and Fields, Vol. XIV, December 1864 (annual binding), p. 649.

One of the authors of this report attempted to discern the relationship of the second to the third lighthouse in another manner: by comparing the documented latitude and longitude readings recorded for the lighthouse location from 1833 to 1933 (see below). Unfortunately, these readings were not precise enough during the period being studied to give any useful insights.

<u>Date</u>	<u>Latitude</u>	<u>Longitude</u>
1833	42 02 19	70 04 22.50
1849	42 02 23	70 03 55
1852	42 02 40	70 03 30
1857	42 02 23.36	70 03 55.33
1860	42 02 21	70 03 18
1866	NA	70 03 38
1885	42 02 21	70 03 39
1891	42 02 22	70 03 40
1898	42 02 4N	70 03 3W
1908	42 02 23	70 03 40
1933	42 02 23	70 03 40

EXTREMITY OF CAPE COD

INCLUDING
PROVINCETOWN AND PART OF TRURO

U. S. COAST SURVEY

A. D. BACHE SURT

Topographical Survey made between the
1st of September and 24th of October

1848

SCALE 1/10,000

Resurvey of high water line

Made during part of November

1857

See tracings with No. 1952 for revision of this sheet.

*Note:
The resurvey of 1857 is*

*These line of main land 14.0 Stat. Miles
of Bay 15.0
of Light 9.0
of Roads 2.5
of Trees 20.0*

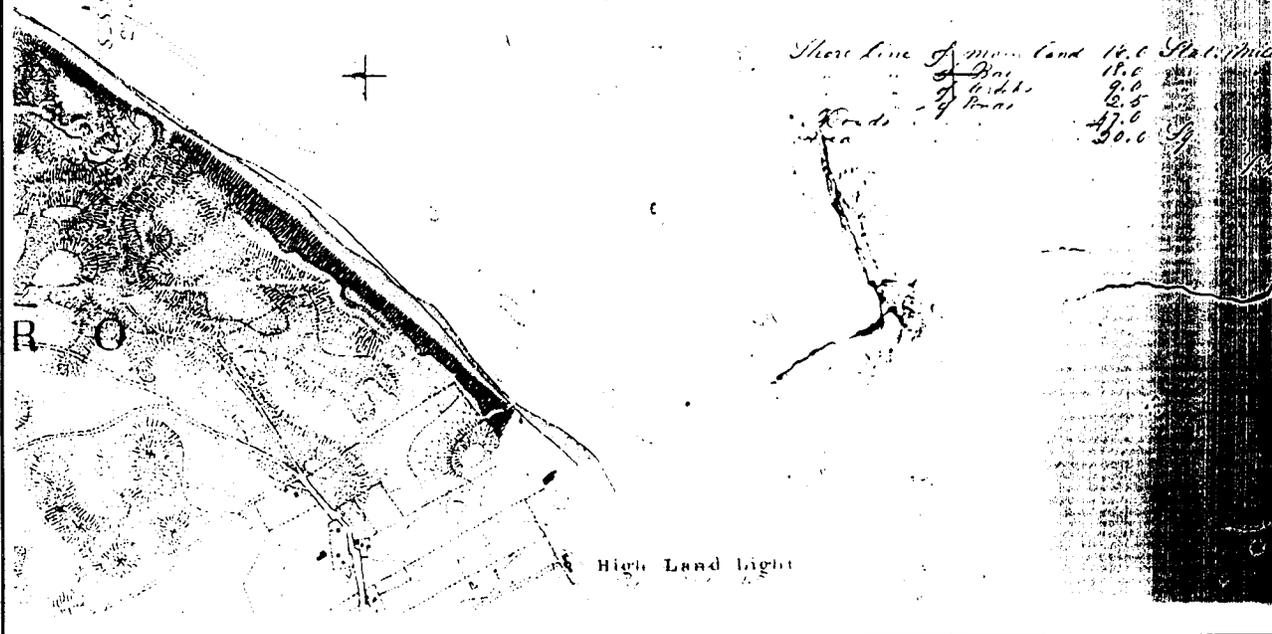
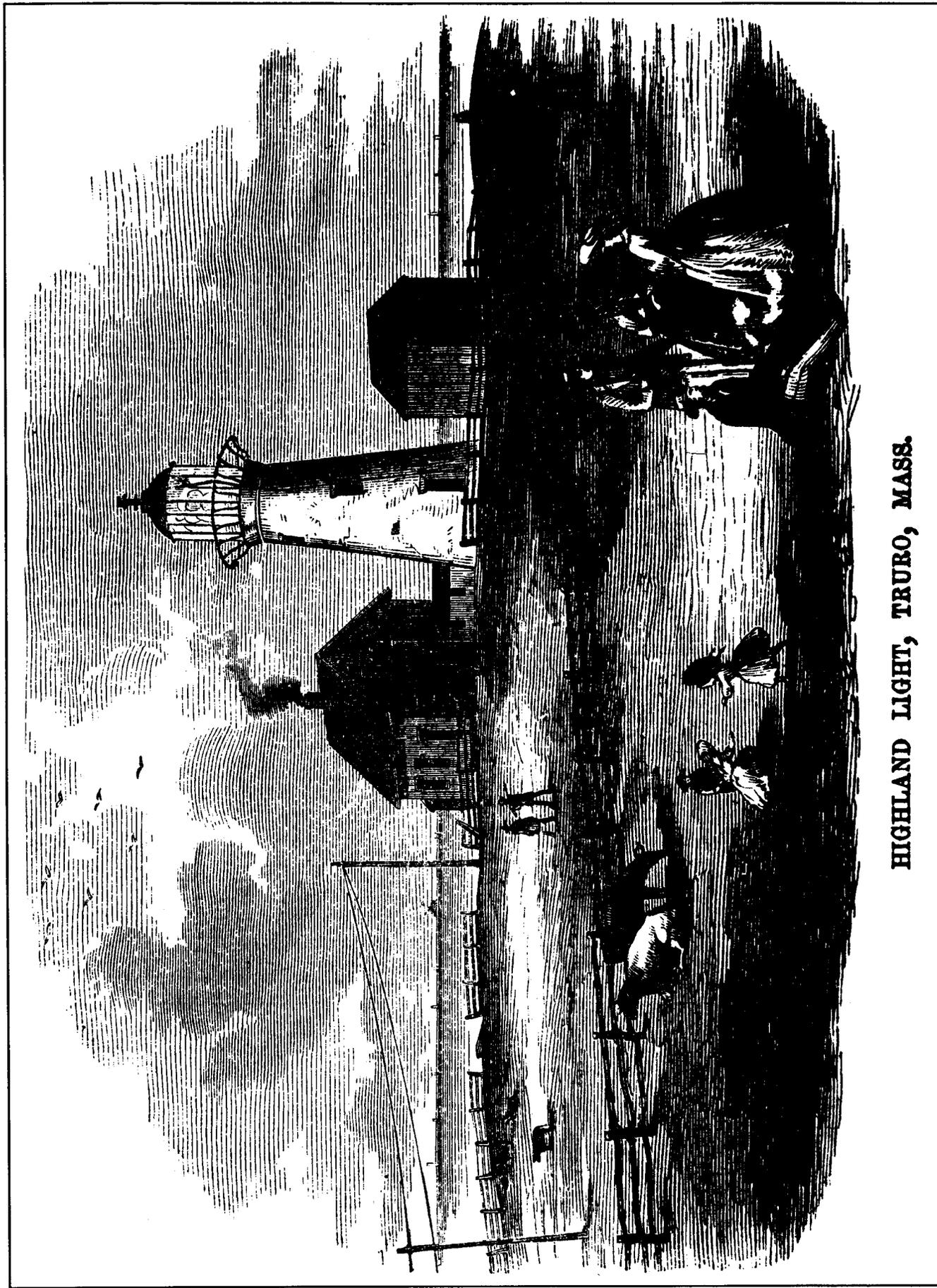


Figure 1. Map section, U.S. Coast Survey, 1848.



HIGHLAND LIGHT, TRURO, MASS.

Figure 2. Illustration printed in *Gleason's Pictorial*, XI, 1856.

Contracting

Pleasanton informed Boston superintendent Henshaw of the decision to rebuild the Cape Cod Light in a letter dated June 27, 1831. In the letter, Pleasanton wrote: "If in your opinion it be not too late to erect the buildings this season, you will advertise for proposals without delay." If this proved to be impossible, Henshaw was authorized to have the work performed in the following year. On July 22, 1831, however, Henshaw signed a contract with Winslow Lewis to complete the work by November 15.⁹

Lewis' contract (see appendix G for the full text) called for structures that differed radically from those being replaced. The new lighthouse tower was to be a round brick structure 35 feet high with a diameter of 22 feet at the base. The keeper's dwelling at 26 by 28 feet was to have approximately the same dimensions as its predecessor, but was also to be constructed of brick. The well was to be in the cellar of the dwelling, while oil was to be stored in eight 90-gallon butts in the lighthouse. (In a brick building there was apparently less concern about fire.) Again, there was no mention of an assistant keepers' dwelling. The total cost of this project was \$3,993—substantially less than the 1797 structures, even though Lewis' contract apparently included a new lantern. Unfortunately, this contract—like the previous one—does not contain any specifications about the location of the structures within the government tract.

Construction

The new complex seems to have been built as specified in the original contract. There is some uncertainty about the actual date of completion of the new complex, and some sources give a date of 1833.¹⁰ However, Lewis' contract called for a completion date of November 15, 1831, and there is no evidence to suggest that he failed to meet this deadline. In addition, the compilation in the "Statement of Appropriations" indicates that \$4,162.78 was expended in the year 1831.¹¹

⁹ Contract Book E, Lighthouse Contracts, p. 259-262; RG 26; NA/DC.

¹⁰ For example, see Holland, p. 83.

¹¹ Lighthouse Clipping File; RG 26; NA/DC.

Subsequent Development

As Pleasonton's unimaginative reign continued, Congress sought means of exerting influence on the management of the troublesome lighthouse establishment. In 1838 it passed an act that divided the country's lighthouses into eight districts, and that ordered a naval officer to report on conditions in each district. The report of Lt. Edward W. Carpenter, the officer whose district included Cape Cod, seems to present an impartial and balanced summary of conditions as of November 1838 (App. H). The regular annual report of the superintendent, George Bancroft, dated August 10, 1839, presents a similar appraisal.¹²

An unexpected finding in the reports for this period is the fact that the Cape Cod Light was supplied with a boat. The surprise lies not in the provision of boats for lighthouses, which was common practice, but in the fact that one was thought to be needed at Cape Cod. Obviously a boat was essential at the many lighthouses that were located on islands; elsewhere, they were useful for carrying supplies, performing rescues, or fishing. However, the physical conditions at Cape Cod would seem to make the usefulness of a boat questionable. A boat stationed on top of the cliffs would have been of little value, yet at the base of the cliffs there would seem to be no reliable way to shelter one from the ocean. While some fishing is conducted in adjacent waters, the longshore current makes landing in the vicinity of the lighthouse hazardous.¹³ Nonetheless, the 1839 annual report makes it clear that there was a boat associated with the light. It also explains its main function, stating that "it was damaged during a tempest last winter in attempting to board a vessel in distress." Before the creation of a separate lifesaving service, keepers often performed this function.

An 1846 report mentions a boat house, but since the reference pertains to the earth under the boat house being washed away, it confirms the problems associated with the location. It is possible that the slope of the cliff was somewhat different at that time, and there may have been a temporary shelf of land that made it possible to shelter a boat. While the general tendency is for the cliff to retreat, the process is irregular, so that the configuration of the slope at any given time varies. Photographs from the first part of the 20th century show that there was a wooden staircase leading down the cliffs to the beach, and other accounts mention that ocean bathing at the base of the lighthouse was possible.¹⁴

In the early 1840's, Cape Cod Light figured prominently in another of the periodic controversies that swirled around the lighthouse administration, and which generated a richly vehement documentary record to delight historians of the subject. After two decades in the same

¹² Annual Report, 1839; Box 2; Annual Reports; RG 26; NA/DC.

¹³ For example, the 1794 "Topographical Description" notes that "The eastern shore of Truro is very dangerous. More vessels are cast away here than in any other part of the county." (p. 197).

¹⁴ Photographs and postcards in collections of Truro Historical Society and Cape Cod NS.

office, Pleasonton was coming under increasing fire. One of his most unsparing and persistent critics became I.W.P. Lewis, a nephew of Winslow Lewis.

The younger Lewis executed many lighthouse contracts before breaking decisively with Pleasonton, one of them to refit Cape Cod with a lantern of improved design. This design incorporated a Fresnel lens, which used triangular prisms to focus and thus increase light for navigational purposes. The project was completed in August 1840.¹⁵ The old reflectors taken from Cape Cod were transferred to Norfolk.¹⁶ In the following months, Pleasonton began to question the cost of the work done at Cape Cod, as compared with seemingly similar work performed by Winslow Lewis at Cape Henlopen.¹⁷ This contributed to the progressive deterioration of relations between the 5th Auditor and the younger Lewis. It became apparent that the new lamps at Cape Cod consumed an excessive amount of oil—in Pleasonton's eyes an indictment of the utmost severity. Late in 1842 Pleasonton ordered the removal of the new lamps and their replacement by the former Argand type. After a test by the captain of the lighthouse service's cutter showed "no perceptible difference in the brilliancy of the lights," Pleasonton could scarcely conceal his glee when informing the Secretary of the Treasury.¹⁸

This seemingly calculated affront must have been a factor in precipitating the final split between Pleasonton and I.W.P. Lewis. In that era of exaggerated sensitivity to any suggestion of criticism, the issue became thoroughly personalized and was soon absorbed into the perpetual partisan political battles. Since the participants were both articulate and possessed of an easily wounded vanity, some marvelous polemics ensued.

As a result of this political maneuvering, I.W.P. Lewis was ordered to prepare a report on the lighthouses of Maine, New Hampshire, and Massachusetts. He seized this opportunity to retaliate and produced a scathing condemnation of Cape Cod Light, which had been built by his uncle only about 10 years before (see Appendix I). This constituted another direct assault on Pleasonton's administration of the nation's lighthouses. Lt. Carpenter had observed some of the same defects during his examination three to four years earlier, but the tone of his report is less severe. The annual report for 1839 also does not portray matters in the catastrophic condition claimed by Lewis, although it is possible some of the structural flaws may not have been easily visible. This leads to the conclusion that Lewis exaggerated the defects to make a stronger case for his side of the larger controversy.

An unusual aspect of the dispute as it developed at Cape Cod was the involvement of the keeper, Jesse Holbrook. He became an ally of I.W.P. Lewis, and Lewis responded by

¹⁵ I.W.P. Lewis to Pleasonton, August 18, 1840; Correspondence; RG 26; NA/DC.

¹⁶ George Bancroft, Superintendent of Lights, Boston, to Pleasonton, October 20, 1840; Correspondence; RG 26; NA/DC.

¹⁷ Pleasonton to Bancroft, January 25, 1841; Letters Sent, vol. 16; RG 26; NA/DC.

¹⁸ Pleasonton to Walter Forward, Secretary of Treasury, February 23, 1843; Letters Sent, vol. 18; RG 26; NA/DC.

recommending that, in view of "the remote location," Holbrook's salary be increased from \$350 to \$500 annually.¹⁹ Holbrook resisted the changeover to the old-style lamps, at one point even writing directly to the Secretary—surely an unusual expression of independence on the part of a lighthouse keeper. Learning of this, Pleasonton concluded that he was "acting under the influence of I.W.P. Lewis," and as a result was "not disposed to do justice to the present lamps." Since Cape Cod was "one of the most important lights on the Eastern Coast," Pleasonton requested the Secretary to remove Holbrook.²⁰ It appears that Holbrook was, in fact, removed soon after and replaced by James Small, son of the first keeper.²¹

Pleasanton survived the challenges of the early 1840's, but by the end of the decade his position was under renewed attack. Furthermore, the recent acquisition of California and the continuing growth of the nation's maritime traffic simply increased the scale of the problem. This time his foes were more determined and persistent. As will be explained in the following chapter, they finally succeeded in bringing an end to his 30-year reign.

¹⁹ I.W.P. Lewis to Secretary of Treasury, February 6, 1843; "Lighthouse Letters, Series P," 1843-1864, Series 35; RG 26; NA/DC.

²⁰ Pleasanton to John C. Spencer, Secretary of Treasury, May 15, 1843; Letters Sent, vol. 18; RG 26; NA/DC. The frequent turnover of Secretaries was probably a factor in Pleasanton's durability.

²¹ Lighthouse annual reports for 1845-1847 list "E. Small" as keeper, although the 1849 report states that James Small was appointed "six years ago." The reasons for this discrepancy are not known.

THE THIRD (PRESENT) CAPE COD LIGHT

Administrative Background

In 1851 Congress appointed a board, composed largely of military men, to conduct a thorough study of American lighthouses. This board examined every aspect of lighthouse technology, operation, and administration. In the words of the best-known modern student of lighthouses, "It is doubtful that any agency prior to that time, or perhaps subsequently, went through such a searching inspection."¹ The result was a massive report of 760 pages, plus numerous appendices. While avoiding explicit condemnation of Pleasonton, the board left no doubt that only a complete overhaul of the lighthouse establishment could bring it into the modern era.

Congress, armed with the report of the 1851 investigative board, at last had the ammunition it needed to overthrow Pleasonton. Indeed, the board had presented its findings in such stark terms that Congress could no longer avoid reforming the lighthouse establishment. The board conveniently provided a blueprint for reorganizing the lighthouse administration, which Congress readily followed. On October 9, 1852, it created a permanent nine-member Lighthouse Board, again with a preponderance of military officers. As in the case of the investigative board, these members had outstanding reputations in their fields, with most of the military men representing technical branches of the services.

For the first time in the more than 60 years of federal control of aids to navigation, a systematic approach took place. Aids to navigation were planned as part of a coherent system, based on the needs of the nation's maritime traffic. In a striking example of this new method, Lt. George C. Meade—later the Union commander at Gettysburg—examined the lights on the southern approach to New York harbor. He concluded that Barnegat was properly a coastal light and should be considered more important than the old light at Sandy Hook. As a result, Barnegat was relocated several hundred feet and rebuilt to become the dominant light in the vicinity.²

The Lighthouse Board conducted a sweeping campaign to modernize the nation's lighthouses in its first years. During this period, a majority of American lighthouses were rebuilt or substantially altered, following a methodical program. Many lighthouses that had been associated with Cape Cod historically or functionally—among them Baker's Island, Thatcher's Island, Plymouth, Gay Head, and Fire Island—were rebuilt and refitted during this energetic period. Cape Cod Light itself was included in this plan, having been placed 31st on the "List of existing sea-coast lights which require

¹ Francis Ross Holland, Jr., *America's Lighthouses* (Brattleboro, VT: The Stephen Greene Press, 1972), p. 34.

² Holland, *America's Lighthouses*, p. 94.

to be elevated, and to be refitted with first-order lens apparatus.”³ As this report indicates, resistance to the Fresnel lens disappeared with Pleasonton, and its use became routine.

The Need for a New Light

The relationship of lighthouses to one another became an important factor under the new system in determining their location and physical characteristics. This approach brought the location of the Cape Cod Light under close scrutiny after some 60 years in essentially the same location. Serious dissatisfaction with the second Cape Cod Light was evident as early as 1852, when it was recommended “to elevate, improve, and fit with first-order illuminating apparatus the light-house at Truro highlands, Cape Cod, being an important seacoast position to mark the approaches to Boston bay” for \$15,000.⁴

An 1853 entry recommended that the Cape Cod Light be moved to higher ground to the south of its current location, because that same high ground blocked its visibility to mariners approaching from a southerly direction.⁵ It was said that “the present light is not seen in approaching it from the south over hills, woods &c which are situated a short distance to the south of it.”⁶

In addition, the Lighthouse Board was hopeful that moving the Cape Cod Light would permit the closing of the triple beacon at Nauset, in Eastham. This was a group of three separate lighthouses known as the “Three Sisters,” whose maintenance struck the efficiency-minded board as wasteful. The board believed that if the Cape Cod Light were moved to the south, it would cover the entire eastern face of Cape Cod, making the three Nauset lights unnecessary. Once again, erosion was not cited as a reason for rebuilding the light.

³ Report of the Light-House Board, January 30, 1852, in *Compilation of Public Documents and Extracts from Reports and Papers Relating to Light-houses, etc., 1789-1871* (Washington: GPO, 1871), p. 710.

⁴ From Annual Report of Lighthouse Board (Annual Report), 1852; Lighthouse Clipping File, Cape Cod., Mass. (Clipping File); RG 26; NA/DC.

⁵ From Annual Report, 1853; Clipping File; RG 26; NA/DC.

⁶ March 28, 1856; Vol. 3; Journal of the Light-House Board, May 20, 1851-Jan. 1, 1908, Series 1 (Journal); RG 26; NA/DC.

Site Selection

General Location

Congress, responding to the dissatisfaction, appropriated \$25,000 on August 3, 1854, "for the removal of the light-house at Truro (Highlands), Cape Cod, to a proper site, and for fitting the same with the most approved illuminating apparatus, and to serve as substitute for three lights at Nausett Beach."⁷

For a time, a substantial change in the location of the Cape Cod Light seemed assured. In February 1855, Massachusetts ceded jurisdiction over additional land in Truro that the federal government might wish to use for lighthouse purposes.⁸ The Lighthouse Board voted on March 28, 1856, to give the following instructions to its agent, Major C.A. Ogden, Corps of Engineers, Boston, 2nd District:

On motion it was ordered that Major Ogden be requested to enter into negotiations with the owner of the land for the new Lighthouse authorized to be built on the Highlands Cape Cod, in place of the present one. - That Major Ogden be informed that the design of the law is to erect a 1st class light on the most elevated and suitable site to the south of the present lighthouse at Cape Cod highland (Truro) to subserve all the purposes now derived from the present light, and the three beacon lights at Nausett Beach, but that the primary object to be attained in the establishment of a 1st class sea coastlight - to be visible within the limits of the range of the height above sea level - north and south - to guide vessels in approaching the coast from seaward and coasters and other from the direction of nantucket and from the eastward (Boston Bay &C) - It is the wish of the board that the site may be selected with great care and with reference to the benefits to be conferred on mariners, as well as to the proper stability and protection of the tower and buildings. - If major Ogden has any doubt as to the position referred to in his letter of 5th July 1855 to the board, he is recommended to make a further examination of the coast line between the present Lighthouse at Truro and the Nausett Beacons and avail himself of the nautical knowledge of the inspector of the district, who, if desired, will be instructed to accompany him in making further examinations. - The complaint is that the present light is not seen in approaching it from the south over hills, woods, &c which are situated a short distance to the south

⁷ Clipping File; RG 26; NA/DC.

⁸ Box 86; Lighthouse Site Files, Series 66 (Site Files); RG 26; NA/DC. A "site for a Light House at Truro:Highlands:Cape Cod" was included with a number of other cessions needed to carry out the board's modernization program.

of it and that on top of one of those hills will be the best site for the light to meet all of the wants of the navigator. - The elevation of the base of the present tower above the level of sea is, according to the information in this office 135 feet and the present tower 36 feet high making 171 ft for the elevation of the light giving a range of 21 nautical miles. - It is believed that an examination of the coast south - with a good telescope from the top of the present light house will facilitate in determining the particular hill or elevation which obstructs the view of the mariner in approaching it from that quarter. A light of equal elevation to the present one placed on the elevated point indicated would no doubt be seen ten or twelve miles beyond the present Nauset beacons. - The board is very desirous of having the necessary quantity of land purchased (depending upon the price asked per acre) and the deeds prepared title investigated for so the work may be done this summer.⁹

It should be noted that the Lighthouse Board spoke decisively of entering into negotiations with the "owner of the land for the new lighthouse authorized to be built on the Highlands, Cape Cod, in place of the present one"; it did not request him to determine *if* a new location was desirable.¹⁰ The documentation indicates that a sum of \$1,100 may have been associated with this work (of which \$37.71 was eventually repaid).¹¹

The search for a new site continued through the spring and into the summer. Its progress is somewhat difficult to follow, because most of the letters sent to the Lighthouse Board during this period have apparently not survived, even if they were subsequently bound into letter books. Fortunately, their receipt is recorded in the board's letter register. A typical entry in the register would include the name of the sender, the date the letter was written, a brief statement of the letter's subject, and possibly the location of the letter in a later bound volume. Thus, it is known that the Lighthouse Board received a letter from A.A. Humphreys dated April 23, 1856, on the subject, "Respond rel to site of light house" [at Highland Light?]¹² A letter dated May 5 records that the board received tracings of Cape Cod from Major Ogden.¹³ The board's journal entry from May 21 supports the letter register as follows: "From Major Ogden Corps Engineers May 5 in relation to the removal of the lighthouse at Cape Cod Truro. - send a tracing of the survey of the locality.

⁹ March 28, 1856; pp. 310-311; Journal; RG 26; NA/DC.

¹⁰ Vol. 3; Journal; RG 26; NA/DC. If the board had a specific piece of property in mind, no reference has been found.

¹¹ March 28, 1856; pp. 310-311; Journal; RG 26; NA/DC.

¹² A.A. Humphries, Ast. Chm. Comt., April 25, 1856; letter book no. 11, p. 241; Letters Received from District Engineers and Inspectors, 1853-1900, Series 24 (Letters Received); RG 26; NA/DC. [From the Letter Register.]

¹³ C.A. Ogden, Major, Corps. Engrs., May 5, 1856; letter book no. 29, p. 585, with three enclosures; Letters Received; RG 26; NA/DC. [From the Letter Register.]

- Referred to the Committee on Lighting.¹⁴ A later entry recorded that "the committee on lighting reported in relation to the proposed lighthouse for Cape Cod - Truro as to site range &c."¹⁵ Ogden's tracings have not been located, nor have other specific letters from this same time period.

By mid-August, however, the Lighthouse Board appears to have decided to build the new lighthouse on the same property as the second lighthouse. The first indication of this is contained in an August 15 letter from Engineer W.B. Franklin of the 1st and 2nd Districts (Maine and Boston), in which he speaks of shipping materials and men for the construction of the Cape Cod Light House.¹⁶ The board officially reversed its March 28 vote on September 3, having determined that a lighthouse on the existing government tract would be adequate.¹⁷ The board's journal for that date reads as follows:

On motion it was ordered that the works for which special appropriations have been made heretofore including those embraced in the lighthouse bill of Aug 18, 1856 to be put in [?] for an early commencement and speedy completion viz Cape Cod Highland Truro Mass. New tower to be erected near the point in a substantial manner for a first order lens, fixed light. On the land belonging to the US at that station and the tower be sufficiently high if the approp will admit of it to be seen above the trees and hills to the southward of it. The work to be commenced at the earliest possible moment.¹⁸

Presumably this conclusion was based on examinations of the area conducted over the spring and summer by Major Ogden and others.¹⁹ The board did not explain its decision, but it seems reasonable to suppose it had concluded that increasing the height of the light, in conjunction with the much greater brilliance of the Fresnel system, would overcome the objections to the old light.

The board's decision to rebuild the light on the same property as its predecessor was also in keeping with common practice of the day. Relatively few lighthouses in the region are the original

¹⁴ May 21, 1856; vol. 2, p. 329; Journal, 1856-57 (Series E-1); RG 26; NA/DC.

¹⁵ June 2, 1856; vol. 2, p. 338; Journal, 1856-57 (Series E-1); RG 26; NA/DC.

¹⁶ Engineer Franklin, Boston, MA, 2nd District, August 15, 1856; letter book no. 47, p. 12; Letters Received; RG 26; NA/DC. [From the Letter Register.]

¹⁷ September 3, 1856; vol. 3, p. 353; Journal; RG 26; NA/DC.

¹⁸ See footnote 17.

¹⁹ An exhaustive search has failed to locate the reports of Major Ogden or others. It appears that these reports were transmitted only as letters and never published in any other form. The originals were probably destroyed in one of the catastrophes that befell lighthouse records before they were placed under the custody of the National Archives.

structure on the site; many are the product of the massive reconstruction program undertaken in the early years of the Lighthouse Board. On the other hand, most lighthouses were rebuilt in close proximity to their predecessors, with temporary beacons being used to avoid an interruption in lighting. The small light on Brant Point, Nantucket, which has been rebuilt six times on essentially the same site since its establishment in 1746, carries this tendency to an extreme.²⁰ It would have been quite exceptional if the Cape Cod Light had been moved, as originally planned, to a new site a mile or more away. The Portsmouth (NH) light was rebuilt about 1,000 feet from the one it replaced in 1877, and that represented about the limit of customary change.²¹

Major relocations required an extensive process of notification of mariners. Even then some element of risk remained for those such as whalers who had been gone for an extended period and returned to changed conditions. Safety factors such as this contributed to a conservative outlook among lighthouse administrators, whatever their organizational affiliation. On a more prosaic note, the government frequently found the acquisition of private land and relations with private neighbors to be troublesome, and may have wished to keep such transactions to a minimum.²²

Specific Location

The government's 10-acre tract on the Highlands permitted the relatively small shifts in location that were typical of lighthouses historically, but not much more. It appears as though the third lighthouse was built not only on the same property, but also on almost the exact same spot as the second lighthouse. As mentioned in connection with the second lighthouse, an 1848 map (fig. 1) shows the second tower and second keeper's dwelling in the same approximate locations as the present structures.

Additional information is provided by an illustration published in 1856 in a popular magazine of the day (fig. 2). As will be explained in the following section, this illustration was drawn after the construction of the third keeper's dwelling, but before the construction of the third tower. The third dwelling and the second tower in this illustration display the same relationship to one another that the third dwelling and the third tower do today. However, there may have been a very slight relocation when the third tower was built. This is based on the fact that the connecting buildings between the present-day dwelling and tower do not run in a straight line (see app. A).

The fact that the Lighthouse Board again chose to rebuild the lighthouse on the same property—even though it was empowered to go elsewhere if necessary—indicates that the board was not overly concerned about the erosion observed by Thoreau during his visits to the site. As

²⁰ Malcolm F. Willoughby, *Lighthouses of New England* (Boston: T.O. Metcalf, 1929), p. 173.

²¹ Holland, *America's Lighthouses*, p. 79.

²² The old light at Brant Point, Nantucket, later provided a conspicuous example. [Edward Rowe Snow, *The Lighthouses of New England* (New York: Dodd, Mead, 1973), p. 274.]

described in connection with the second lighthouse, Thoreau had commented on the wasting of the cliff, probably because he was fascinated by the transient character of Cape Cod geography, and perhaps also by human efforts to impose permanence on it. He concluded that the lighthouse would have to be moved "erelong," but his estimate of the rate of erosion (6 feet per year) is much higher than the historical average. The board's decision to rebuild the light on the same property indicates that it was prepared to accept the actual, observed rate of erosion.

Construction

Early Expenditures

The financial records are confusing concerning the construction dates of the third lighthouse and its associated buildings. A sum of \$7,655.54 was expended in 1855 relative to the 1854 Congressional appropriation to rebuild the light.²³ However, the specifics of the expenditure are not clear. The only surviving archival entry from 1855 is as follows: "*Removal of light-house at Truro, (Highlands) Cape Cod.* - The subject of the new location is under the consideration of the Light-house Board."²⁴ The expenditure of \$7,655.54 seems excessive for the purposes of "consideration," even if it included activities such as planning and surveying, and related salaries and travel.

Thorough investigation of the documentary record provided no clue to the use of this money. For example, *The Boston Daily Advertiser*, a newspaper of the period that contained maritime news, was scanned thoroughly for the years 1855 through 1858. While changes to other lighthouses, including construction of temporary towers, were recorded in the paper's "Notices to Mariners" section, none were found for Cape Cod (Highland) Light.

The 1855 expenditure, however, could not have been for the construction of the lighthouse tower. The 1856 magazine illustration (fig. 2) shows that the second lighthouse was still extant. However, the same illustration shows that the new keeper's dwelling for the third lighthouse had been built by that time. It is thus tempting to ascribe the 1855 expenditure to the construction of the third keeper's dwelling.

A careful study of two historical documents, however, indicates that the third dwelling was not built until 1856. The first document is an article that appeared in the Barnstable *Patriot* on

²³ Clipping File; RG 26; NA/DC.

²⁴ Annual Report, 1855; Clipping File; RG 26; NA/DC.

December 4, 1855.²⁵ The article, written by a "Mrs. Margery Daw," proves that the second keeper's dwelling was extant and in poor condition at that time:

We were all seated cozily at dinner. The Squire on my right, Mr. Hall on my left, Mrs. Small opposite and next to her a young lady, who I may call the light of the Light House, with little boy Small on the other side of his mother's wing, when just as the hostess had put her fork into as plump a fowl as ever crowed, there came a rattle, a crash, smash and cloud of dust which rendered all on the opposite side of the table invisible to me.

My first impulse was to look down, and lo! and behold what a sight! The fowl, the squash, the potatoes, the beets, the cabbage, the bread and the pumpkin pie were covered with fragments of mortar and plaster. The castors [?] only stood above the heap of rubbish, like flowers over the ruins of...[word indistinguishable] running from this melancholy spectacle. I looked up and lo! the cause of the catastrophe! a part of the ceiling had fallen down over our devoted board and heads. It was not the first time the ceiling had acted so, I was told, as on a former occasion it had descended and Mrs. Small had patched the chasm with a newspaper.

The second document is a request made in March 1856 to use a room in the keeper's dwelling as a telegraph office.²⁶ It is possible that this request sought a room in the new keeper's dwelling: a room in the old keeper's dwelling was *already* being used as a telegraph office at that time, and there would have been no need of the March 1856 request unless it pertained to the third dwelling. There had been a telegraph office at the site since December 1855.²⁷ It is known to have been located in the second keeper's dwelling, based on Mrs. Daw's *Patriot* article of December 4, 1855, which also included the following:

As we sat chatting about the probability of Provincetown one day becoming an island, and of its harbor being destroyed for want of a little care to prevent the sea breaking through in one particular part, -a circumstance

²⁵ Mrs. Margery Daw, "Light From A Light House"; written November 20, 1855; published in the Barnstable (MA) *Patriot*, December 4, 1855, p. 1.

²⁶ Letter book no. 41, p. 342; Letters Received; RG 26; NA/DC. This letter book, like many of the bound volumes of letters from the period, has not survived. As stated previously, the Letter Register of the Lighthouse Board records the former existence of many of the letters. Another such record is two boxes of index cards in the National Archives in Washington, D.C., which contain references to missing letters and a brief description of their contents. These boxes are called the Index Card Finding Box, hereinafter called the "Finding Box."

²⁷ A Yarmouth (MA) *Register* article dated December 14, 1855, reported that the Cape Cod Telegraph was completed, and that a station "had been opened at Highland Light."

which Captain Small considers by no means improbable- and of Beach Point being gradually washed away, and of other such matters, I heard all at once a very curious and inexplicable sound. If I had been a believer in Spirit Rappings I should have perhaps imagined that the ghosts of one or other of my departed three husbands had left their particular spheres to visit me, [I must candidly say, I'd rather have them near me in the spirit than in the flesh] but as I have no faith in such tom-foolery, I at once sat down the noises to natural causes- of course I was right . . .

"Click--click--cli-eli-click," on it went - and Mrs. Small seeing me somewhat surprised, observed by way of explanation: "It's the Telegraph-office is in the next room- let us go and I will introduce you to the operator."

So in we went and lo! and behold there was a queer little brass machine close to the window, with wheels and springs and cylinders with coils of wires round them- and a slip of white paper, like a doctor's bandage, running from one hole in the stand into the machine and from it into another little hole; and there were wires coming in through the window. . . .²⁸

Therefore, the third keeper's dwelling was not built until 1856, and so could not have been the cause of the \$7,655.54 expenditure in 1855.

Construction of the Keeper's Dwelling

The main keeper's dwelling was erected in 1856, prior to the third lighthouse tower and assistant keepers' dwelling. This is based on two sources. The first is the Annual Report for 1856, which states that "a new dwelling has been built for the keeper at the Cape Cod Highlands lighthouse"²⁹ The report does not mention a new lighthouse or an assistant keepers' dwelling. The second is the 1856 magazine illustration (fig. 2). It depicts a keeper's dwelling very similar to that constructed in 1856, with window and doorway openings in exactly the same locations. There are only two differences. The artist drew eared window lintels, a hallmark of the Gothic Revival and Italianate styles, instead of the slightly pedimented lintels that were actually installed. (Artistic license could be blamed). Second, the illustration shows the doorway on the south elevation leading directly from the interior of the house to the exterior. This doorway is in the same location as the extant doorway that currently leads into the brick connecting building, and is therefore not a real difference.

The 1833 keeper's dwelling may have been ready for demolition in mid-1856. Requests were made in June and July of that year to remove heating apparatus and the telegraph office, respectively,

²⁸ Daw, "Light from a Lighthouse."

²⁹ Annual Report, 1856; Clipping File; RG 26; NA/DC.

from somewhere on the site.³⁰ These requests almost certainly relate to the old keeper's dwelling—it is the only structure that would have had a heating system, and it is known to have contained the telegraph office.

Construction of the Lighthouse and Assistant Keepers' Dwelling

As stated previously, the 1856 illustration (fig. 2) shows the buildings on the site at that time to have included the new keeper's dwelling. Also depicted are a freestanding outbuilding and the 1833 lighthouse. It is assumed that the outbuilding is the barn. It is not certain if this is the barn that was constructed on the site in 1797. However, it does appear to be the same outbuilding that appears in the earliest photographs of the site. The lighthouse shown in the illustration is clearly the 1833 tower, since it is radically different from the extant tower. (The differences are far too great to attribute them to artistic license.)

Preparations for the construction of the lighthouse tower continued through 1856. An undated drawing found in Coast Guard archives is entitled "Design for Light House Tower at the 'Highlands, Truro, Cape Cod'" (fig. 3). It includes balcony- and ground-floor plans, and a vertical section through the center of the tower. This drawing may have been a generic design that was being evaluated for use at Cape Cod; it might even have been a first proposal for construction. In either case, it closely resembles the tower as actually constructed. The only differences are in the ground-floor plan, concerning the relationship between the tower base and the covered walkway to the assistant keepers' dwelling. (The design of the stair to the tower's upper decks is also different from what exists today, but the documentation shows that the original stair was later replaced.) Other records show that a drawing of the proposed new tower existed by December 10,³¹ and that plate glass for the entry was delivered by December 23.³²

The letter register records the receipt of a September 9, 1856, letter from Engineer Franklin regarding the transmittal of the estimate of funds required for the removal of the lighthouse at Cape Cod, Highlands of Truro.³³ In the absence of the actual letter, the nature of this "removal" work is unclear; it may refer to the anticipated demolition of the second lighthouse tower.

Actual construction of the tower, the assistant keepers' dwelling, and the passages connecting them to each other and the main keeper's dwelling took place in 1857. On April 15, Franklin

³⁰ Letter book no. 41, p. 475, and no. 48, p. 27; Letters Received; RG 26; NA/DC. [These volumes have not survived; the information is from the Clipping File.]

³¹ December 10, 1856; letter book no. 47, p. 50; RG 26; NA/DC. [From the Finding Box.]

³² December 23, 1856; letter book no. 47, p. 74; RG 26; NA/DC. [From the Finding Box.]

³³ Engineer Franklin, Boston, MA, 2nd District, September 9, 1856; letter book no. 47, p. 21; Letters Received; RG 26; NA/DC. [From the Letter Register.]

transmitted a special estimate for building the Cape Cod lighthouse.³⁴ One somewhat unreliable source says that "a light was displayed from a temporary structure near the edge of the cliffs" while the construction of the new light was in progress.³⁵ In October, two letters were sent to Franklin by N. Libby from Highland Light. An excerpt from the first includes the following: "I think that we shall finish up by the 20th if the weather is as good as it has been for two weeks."³⁶ The second reveals: "As we shall finish all up this week ready to leave for home I shall need as near as I can ascertain a \$1000 or \$1200 to pay up all bills."³⁷ An Annual Report entry confirms that "*Cape Cod light-house* has been rebuilt and a first-order lens placed and lighted. Two houses for assistants have been built."³⁸ Expenditures for work in 1857 exceeded \$17,000.³⁹

The relationship of the various structures at the close of 1857 was as follows: the tower and the principal keeper's dwelling were joined by one passage, with a second passage running perpendicularly from the first to the assistant keepers' dwelling.

³⁴ Engineer Franklin, Portland, ME, 1st & 2nd Districts, April 15, 1857; letter book no. 47, p. 97; Letters Received; RG 26; NA/DC. [From the Letter Register.]

³⁵ Isaac M. Small, "Highland Light, This Book Tells You All About It" (Provincetown, MA: The Advocate Press, Howard Hopkins, 1891), p. 5.

³⁶ N. Libby to Capt. W.B. Franklin, Portland, ME, October 11, 1857; Lighthouse Expenses 1850-1900 (Expenses); Miscellaneous Materials Received by 5th Auditor 1792-1855, series 45 (Miscellaneous Materials); RG 26; NA/DC. [Note: the "Lighthouse Expenses" folder appears to have been misfiled in series 45.]

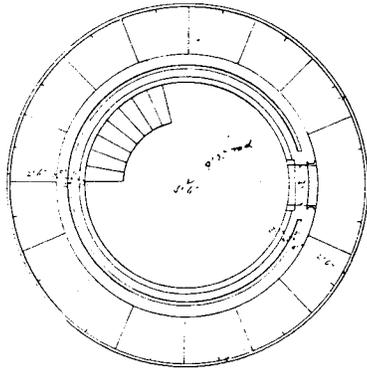
³⁷ N. Libby to Franklin, Secy. of the Lighthouse Board, Washington, October 14, 1857; Expenses; Miscellaneous Materials; RG 26; NA/DC. Engineer Franklin was also a Secretary of the Lighthouse Board, and so resided at least part of the time in Washington, D.C.

³⁸ Annual Report, 1857; Clipping File; RG 26; NA/DC.

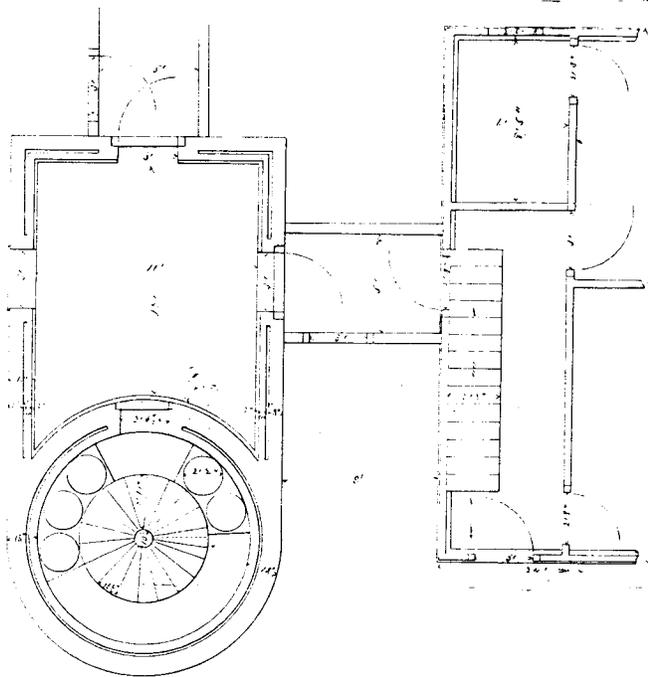
³⁹ "Statement of Appropriation, &c.," March 4, 1789-June 30, 1882 [published 1886]; Clipping File; RG 26; NA/DC.

*Design for Light House Tower
at the Highlands, Truro, Cape Cod.*

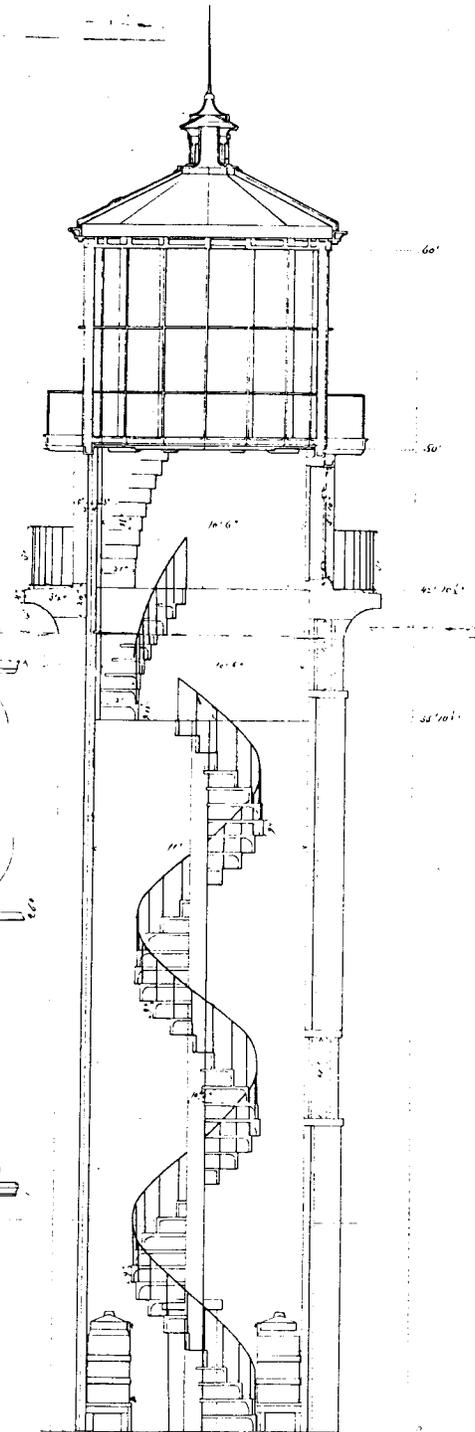
Scale $\frac{1}{8}$.



*Plan of Balcony.
Modified as by Fig. 1. Plate II.*



*Ground Plan.
Modified as by Fig. 2. Plate II.*



*Vertical Section thru Centre.
Modified as by Fig. 3. Plate II.*

Figure 3. Design for Light House Tower at Highlands, Truro, Cape Cod (no date).

Subsequent Development

1857 to 1898

The Role of the Lighthouse Board

The Lighthouse Board, which had been established in 1852, continued to administer aids to navigation through the remainder of the 19th century. The surge of modernization activity in the 1850's was soon followed by the massive rebuilding of southern lighthouses after the Civil War. After that, the Lighthouse board settled into an efficient routine. As a quasi-military entity, it sought to establish bureaucratic regularity in the management of its far-flung system. Following military precedent, the country was divided into 12 districts, each with a naval officer serving as inspector and with a military engineer. This continued policies of the previous lighthouse administration, but on a more systematic basis.

As will be explained subsequently, the number of lighthouses increased dramatically in the second half of the 19th century. Under these circumstances, and with continued pressure toward standardization, the individuality of any one lighthouse diminished. Each light's equipment and function was determined by its role within the overall system. The formation of a unified lighthouse service with highly regulated personnel management was a contributing factor. (Lighthouse keepers were placed under the Civil Service system in 1896, bringing an end to the long period of political interference, with its widely variable results.)⁴⁰

Despite the movement toward more systematic management of lighthouse affairs, it was still possible for local interests to make their needs felt through formal channels. In 1872, for example, the Light-House Engineer for the district in which Cape Cod was located noted that "The merchants and ship masters of Boston are also desirous of having an efficient fog signal at Cape Cod Light House and at Race Point also. If however they can have but one they would prefer the former."⁴¹

Activity at the Highland Light

Documentation has shown that at least three Highland structures were built prior to the close of 1857: the lighthouse, the keeper's dwelling, and the assistant keepers' dwelling, which was a duplex dwelling for two assistant keepers. The light was equipped with a first-order fixed Fresnel lens. Either at the same time or shortly thereafter, covered walkways were constructed connecting the dwellings to the lighthouse. The exterior details of the main keeper's dwelling were slightly

⁴⁰ Holland, *America's Lighthouses*, p. 40. There must have been some reluctance to surrender this "plum," since the major Civil Service reform act had been passed in 1883.

⁴¹ Light-House Engineer, 1st and 2nd District, Portland, ME, to 2nd District Engineer; letter book no. 297; Letters Received; RG 26; NA/DC.

different than those of the assistants' dwelling, although both were finished with vertical board-and-batten siding. The main keeper's house was trimmed with slightly pedimented lintels over doorway and window openings. All of the window openings visible in early photographs, except foundation openings, contained six-over-six double-hung sashes, including the openings in the tower below the lantern level. While both the tower and the small connecting structures were built of brick, only the tower was whitewashed; the connectors were painted to match the dwellings. The roofs appeared to be covered with wooden shingles or shakes.

A property survey conducted in 1885 (see fig. 10) shows that the location of the three structures was as close to the west property line as possible, and near the south corner. This site selection was no doubt based on the need to keep the buildings as far away from the eroding cliffs as possible, so the necessity for relocating or rebuilding the structures would be postponed for as long as possible.

Repairs were performed at the site as early as the end of 1857 and throughout 1858. An inspector reported on the condition of the cisterns, the specifics of which may be lost.⁴² Entries from May and June 1858 show that repairs of some type were required.⁴³ The letter register from August shows that the repairs at the "lighthouse, Cape Cod - Highlands of Truro" were completed.⁴⁴ The nature of those specific repairs are unknown.

On October 23, 1858, the "old Lanterns of Nauset L.H." were transferred to Cape Cod (Highlands).⁴⁵ As explained previously, the Lighthouse Board in 1856 intended for the new Highland Light to take the place of not only the earlier Highland Light, but also the nearby "Three Sisters" lighthouses at Nauset Beach. These had been constructed in 1838.⁴⁶ However, the removal of the three lighthouses' lanterns in October 1858 was not in preparation for their demolition; instead, they were outfitted with sixth-order Fresnel lenses that very same month.⁴⁷ Therefore, the reason for transferring Nauset's old lanterns to Cape Cod (Highland) Light is unknown; no instructions for their disposal were found.

⁴² Inspector Smith, December 10, 1857; letter book no. 69, p. 211, with one enclosure; Letters Received; RG 26; NA/DC. [From the Letter Register.]

⁴³ "Chart of repairs as necessary, May 26, 1858"; letter book no. 62, p. 154. "Repairs will be commenced on, June 18, 1856"; letter book no. 62, p. 149; RG 26; NA/DC. [From the Finding Box.]

⁴⁴ W.L. Dearborn, Clerk of Works, Boston, MA, 2nd District, August 16, 1858; letter book no. 62, p. 138; Letters Received; RG 26; NA/DC. [From the Letter Register.]

⁴⁵ October 23, 1858; letter book no. 62, p. 123; Letters Received; RG 26; NA/DC. [From the Letter Register.]

⁴⁶ A. Berle Clemensen and William W. Howell, with H. Thomas McGrath and Elayne Anderson, *Historic Structure Report - Three Sisters Lighthouses, Cape Cod National Seashore, Massachusetts* (Denver Service Center: U.S. Department of the Interior, National Park Service, 1986), pp. 11-12.

⁴⁷ Clemensen, Howell, McGrath, and Anderson, p. 16.

Cape Cod (Highland) Light was photographed as early as 1859, when the documentation shows that such photographs were transmitted.⁴⁸ Figures 4 and 5 may date to that time: they show the keeper's dwelling with its earliest vertical board-and-batten siding. Two other historic photographs (figs. 6 and 7) also show the board-and-batten siding. However, Ross Holland attributes the 1859 date to figure 4, a copy of which he located in the National Archives.⁴⁹ This photograph is very clear. It shows the whitewash on the foundation of the keeper's dwelling and the tower, the same dark paint color on the brick connecting passageways and the frame dwellings, and the lantern deck and catwalk appearing as though they were unpainted or painted in a light color. The only original exterior paint remaining on original building fabric was found on a basement window frame, at the north end of the west side of the main block of the keeper's dwelling. This opening had been covered during the later relocation of the main entrance, and so had been protected from subsequent alterations. The frame's paint sample showed that the original finish (and at least one additional finish) was a dark brick-red color, which probably is the color seen in all four early photographs.

Other repairs were completed in 1865, the nature of which are unknown.⁵⁰ Additional maintenance and alterations, but no new construction, occurred in 1868 and 1869, based on National Archives clipping file entries. The first entries from 1868 appear to relate to the dwellings. The roof valley was releaded and the shingling was renailed. This shingling was probably roof shingling, since the dwellings were sided with vertical board-and-battens and the lighthouse was brick. However, it is not known if this roof repair occurred on one or both of the dwellings. The "saddle-boards" and window frames were packed with paint cement, and the storm doors were repaired.⁵¹ (The derivation of paint cement was not found, but a publication dated 40 years later suggests that zinc dust or a combination of zinc oxide and fine Paris white, mixed with "33 degrees Be waterglass," could form a waterproof putty that became hard in 6 to 8 hours.⁵²) Perhaps paint cement was some sort of putty that was used as a type of weatherstripping, and which contained paint pigment as an ingredient.

Also in 1868, the floor of the covered walk was repaired. One chimney received an arched top in place of a blown-off ventilator. Also, call-bell fixtures were set. Later references indicate that a call-bell system existed between the dwellings, and between the lighthouse and dwellings. Three rooms were papered, but the specifics of location are unknown.⁵³

⁴⁸ February 14, 1859; letter book no. 62, p. 93; RG 26; NA/DC. [From the Finding Box.]

⁴⁹ Holland, *America's Lighthouses*, p. 82.

⁵⁰ September 7, 1865; letter book no. 180, p. 102; RG 26; NA/DC. [From the Finding Box.]

⁵¹ Annual Report, 1868; Clipping File; RG 26; NA/DC.

⁵² The Painters Magazine (New York), *739 Paint Questions Answered*, 2nd ed. (London: The Trade Papers Publishing Co. Ltd., 1904), p. 32.

⁵³ Annual Report, 1868; Clipping File; RG 26; NA/DC.

The newly arched chimney top may be that visible on the west chimney of the assistant keepers' dwelling in figure 4, which would date the photograph to no earlier than 1868. The less-sharp image in figure 5 also appears to show the same chimney lacking a ventilator. Figure 6 depicts an additional ventilator missing from the main chimney of the keeper's dwelling, suggesting the photograph was taken at a later date than figures 4 and 5. Figure 7 shows that all ventilators had been removed, putting it last in the chronological sequence of all four photographs. It is believed that the later two photographs also show the brick-red painted finish on the dwellings and connector buildings, but the color may be faded in figure 6. The lantern deck and catwalk appear to have been painted in a dark color by the time figure 6 was taken.

The lighthouse apparently needed reinforcement in 1868, since "tie rods [were] fitted around [the] parapet wall outside, the lower end of each having a cross head bolted to the gallery stone with wedge bolts, and the upper end going through the projecting iron deck of [the] lantern with a nut turned on." (These tie rods are still in place, and their installation date is helpful in dating photographs.) Lantern glass was set; the tower stairways and decks were painted; the illuminating apparatus was examined and the lamps, etc., were repaired; ropes were supplied for whitewashing tackle; and wick rings, stove fixtures, and oil butts were repaired.⁵⁴

In 1869 the illuminating apparatus was overhauled, "the timepiece cleaned and repaired; a door lock for the Assistants' Dwelling and a chest of tools supplied."⁵⁵ Further additions to the site took place in 1873 when the fog signal and engine house were constructed east of the main structures, nearer to the edge of the bluff. A fuel shed was also erected at that time.⁵⁶

No documentation of other site developments was found for the period between 1857 and 1868. In the latter year, a plank sink drain was laid and a cesspool was dug, and 300 feet of enclosure fence was rebuilt.

Unspecified repairs were made to the buildings by 1873.⁵⁷ By 1880, conditions had gotten so bad that a recommendation was made to rebuild the keepers' dwellings.⁵⁸ Apparently the Lighthouse Board took notice: documentation from 1881 stated that the dwelling (singular) had been refloored, shingled, and clapboarded; new doors were fitted; and old doors and windows were repaired. Subsequently, it was reported that "The station is now in excellent condition."⁵⁹ The replacement of the original vertical board-and-batten siding on both dwellings with clapboards is confirmed by a historic photograph dated September 13, 1886 (fig. 8).

⁵⁴ See footnote 53.

⁵⁵ Annual Report, 1869; Clipping File; RG 26; NA/DC.

⁵⁶ Annual Report, 1873; Clipping File; RG 26; NA/DC.

⁵⁷ Annual Report, 1873; Clipping File; RG 26; NA/DC.

⁵⁸ Annual Report, 1880; Clipping File; RG 26; NA/DC.

⁵⁹ Annual Report, 1881; Clipping File; RG 26; NA/DC.

However, additional work was necessary the very next year. The 1882 report stated that "The plastering in the principal keeper's dwelling was repaired and 235 feet of drain-pipe were laid."⁶⁰ Perhaps the interior plaster was not replaced in 1881, and therefore was in need of work in 1882. (The extensive work in 1881 also may have damaged the plaster.) Alternatively, the interior plaster may have been replaced in 1881, but in so poor a manner that it had to be redone. The report's reference to drainpipe may suggest that the plank sink drain laid in 1868 was replaced.

Two notations from the early 1880's refer to the light itself. The first mentions the "discontinuance of the light,"⁶¹ and the second mentions an introduction to illuminating apparatus measurements, etc.⁶² Neither provides any other specific information.

The historic photographs that have been dated between 1881 and 1898 (figs. 10-14) do not provide much information about the light, because most of them show the curtains inside the lantern in a closed position. These curtains were necessary to protect the Fresnel lens during the day, because sunlight focused back through the glass prisms of the lens would cause enormous heat in the center of the lens, as well as the discoloration of the prisms themselves. Figure 10, dated September 13, 1886, is the only one in which the curtains are open. It reveals a Fresnel lens that appears to be of the first order, the same as installed in 1857.

A survey of the property was conducted on December 18 and 19, 1885, and printed on March 27, 1886. It consisted of two drawings, both signed by E. P. Adams, Light-House Surveyor, and W. S. Stanton, Major of Engineers, Engineer of 1st and 2nd Light-House Districts. Stanton forwarded a tracing of the survey on April 1, 1886.⁶³

One of the drawings (fig. 8) details the immediate area around the main buildings; it also shows the more distant fog-signal building and coal house (engine house) in an inset block. A note in the inset directs that "for position [of the buildings] in relation to [the] 'light' see reservation plan." This note refers to the other drawing of the survey (fig. 9), which is a plot plan. This drawing was found in two separate archives. While the clearer of the two images is included in the body of this report, some of its notations have disintegrated; the second copy is included in Appendix K.

⁶⁰ Annual Report, 1882; Clipping File; RG 26; NA/DC.

⁶¹ October 13, 1882; letter book no. 634, p. 624; RG 26; NA/DC. [From the Finding Box.] It is not known what was meant by "discontinuance of the light," but there is no indication that the light was ever extinguished.

⁶² July 17, 1883; letter book no. 586, p. 30; RG 26; NA/DC. [From the Finding Box.]

⁶³ Engineer Stanton, April 1, 1886; letter book no. 645, p. 460; Letters Received; RG 26; NA/DC. [From the Finding Box.]

The survey provides a wealth of information about many aspects of the lighthouse tract. Perhaps most importantly, it indicates that the following buildings were extant at that time:

- Light Tower
- Principal Keeper's Dwelling
- First & Second Assts.'s Dwelling
- 2 passageways
- Principal Keeper's Wood House
- First Asst.'s Wood House
- Second Asst.'s Wood House
- Fog Signal House
- Coal House—formerly called the engine house
- Barn & Hen Houses
- Merchant Marine Telegraph

These same buildings probably existed in 1873, based on the lack of written documentation for construction work between 1873 and 1885. A possible exception is the barn. The 1885 survey shows it in the southwest corner of the property. This differs from the location of the barn in previous illustrations—immediately south of the lighthouse. A 20th-century annual Coast Guard report (n.d.) states that a new barn was built on the site in 1888. Taken together, this information suggests that the old barn was removed, and a new barn was built in a new location, shortly before 1885. (The 20th-century report seems to have erred slightly in terms of date.)

In addition, the survey provides information about the appearance of the structures on the site. The first (or detail) drawing of the survey notes that the lighthouse was constructed of brick, as were the adjoining passageways, while all of the other structures were of wood construction. The drawing also provides measurements for all the structures and the locations of exterior steps, which presumably led to exterior doorways.

The survey also offers information about structures other than those directly related to the lighthouse. For example, it indirectly indicates the existence of the Highland Lifesaving Station, seven-eighths of a mile west of the light. The detail drawing shows a cross drawn in the picket-fence line directly in front (to the west) of the principal keeper's dwelling, with the notation "gate" next to it. This is quite likely the turnstile that Stanton reported on May 15 had been installed in the fence for the convenience of the lifesaving patrol.⁶⁴

The plot plan also shows the privately operated Merchant Marine Telegraph building outside the northwest corner of the property, distinguished by the letter "J". This was the Cliff House, built in 1880 as the home of Isaac M. Small, the longtime "Marine Observer" and operator of the telegraph station. An 1891 pamphlet states the following about the structure: "The building just north of the lighthouse is the home of the Marine Observer, connected by Electric Telegraph directly

⁶⁴ Engineer Stanton, May 15, 1886; letter book no. 645, p. 708; Letter Received; RG 26; NA/DC. [From the Finding Box.]

with Boston and by Government Telephone with all the Life Saving Stations on the coast.”⁶⁵ As stated previously, the telegraph office was probably located in the third keeper’s dwelling when the latter was built in 1857. It is not known if the office remained there until the Cliff House was built in 1880, nor exactly when prior to 1885 it was moved to the Cliff House.

The main reason for conducting the 1885 survey, however, appears to have been related to anticipated changes to the site’s property fencing. This idea is based on the large number of references in the documentation from 1886 to such changes. Prior to that year, the main group of buildings was surrounded by a wooden picket fence, as shown in the survey’s detail drawing (fig. 8). A board-rail fence extended at least to the south of the property (fig. 10). Engineer Stanton wrote on April 15 that he was rebuilding fences and buying the fence material through an open purchase.⁶⁶ On May 11, R.J. Davis wrote that he was placing a barbed-wire fence, under protest of their neighbor “J. Small.” The latter was undoubtedly abutter Isaac M. Small, whose first initial “I” was often written looking much like a “J.”⁶⁷ (Small apparently wrote his own letter of protest in June, requesting to meet with the engineer secretary.⁶⁸)

The date of installation for the barbed-wire fence and its wood posts is unclear. Figure 10, taken on September 13, 1886, shows the earlier board fence. However, it existed by the end of that year, since a notation from the 1886 Annual Report states that “the light-house reservation was inclosed by a barbed-wire fence.”⁶⁹ Apparently the barbed-wire fencing was used to replace the earlier board-rail fence, but was also extended to enclose the entire property. A photograph dated 1886-1898 (fig. 11) shows that the picket fence remained standing after the barbed-wire fencing had been installed. Other activity at the site in 1886 included the addition of three new smokestacks to the fog-signal building. These had been built by the time figure 10 was taken on September 13, 1886. Another notation in the 1886 Annual Report said: “three new smoke stacks were supplied.”⁷⁰

Figure 11 is the earliest of a group of photographs taken of the site after September 1886, but before April 1898. It shows that the trim of the dwellings was painted a contrasting color to the bodies by this time (probably the light gray found in the paint sample from the basement-window frame). The remainder of the group—figures 12 to 14—were all taken the same day, based on

⁶⁵ Small, p. 15.

⁶⁶ Engineer Stanton, April 15, 1886; letter book no. 645, p. 534; Letters Received; RG 26; NA/DC. [From the Finding Box.]

⁶⁷ R. J. Davis, May 11, 1886; letter book no. 674, p. 350; Letters Received; RG 26; NA/DC. [From the Finding Box.]

⁶⁸ I. Small, June 28, 1886; letter book no. 674, p. 700; Letters Received; RG 26; NA/DC. [From the Finding Box.]

⁶⁹ Annual Report, 1886; Clipping File; RG 26; NA/DC.

⁷⁰ Annual Report, 1886; Clipping File; RG 26; NA/DC.

identical attributes such as the height of various window shades, the positions of exterior doors, and staining. These photographs indicate that the picket fence was removed from the west property boundary before 1898. The trim of all structures was at that time still painted in a contrasting color.

Inspector Wilde reported on March 4, 1891, that the keeper's dwelling had been struck by lightning.⁷¹ Two subsequent entries within the following week recorded that damage had occurred and that a requisition for \$140.00 was needed for repairs.⁷² The lightning strike occurred on February 28, requiring extensive and immediate repairs to the "clapboarding, masonry, plastering, interior joiner work, shingling, and lead flashing."⁷³ The description of the damage suggests that the building suffered severely, possibly from fire.

Authority for placing a Kane signal staff on the site was requested at the end of April 1898.⁷⁴ Six weeks later a description and photograph pertaining to the site were transmitted, but the nature of each was not specific.⁷⁵ It is believed that the Kane signal staff was a black vertical bar attached to the tower lantern. Based on this assumption, one photograph (fig. 15) and one postcard (fig. 16) date to this time: the photograph could be the one that was transmitted in 1898. Both images show that the trim of the structures had been painted in a darker contrasting color by this time, probably a dark gray found in paint samples.

No changes or additions to the site or ancillary structures were made between 1891 and 1898, according to the documentation.

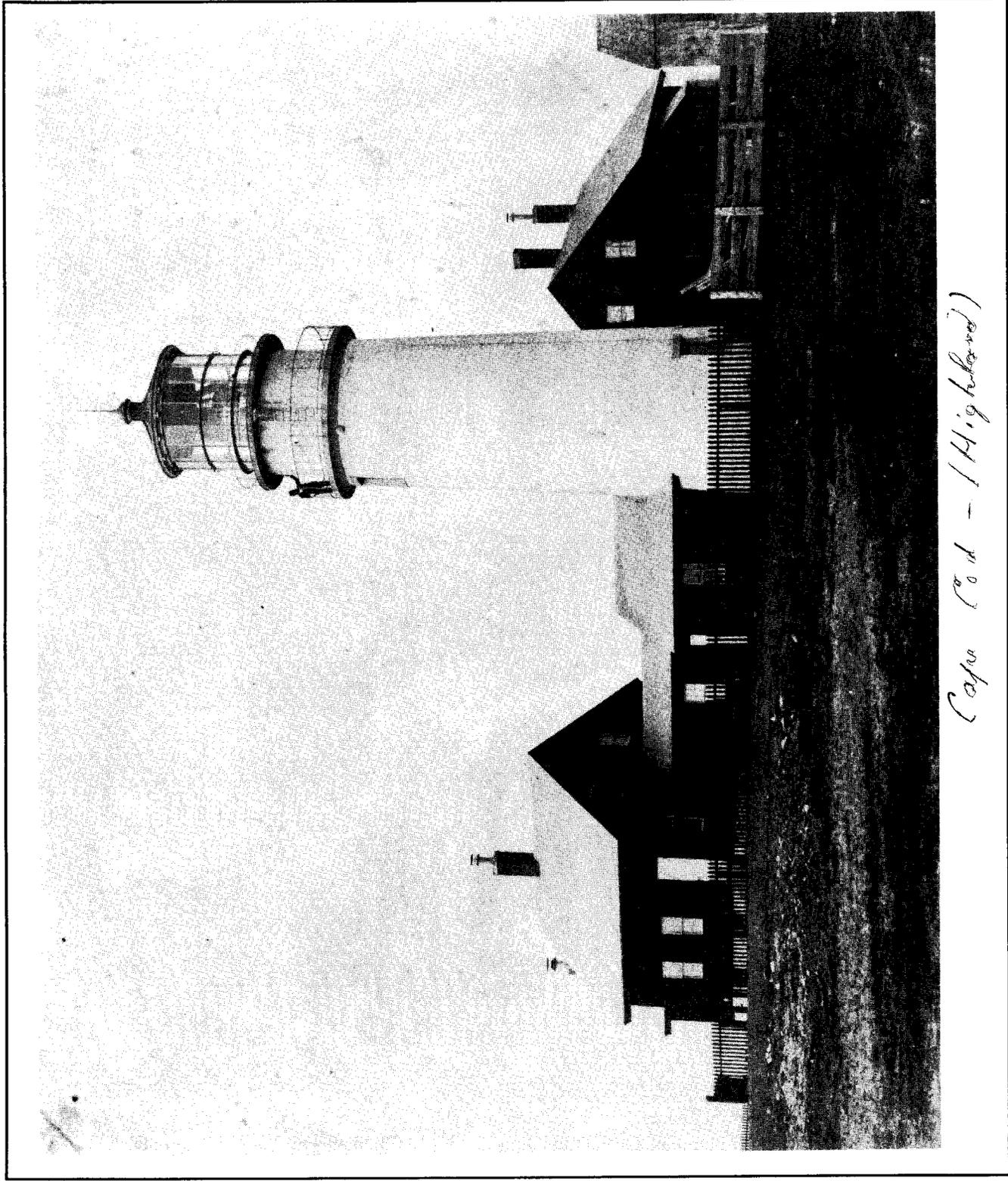
⁷¹ Inspector Wilde, March 4, 1891; letter book no. 878, p. 760; Letters Received; RG 26; NA/DC. [From the Finding Box.]

⁷² Engineer Stanton, March 7, 1891; letter book no. 879, p. 412; and March 11, 1891; book 879, p. 422; Letters Received; RG 26; NA/DC. [From the Finding Box.]

⁷³ Annual Report, 1891; Clipping File; RG 26; NA/DC.

⁷⁴ April 30, 1898; letter book no. 1214, p. 1052; Letters Received; RG 26; NA/DC. [From the Finding Box.]

⁷⁵ June 9, 1898; letter book no. 1215, p. 564; Letters Received; RG 26; NA/DC. [From the Finding Box.]



Cape Cod - (Highland)

Figure 4. Cape Cod Light, looking northeast, between 1857 and 1868.

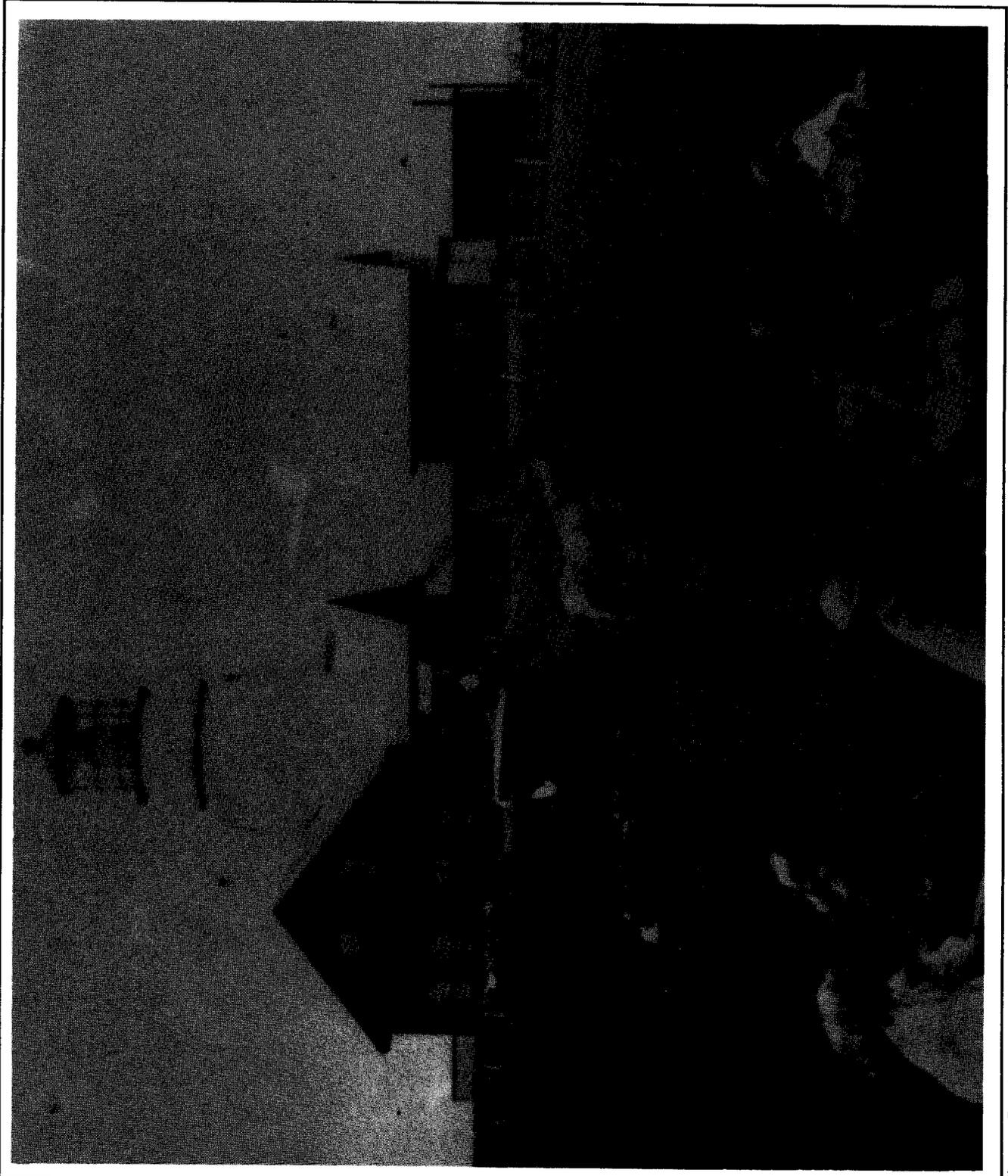


Figure 5. Cape Cod Light, looking north-northwest, between 1857 and 1868.

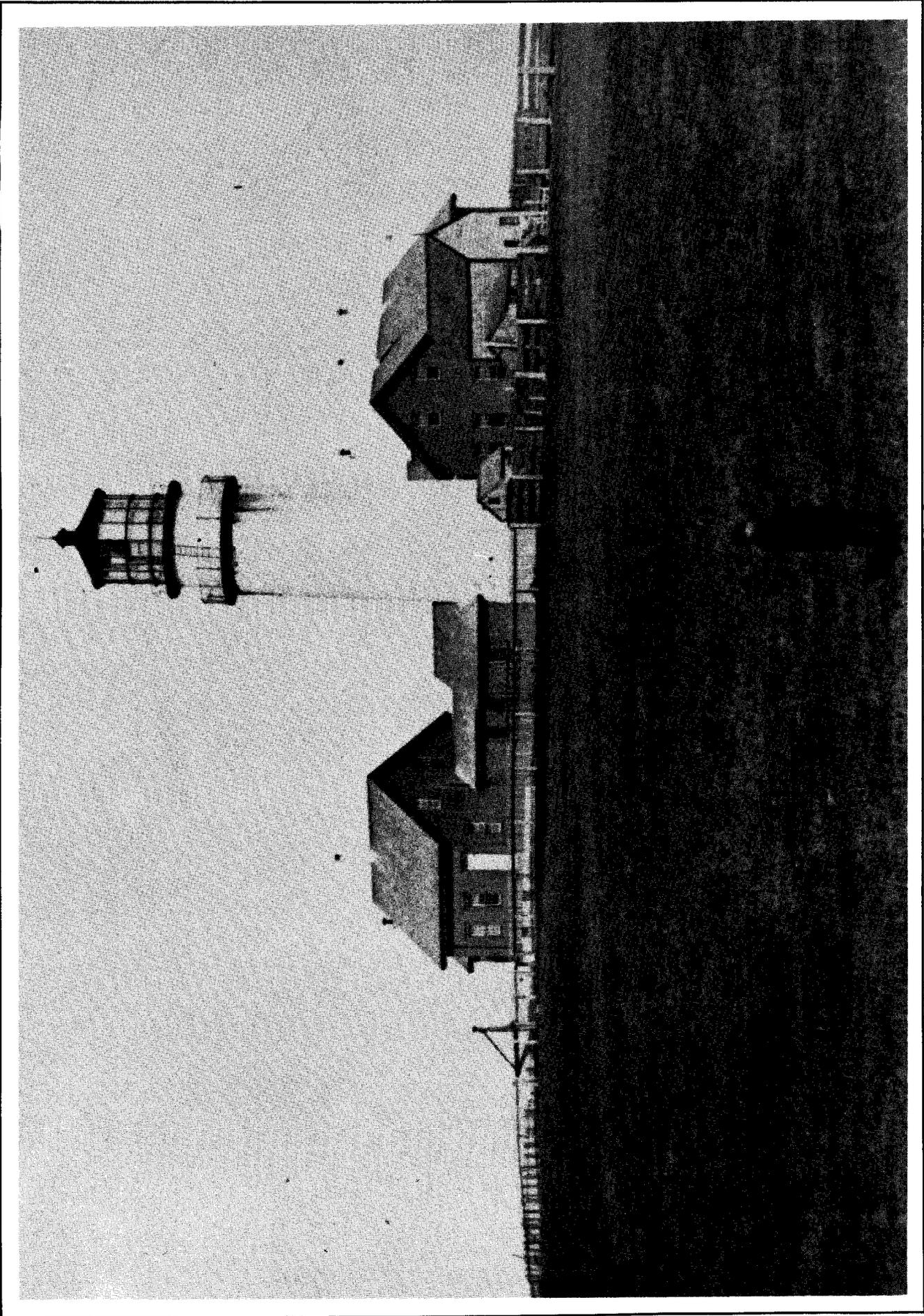


Figure 6. Cape Cod Light, looking northeast, between 1868 and 1881.

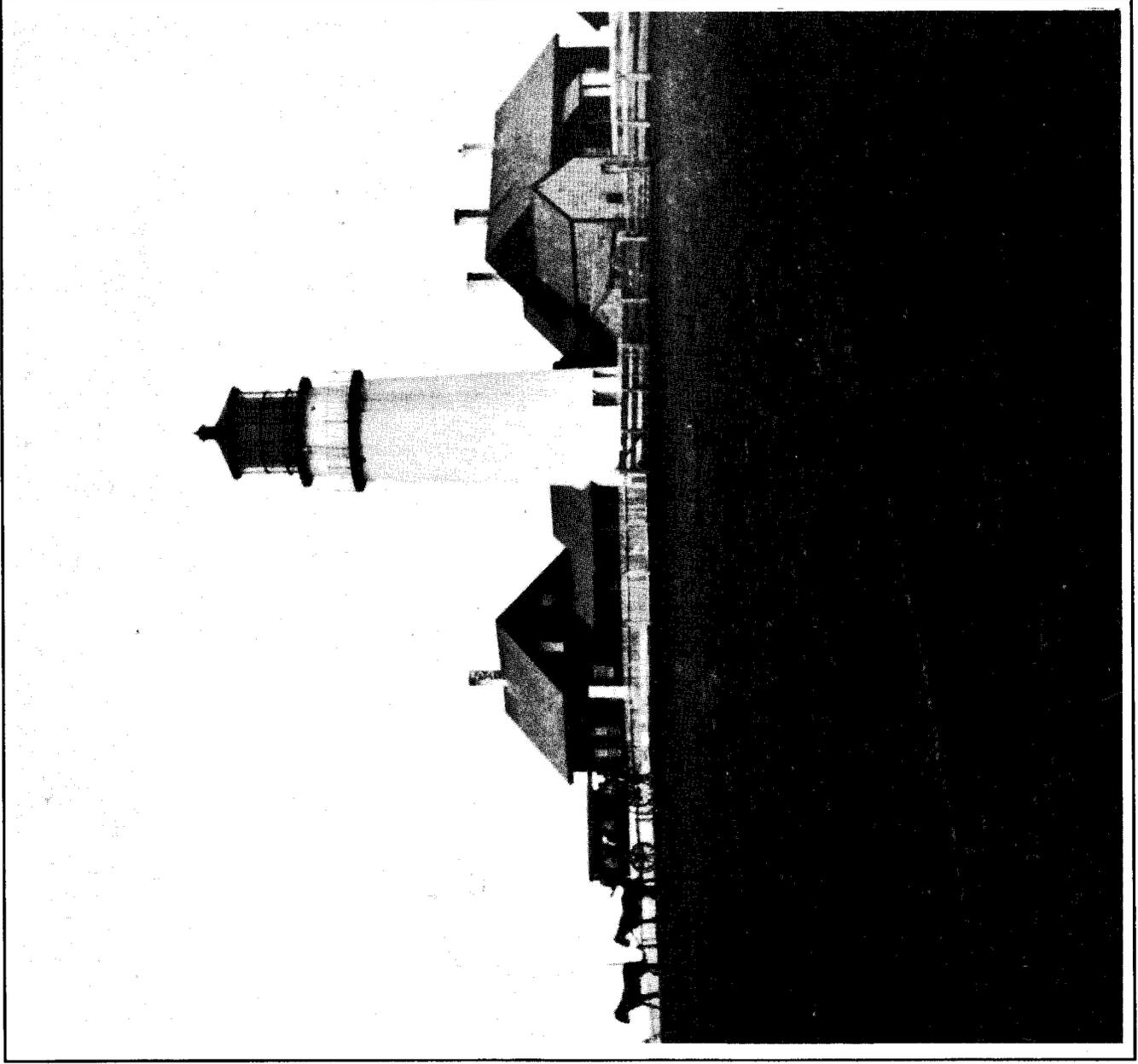


Figure 7. Cape Cod Light, looking northeast, between 1868 and 1881.

CAPE COD, MASS.

LIGHT STATION.

Buildings Surveyed Dec. 18 & 19, 1885, by E. PADAMS, C.E., L.H. Surveyor.

Scale, 230

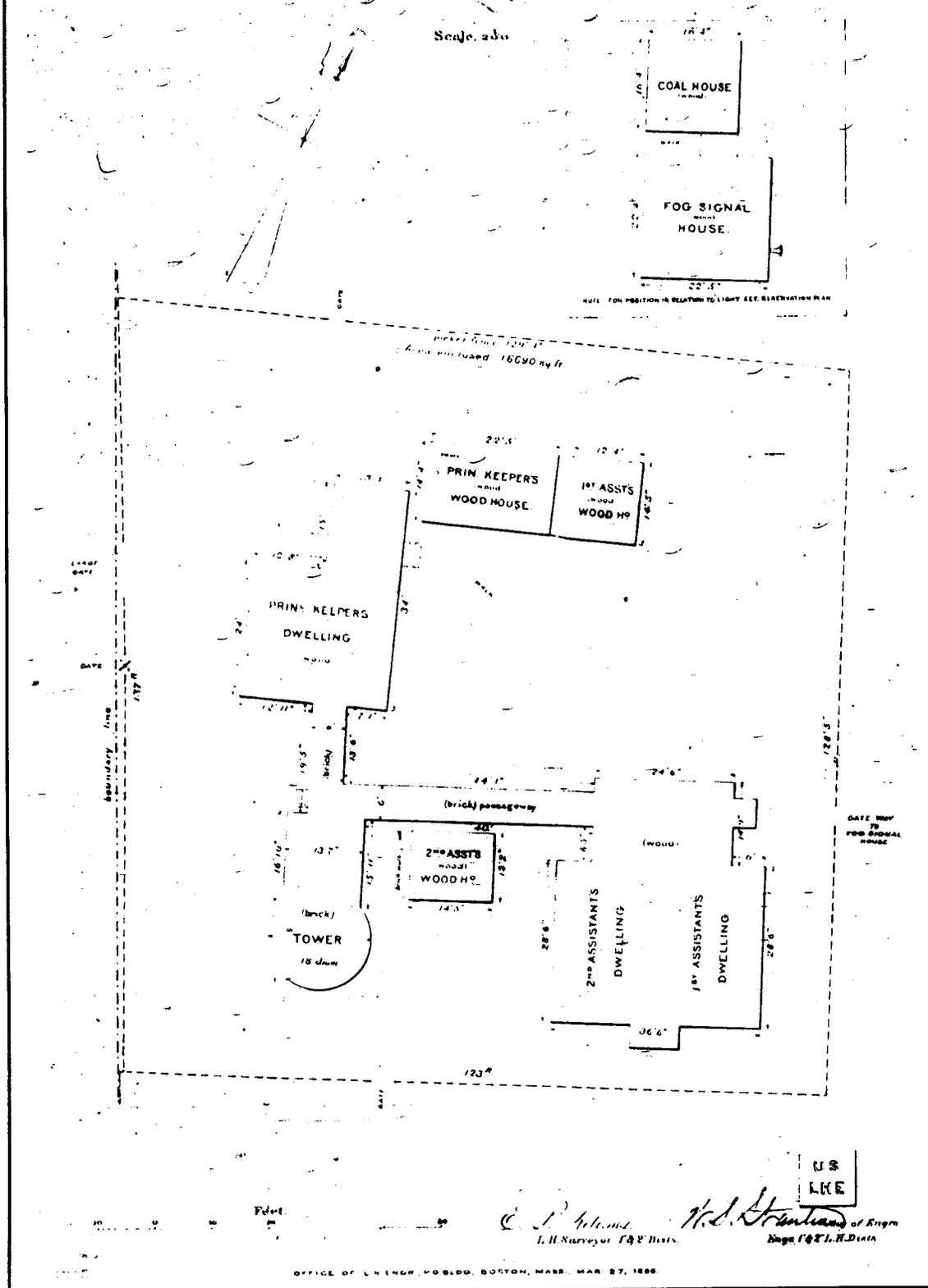


Figure 8. Cape Cod Light Station, 1885 survey.

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., I.H. Surveyor.

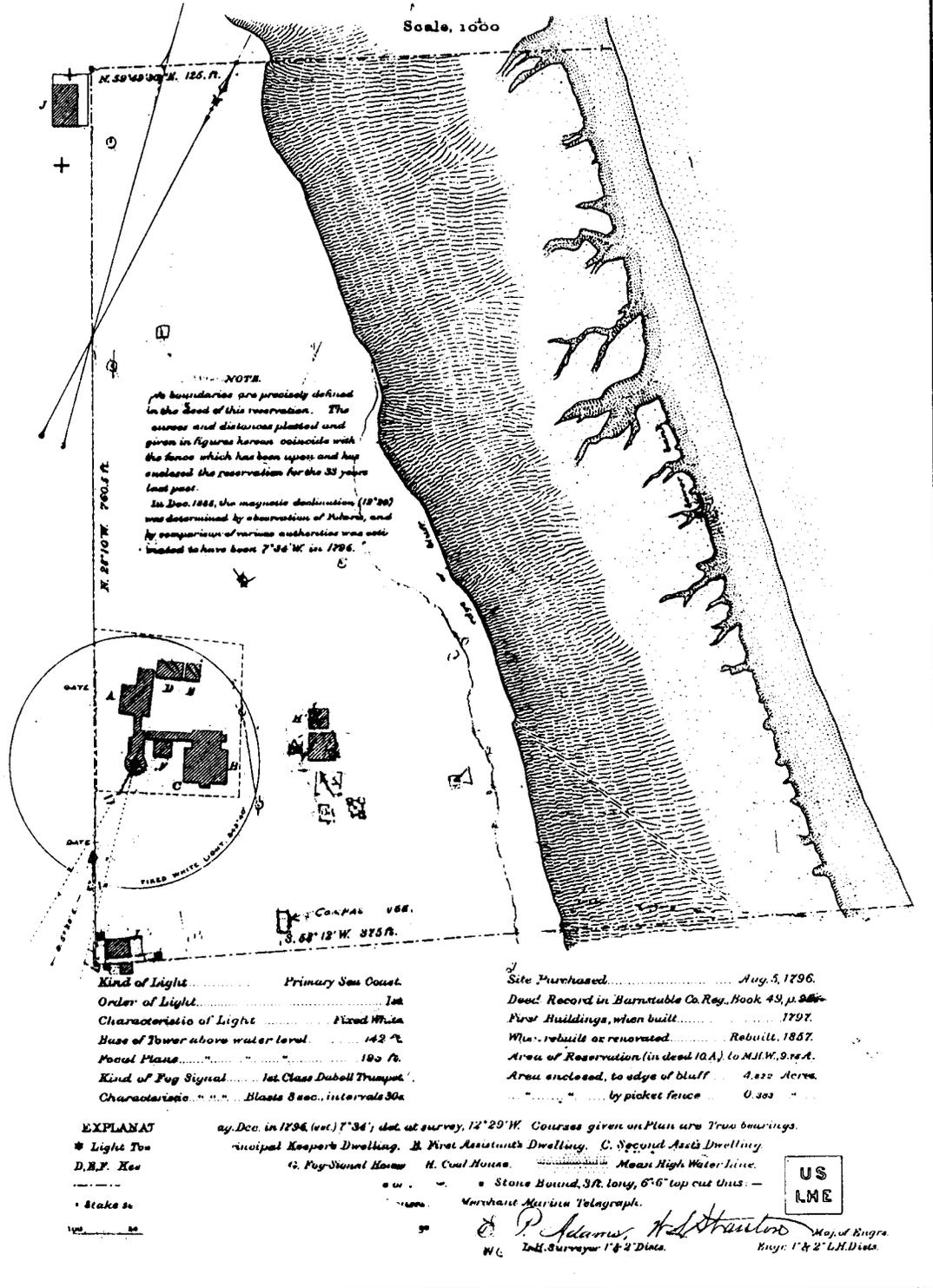


Figure 9. Cape Cod Light Station, 1885 survey.

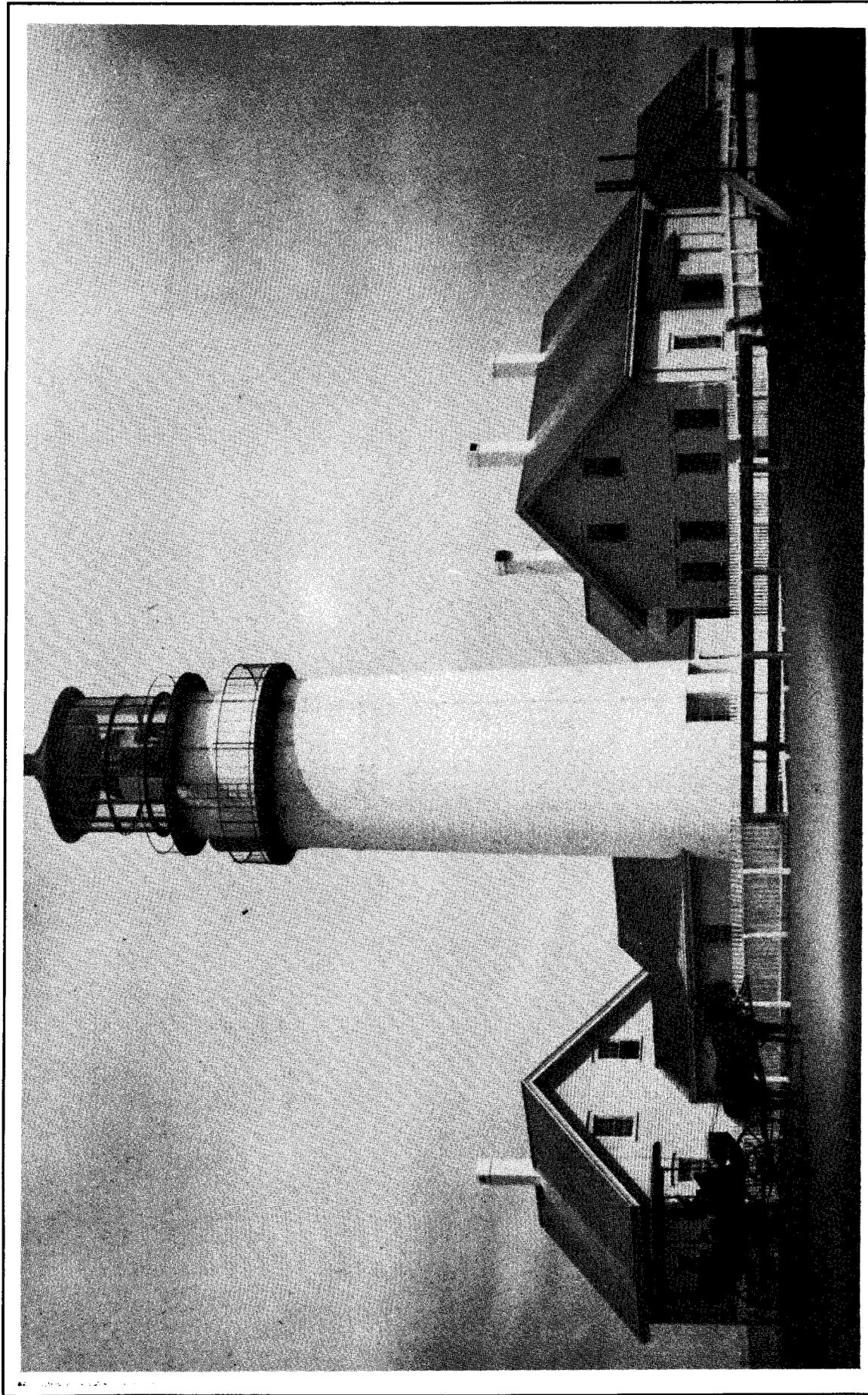


Figure 10. Cape Cod Light, looking northeast, September 13, 1886.

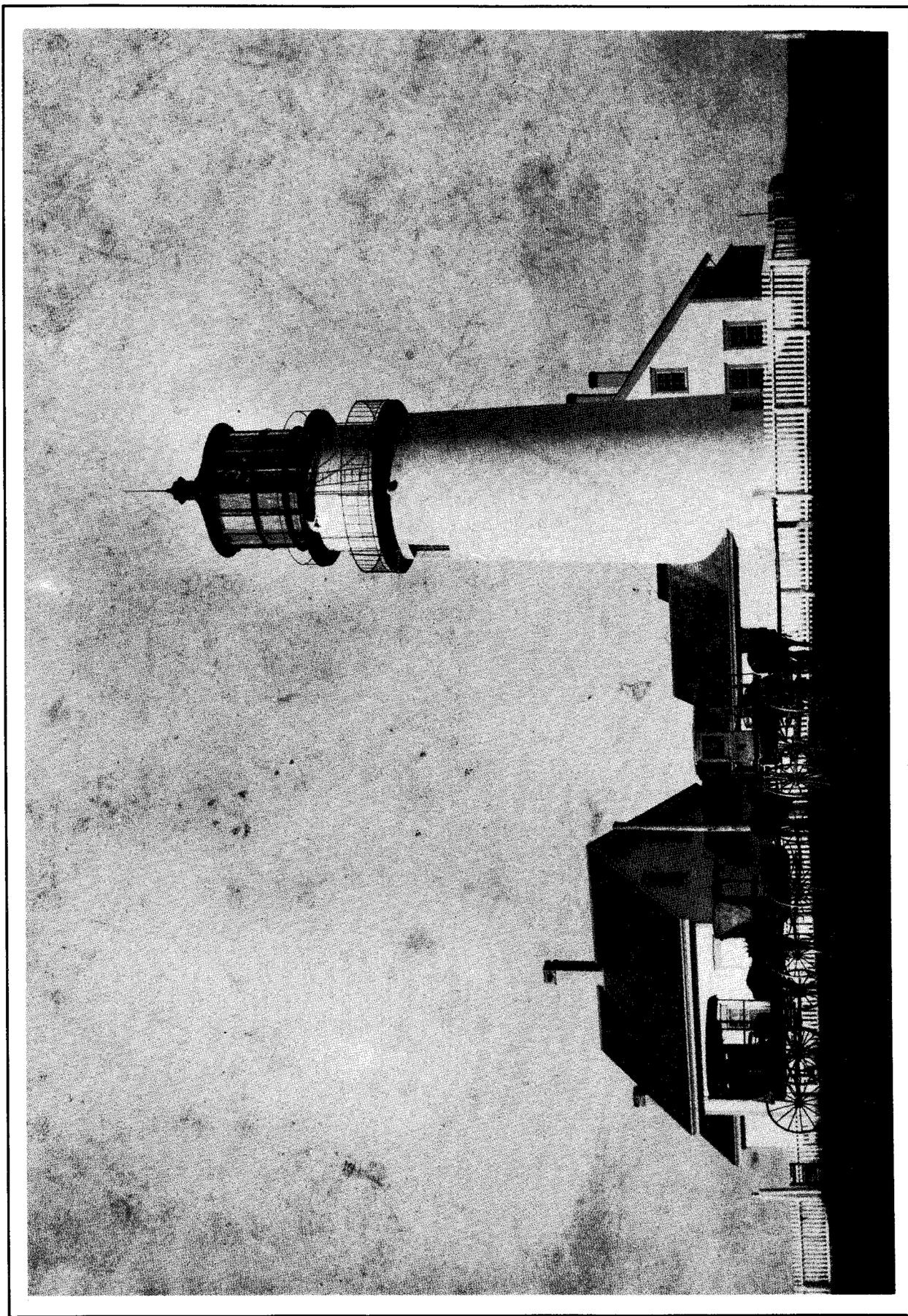


Figure 11. Cape Cod Light, looking northeast, between 1886 and 1898.

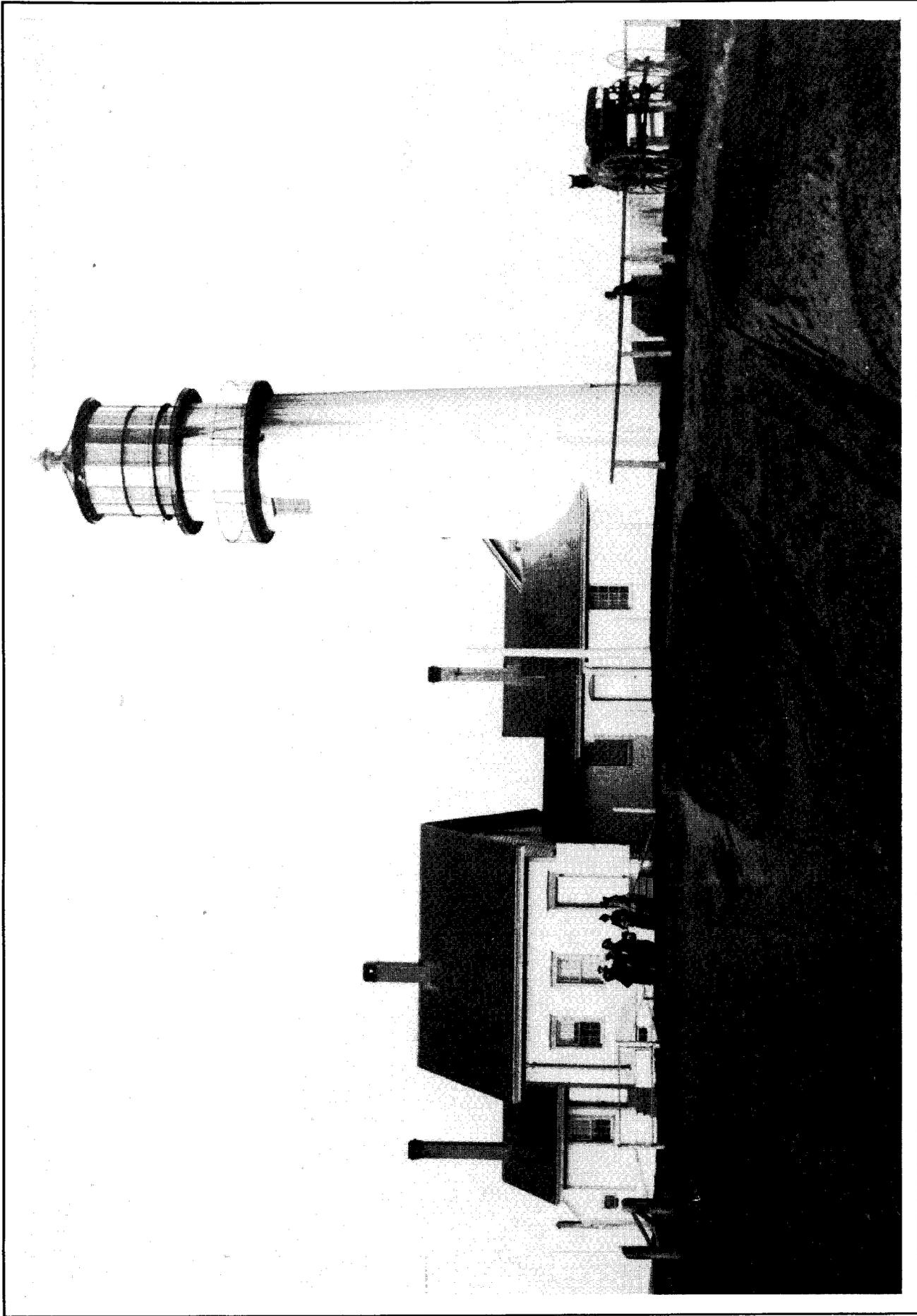


Figure 12. Cape Cod Light, looking northeast, between 1886 and 1898.

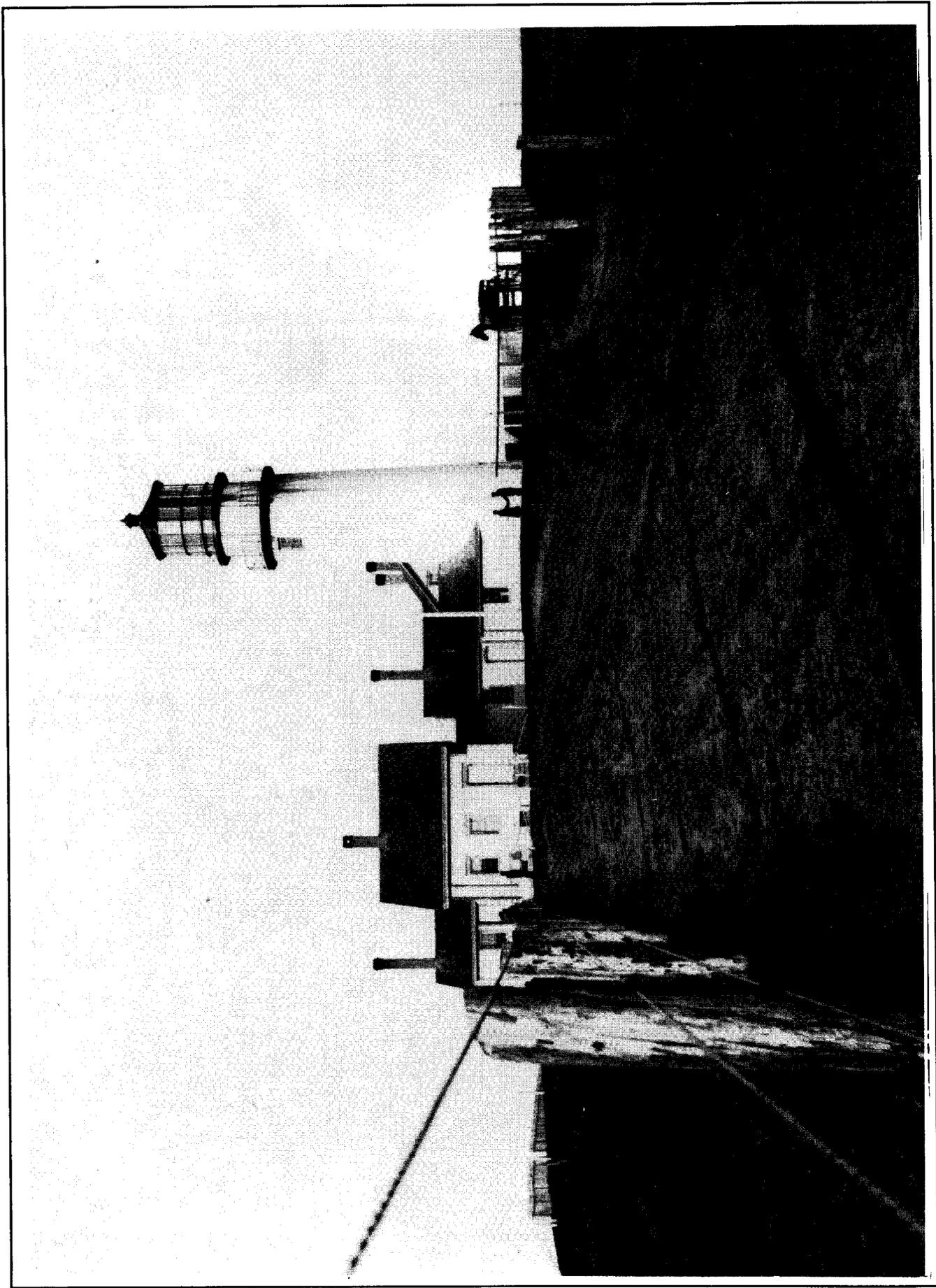


Figure 13. Cape Cod Light, looking east, between 1886 and 1898.

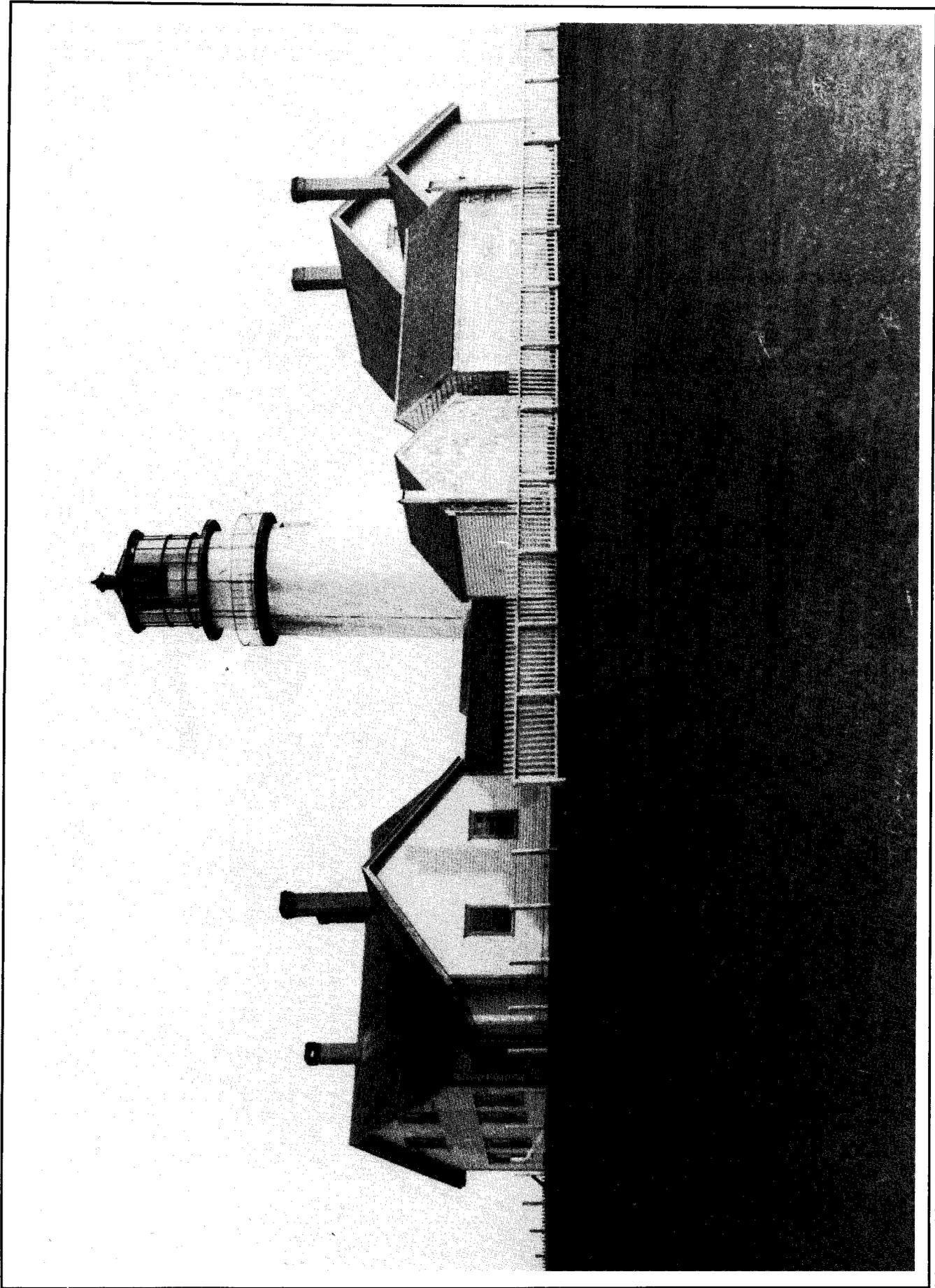


Figure 14. Cape Cod Light, looking east, between 1886 and 1898.

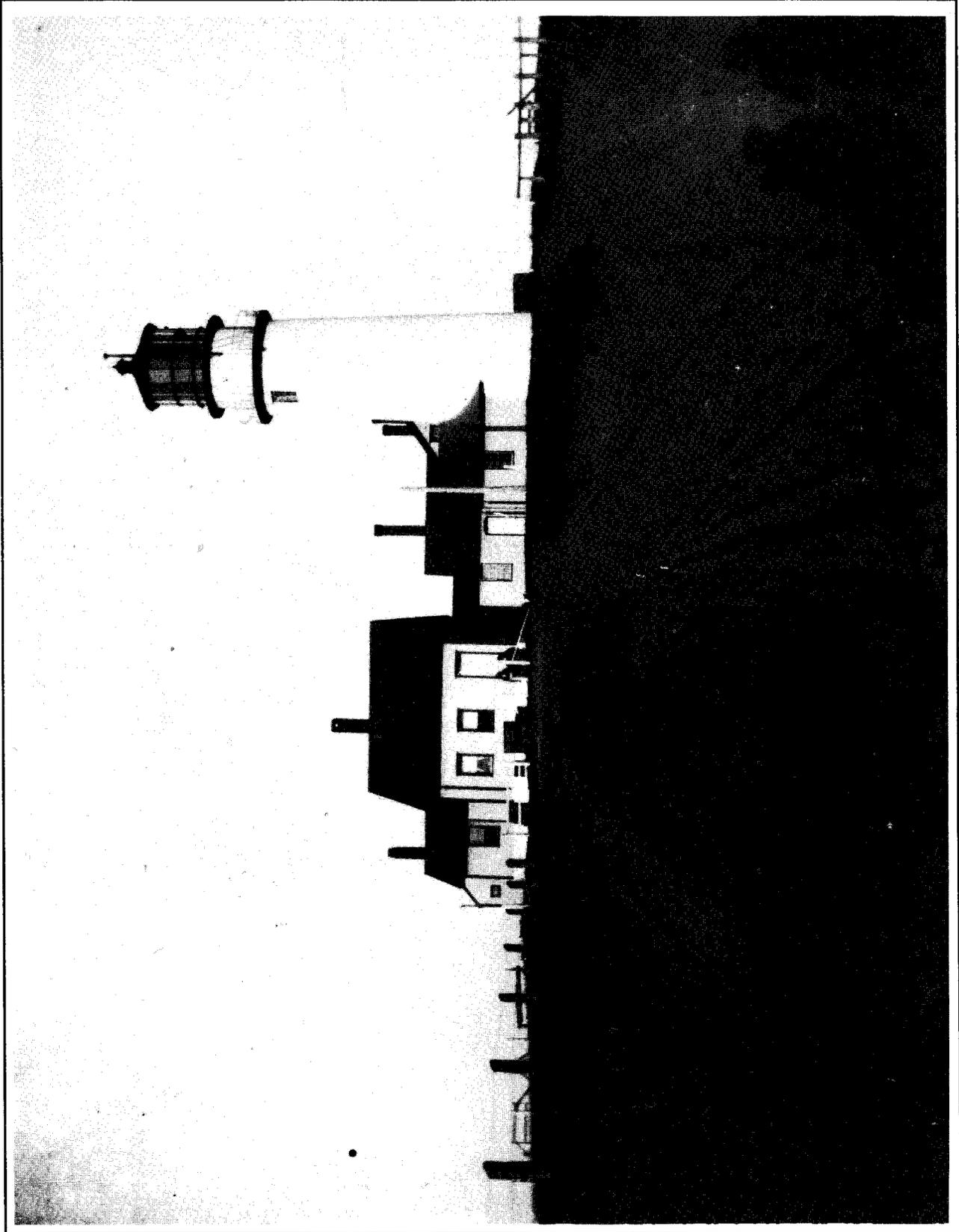


Figure 15. Cape Cod Light, looking east, circa 1898.

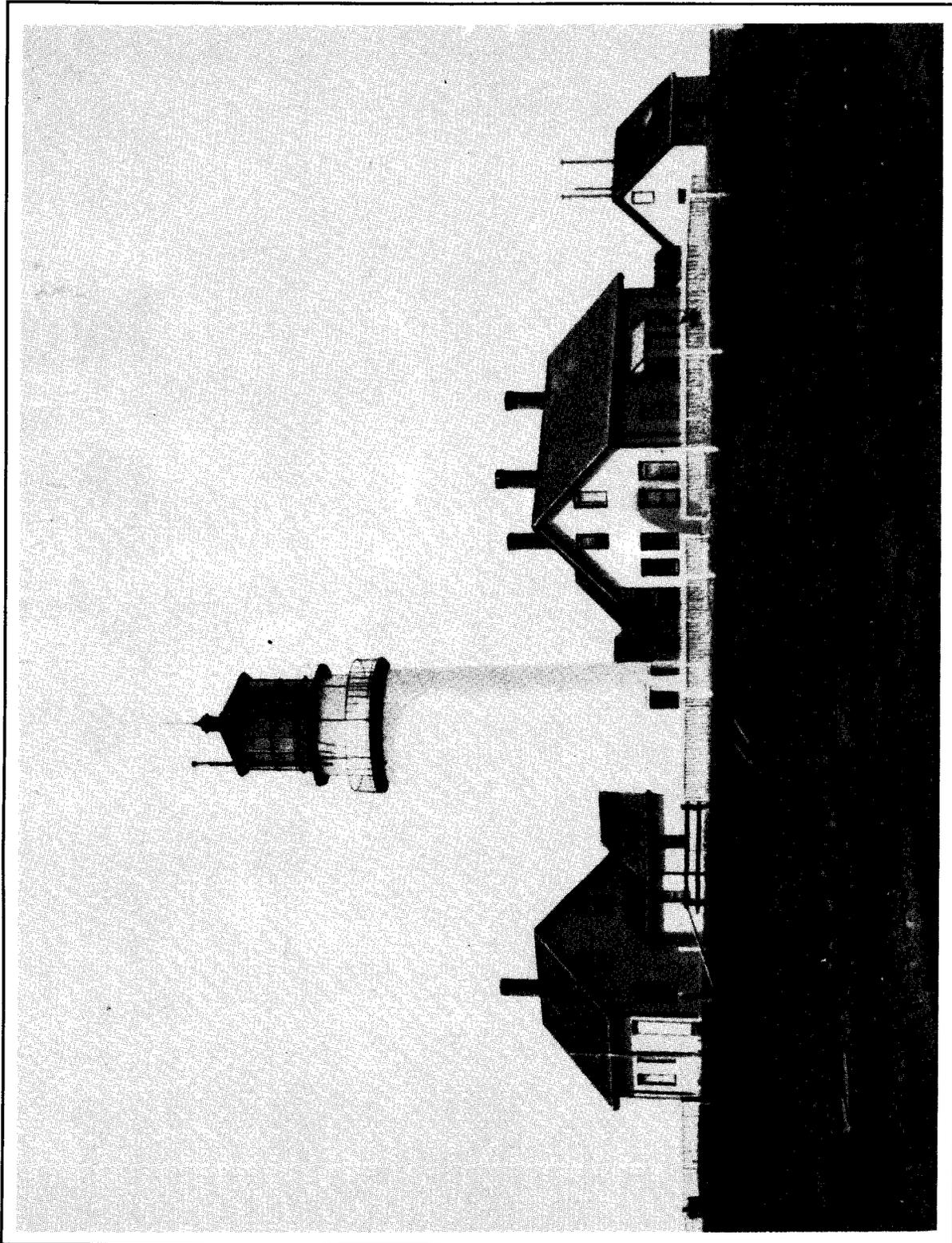


Figure 16. Cape Cod Light, looking northeast, circa 1898.

1898 to 1947

The Bureau of Lighthouses and the U.S. Coast Guard

The Lighthouse Board, which had been established in 1852, continued to administer aids to navigation until 1910. (However, in 1903 it was transferred from the Treasury Department to the Department of Commerce—then the Department of Commerce and Labor.)⁷⁶ During the board's existence, the number of aids to navigation in the United States increased dramatically. In 1852 there were more than 1,500 aids, of which 331 were lighthouses; by 1913, there were 12,824 aids, of which 1,462 were lighthouses.⁷⁷

However, complaints against the Lighthouse Board had begun to arise. A consensus emerged that the nine-member board was too cumbersome and should be replaced by a single executive. There was also a feeling that an essentially civilian function should not continue to be dominated by the military. Congress responded by abolishing the board in 1910 and transferring its responsibilities to a new Bureau of Lighthouses.⁷⁸

The period of the bureau's existence was one of continued expansion. During most of the time, it was headed by George R. Putnam. Putnam's administration of the bureau lasted until 1935—a tenure comparable with Pleasonton's, but generally conceded to be far more effective. During this period, aids to navigation increased not only in absolute numbers, but also in their complexity and capabilities. This era of rapid change brought technological improvements such as greater use of electricity, greater automation, and the introduction of radio beacons.⁷⁹

A major reorganization of the federal government in 1939 abolished the lighthouse bureau and transferred aids to navigation to the Coast Guard. This placed lighthouses back under the administration of the Treasury Department, where they had resided from 1789 to 1903. Like its predecessor agencies, the Coast Guard divided the country administratively into a number of districts.

Activities at the Highland Light

Major changes were made to virtually all aspects of the Highland Light around the turn of the century. They included the installation of a new illuminating apparatus, improvements to the dwellings, and the addition of support structures.

⁷⁶ George R. Putnam, *Lighthouses and Lightships of the United States* (Boston: Houghton Mifflin, 1917), p. 46.

⁷⁷ Holland, *America's Lighthouses*, p. 37; also Holland, draft National Historic Landmark thematic nomination (National Park Service, 1993), p. 30.

⁷⁸ Holland, *America's Lighthouses*, p. 37.

⁷⁹ Holland, *America's Lighthouses*, p. 38.

Alterations to the Dwellings Circa 1900. The year 1898 marked the beginning of major changes to the site's dwellings. Beginning with a letter dated October 1, the major of engineers for the second lighthouse district gave a description of the keeper's dwelling and reasons for a need to alter it:

At cape cod, mass light station which I inspected August 28 the keepers dwelling has only two sleeping rooms, each lighted by only one window facing north. The kitchen has not enough closet room and is in the ell, which has only one story. The ell is 13ft x 15ft 6 inches should be extended three feet to give more closet room, a second story should be built upon it to provide another sleeping room, and four dormer windows should be built to give the present sleeping rooms more light, and to give them sun. For this purpose there is an item of \$800 in the supplemental estimates of funds required from the appropriation for 'Repairs and Incidental Expenses of LightHouses 1899,' in the second district, submitted this date.

If funds permit, authority is desired to make the repairs,-- hire of labor, and purchase of materials in open market,--10 days advertizement, of the lowest bidder without formal contract, because this method is the most economical and advantageous to the government.⁸⁰

The Annual Estimates showed an entry of \$800.00 for Cape Cod light. Labor was estimated at \$410.00 and materials were estimated at \$390.00 for the "addition to keepers dwelling with kitchen below and bedroom above and four dormer windows."⁸¹

While no further correspondence relative to these changes was located, two sets of the same drawings were found, one (app. L) in the Coast Guard's Civil Engineering Unit Providence (CEU), and one (app. M) in the Coast Guard Academy Library microfilm collection, dating to April 1899 and signed by Major Engineer Stanton. These drawings represent the majority of changes proposed in the 1898 letter transcribed above. The set retrieved from the Academy Library does not reflect any sheet numbering, approval notations, or later alterations. This set additionally contains the plan of the existing (pre-1899) second story, which the CEU's set does not contain, but is missing the proposed front (west) elevation drawing, which the CEU's set does contain. On the CEU's set, sheet one denotes that the plans were approved by a Light House Board telegram of April 25, 1899. The proposed plans from the same set reflect alterations that were added at some later date, including the locations of electric ceiling fixtures, the additions of radiators, a notation that "A No. 0019 Magee Heater was used here," the addition of a piazza, and a sink alteration.

⁸⁰ Major of Engineers, U.S. Army, Engineer second lighthouse district, October 1, 1898; letter book no. 1248, pp. 282-284; Letters Received; RG 26; NA/DC.

⁸¹ Annual Estimates, July-December 1898; letter book no. 1248, p. 318; Letters Received; RG 26; NA/DC.

The simple line drawings that represent existing (pre-1899) conditions reflect a much different floor plan than the present one. But the locations of the exterior stoops are in the same locations as those on the 1885 survey map (fig. 9), suggesting that little changed in the 14 years preceding 1899. These earlier plans may also reflect the same general conditions of original construction. The only known major alteration prior to this time was the replacement of the exterior siding.

Originally, the main entrance on the west elevation of the main block was at the south end, with two additional window bays to the north. The north ell also had an entrance at the south end of the west elevation, with one window opening to the north of it. The ell had a second entrance on the east elevation, again at the south end with a window to the north of it. The east elevation was contiguous with that of the main block, which had three window bays. Six additional window openings were located in the main block. One each was on the north and south elevations at the first-story level, and two were on the north elevation and two on the south elevation at the second-story level.

In plan, the main entrance opened into a hallway, with the second-story staircase directly in front of the door. The main block consisted of a two-room plan, with two staircases in the hall along the south wall. A doorway at the center of the south wall led to the connecting passageway to the lighthouse, while the stairway to the cellar was in the east half of the house along the south wall, *not* under the stairway to the second floor. The dining room was situated in the back or east half of the main block and connected to the kitchen ell to the north. No fireplaces were evident in these simple drawings, but a chimney stack separated the parlor or west room from the dining room, and another stack was located at the center of the north wall of the kitchen ell. As described by the major of the engineers, the second story of the dwelling occupied only the main block, containing two chambers separated by the chimney stack, each with one window on the north elevation. The stair hall, containing two window openings on the south wall, extended almost the full length of the same wall, with a closet in the southwest corner.

The Barnstable *Patriot* recorded on May 1, 1899, that "Lumber and workmen have arrived at the Light house to commence the contemplated improvements and changes."⁸² These alterations radically changed the interior floor plans. The main doorway was switched with the window at the north end of the main block's west elevation. A vestibule and closet were created at this entrance, and both stairways were relocated behind the vestibule, one under the other. The configuration of the stairway to the second story was changed from a straight run to U-shaped, with six winders (and no landings) negotiating the change of direction. This alteration necessitated the removal of the window opening at the first-story level of the main block's north elevation. The larger chimney stack remained near the center of the main block, but the removal of the hall and staircases at the south end created enough space to shift the parlor and dining room to the south. The window that had been near the west corner of the south wall of the entrance and stair hall was moved slightly to the east to be centered on the new parlor's south wall. A closet was created along the south wall of the dining room without blocking the doorway to the connector link. However, the creation of the closet required that the southernmost window on the east elevation be moved slightly to the north.

⁸² Barnstable (MA) *Patriot*, May 1, 1899.

Instead of increasing the kitchen ell by 3 feet, as recommended, the wall that had separated the dining room from the kitchen was moved to the south approximately 3 feet, keeping the same north-south division, but in a slightly different location. Both exterior doorways were removed from the kitchen ell and replaced with window openings, but the east opening was moved slightly to the south. The closets that had been at the north end of the room were simply enlarged: the one in the northwest corner now contained a pantry with a sink, and a new window over the sink on the north wall. The pantry encased the smaller chimney stack, with a stovepipe feeding into the kitchen space. The new space in the northeast corner became an entry vestibule, with a "back door" proposed on the east wall. This configuration was changed when the porch was added, perhaps at the time of actual construction, or shortly thereafter. The doorway then led into a small vestibule or mud room from the kitchen's north wall.

At the second-story level, the ell (and its chimney) was heightened to include a second story as recommended. All existing interior partitions in the main block were removed except those covering the main chimney stack. Since the original hall and staircase were removed, the two chambers were shifted to the south with a closet wall (the depth of the chimney stack) dividing them. A second closet was constructed for the southwest chamber, above the first-story entry vestibule. A closet wall also separated the southeast chamber from the newly built ell chamber. This latter chamber occupied some of the main block's space. One dormer window was installed in each of the chambers, with the southwest and ell chambers' dormers facing west, and the southeast chamber's dormer facing east. It seems that only three dormers were added at this time, instead of the four that were proposed. A small window opening was also installed on the north wall of the ell chamber, immediately to the east of the chimney stack.

In all, one exterior doorway was removed, and two were relocated and possibly reused. Two additional windows were required for the first story. The other relocated windows were probably reused. One window was removed from the second story; a new, possibly smaller one was installed; and three new dormer windows were installed. The one window removed from the second story may have been reused on the first story.

A bulkhead entrance to the cellar was added during these renovations. No documentation suggested that the clapboarding or roof covering was changed, but perhaps the clapboarding required patching. The Annual Report from 1901 records that "The work of repairing, rearranging, and improving the first and second assistants' dwellings, commenced in June, was almost completed at the close of the fiscal year."⁸³ One could logically assume that this entry referred to the previous calendar year, 1900.

On May 22, 1900, while planning was underway to replace the light apparatus, the engineer requested authority to make needed improvements to the dwellings.⁸⁴ The documentary evidence concerning this work is confusing. The Barnstable newspaper recorded that the work was begun in

⁸³ Annual Report, 1901; entry #135; Clipping File; RG 26; NA/DC.

⁸⁴ Engineer, 2nd District, May 22, 1900; letter book 1320, p. 414; Letters Received; RG 26; NA/DC. [From the Finding Box.]

May 1899, but the annual report for 1901 suggests that the work on the dwellings took place throughout the summer of 1900. The only mention of any dwelling-related activity in the 1900 Annual Report was the laying of a concrete floor in the covered ways connecting the lighthouse tower and the dwellings.⁸⁵

The annual report for 1902 states: "The improvement and repair of the double dwelling occupied by the assistant keepers were completed and a veranda was built on the keeper's dwelling."⁸⁶ The veranda or porch may have been an afterthought to the submitted 1899 plans, because no details surfaced that hint of its impending construction. However, the word "piazza" is added in handwriting to the first-floor drawing of the keeper's dwelling in one set of the alteration drawings (app. L). Clearly the evidence shows that the porch had been completed by 1902, and more likely by 1901.

The earliest depiction of the site after this work is a postcard dated 1905 (fig. 19). It reflects the several exterior changes to the keeper's dwelling. These include the relocation of the main entrance (with its stair protecting the basement window from which the earliest exterior paint sample was removed), the enlargement of the ell, the addition of the porch around the ell, and the addition of the second-story dormers. The trim was again painted in a contrasting color; the pedimented lintels remained on the keeper's dwelling.

Alterations to the Light Circa 1900. On February 5, 1900, an estimate was requested or submitted for changing of the characteristic of the Highland Light from a fixed to a flashing light.⁸⁷ Congress appropriated \$15,000 for that purpose on June 6.⁸⁸ Apparently a number of options were evaluated: two similar charts dated July and August (figs. 17 and 18, respectively) list and compare the attributes of 12 different apparatus systems. Figure 17 appears to represent the first attempt at entering the data into the chart, since it has corrections made in pencil; figure 18 appears to be the corrected chart. A handwritten note on the margin of the second chart notes that the fifth entry was the one that was selected: design number 14627, manufactured by Barbier & Benard, Paris. The system included a first-order lens, with four 90° panels, nine dioptrics, 18 superior and eight inferior catadioptrics, and a focal distance of 92 mm or 36.22 inches. The burner was available in either a five- or six-wick model. The diameter of the five-wick burner was 110 mm or 4.33 inches; the intensity of its beam would have been 192,080 c.p. (candlepower), with a .38-second duration of flash. The diameter of the six-wick burner was 130 mm or 5.118 inches; the intensity of its beam would have been 204,660 c.p., with a .45-second duration of flash. In either case, the time of one revolution was 20 seconds, and the F.O.B. cost in an English or French port was \$9500, with the equipment to be delivered four months after the receipt of order.

⁸⁵ Annual Report, 1900; Clipping File; RG 26; NA/DC.

⁸⁶ See footnote 85.

⁸⁷ February 5, 1900; letter book no. 1320, p. 98; RG 26; NA/DC. [From the Finding Box.]

⁸⁸ Appropriation by act of Congress, June 6, 1900; Clipping File; RG 26; NA/DC.

Specifications were submitted on September 29 as follows:

In compliance with boards [sic] letter of 18 July 1900. . . . The estimated cost is:

One first order apparatus in foreign port	\$ 9,500.00
Freight to the United States. About 150 cu ft.	250.00
Freight wharfage and carting in the United States	300.00
One set first order lamps	500.00
Modifications of tower for new apparatus	500.00
Dismantling, boxing, freight and carting on present lens	250.00
Temporary tower, lantern and glass	400.00
Rigging and tools	400.00
Taking down, packing and freight on temporary tower and lantern	100.00
Superintendence	300.00
Traveling Expense	100.00
Contingencies	2,000.00
Total	\$14,750.00 ⁸⁹

Note that the cost of the apparatus listed with the specifications is the same as the cost of the selected item in the chart.

Again, two annotated versions of the same drawing exist, culled from two different Coast Guard sources. The drawing is entitled, "Lantern & Watchroom" at the "Cape Cod Lt. Station" (app. N). One version is labeled Sheet 1, "2^d Dist. 3 C. with Engr's lett. #81. of 29 Sept. 1900, filed 1 Dec.-"-[1900]. The other version is labeled Plate 1, "Accompanying Specifications for Illuminating Apparatus." The drawing obviously was meant to accompany the letter above and appears to represent the entry: "Modifications of tower for new apparatus." However, modifications other than the purchase of new equipment were not specified either in the letter or the drawing.

The Annual Report from 1901 notes that the optical apparatus was ordered from Europe on March 13, 1901. "It has four panels of 0.92 meter focal distance, revolves on a float in mercury, and will give every 5 seconds, flashes of about 192,000 candlepower nearly one-half second in duration. It will soon be received and installed. Materials for building a temporary tower for use during the installation of the new optical apparatus were sent to the station."⁹⁰ The Barnstable paper recorded on September 16, 1901, that "The oil steamer Azalia [operated by the Light House Board] landed the lighthouse apparatus at Provincetown and it was carried over from there. The steamer has returned to New York for the machinery to go in the permanent tower."⁹¹ Meanwhile,

⁸⁹ September 29, 1900; letter book no. 1373, p. 270; Letters Received, 1st & 2nd Engineering Districts, July to December 1900; RG 26; NA/DC.

⁹⁰ Annual Report, 1901; entry #135; Clipping File; RG 26; NA/DC.

⁹¹ Barnstable (MA) *Patriot*, September 16, 1901.

details for the apparatus's new smoke pipe and its support were being designed by the U.S. Lighthouse Machine Shop in Boston, MA (app. O), as was a ball bearing, probably to be used in the float mechanism.⁹²

The Annual Report for 1902 confirms the following: "The new apparatus was installed in September and October, and the light (now flashing white instead of fixed) was first exhibited on October 10, 1901. . . During the installation, a third-order light flashing white every 5 seconds was exhibited from a temporary skeleton tower. The tower was sold at auction when it was no longer needed. The old fourth-order fixed lens and the temporary third-order lens were returned to the general light-house depot."⁹³

This information suggests that a fourth-order lens had been installed in the lighthouse. Previous documentation indicates that a first-order lens had been installed in 1857. If, when, and why this replacement occurred is unknown. The documentation merely records that the extant light would be changed from a fixed to a flashing light, not that it was defective and needed temporary (fourth-order lens) and then permanent replacement.

The earliest depiction of the site after this work is a postcard dated 1905 (fig. 19). This illustration is the first to depict the edge of the tower's granite gallery as painted white. It probably was whitewashed when the tower was similarly finished.

An April 4, 1903, drawing from the Coast Guard files is entitled "Handrail for Cape Cod Light Tower" (fig. 20). Not only does this drawing depict a full-size section of a handrail, but also a plan for a run of stairs including 43 risers. An accompanying note relates that "There will be three runs of stairs with two landings and a half deck at the top. Rise of stairs 8" - tread 8". The forty-third riser landed at the half deck. According to the plan, these stairs ascended to a deck that is currently two below the watch deck and three below the lantern deck. This is illustrated more clearly in a 1907 drawing showing the illuminating apparatus (fig. 21). The actual changes become more clear when this information is compared to the drawing of the assumed generic or initial proposal for the light tower construction (see fig. 1), where the staircase winds around a center pole to the first (or weight) deck below the watch deck. The center winding stair was replaced by a new stairway with two small landings that hugged the wall. A new deck, occupying only half the available floor space, was installed below the original lowest deck (weight deck). The 1907 drawing documents a ladder-type stair negotiating the connection between the new half deck and the one above it. This latter, original weight deck remained in place, along with its more ornate metal staircase that accessed the watch deck. The extant lower staircase and deck configuration was that installed in 1903. The extant noncontiguous metal stair that connects the first half deck to the weight deck was probably added at a later date. The same may be true for the metal stair that interconnects

⁹² Drawings entitled "Ball Bearing - Cape Cod," August 16, 1901; files; U.S. Coast Guard Civil Engineering Unit Providence (USCG CEU Providence); Warwick, RI.

⁹³ Annual Report, 1902; entry #136; Clipping File; RG 26; NA/DC.

the watch and lantern decks, since the 1907 drawing depicts only a freestanding, ladder-like apparatus leading into the center of the Fresnel lens.

Further verification of the change in the staircase was found in the Barnstable paper: "Workmen are engaged in removing the winding stairs at the Highland Light and replacing them with stairs attached to the wall of the tower, in a circle with an additional landing platform about eight feet below the present first landing."⁹⁴ This quote descriptively confirms the new installation.

A drawing dated 1906 and entitled "Lantern Lining and Cone for Cape Cod Lt. Station" depicts drawings of the lantern lining and cowl (app. Q). Since the *American Heritage Dictionary* defines cowl as "a hood-shaped covering used to increase the draft of a chimney," the cowl (and not cone) most likely would have fitted over the chimney of the Fresnel lens, while the lantern lining would have fitted above it, into the "roof" of the lantern. A later photograph (fig. 32) shows the cowl in place under the lantern hood.

The 1907 drawing previously mentioned, "Showing Illuminating Apparatus," may have been authorized only for documentation purposes (fig. 21); it certainly serves this purpose almost 90 years later. Not only does it delineate the staircase, but also the Fresnel lens and rotating illumination mechanism. Some type of storage unit is drawn in elevation on the ground story of the lighthouse. Whether this was used for oil storage or other supplies is unknown.

⁹⁴ Barnstable (MA) *Patriot*, April 27, 1903.

Cape Cod Light Station, Mass.

Optical Apparatus for Flashing Light

Abstract of Replies Received to Letters addressed to Foreign Manufacturers - July and August 1900.

Number	Order	No of Hands	Diameter of Lens	Lenses			With Burner of 5 Wicks.				With Burner of 6 Wicks.				Time of One Revolution, Sec.	Cost F.O.B. in English or French Port.	Delivered to Order	Number of Designs	Maker				
				No. of Elements	Calculation	Material	Diag. of Lens	Focal Dist.	Diag. of Burner	Intensity of Naked Flame	Purulence	Intensity of Burner	Duration of Flash	Diag. of Burner						Intensity of Naked Flame	Purulence	Intensity of Burner	Duration of Flash
1	3	2	180°	7	13	13	7-2		110 mm 4.33"							113 595	40 sec	10	\$ 48.00	3 1/2	25034	Barbier & Binard, Paris	
2	3	2	180°	3	11			50 mm 1.968"							130 000	33 sec	10	\$ 50.00	5			Sautter, Harlé & Co, Paris	
3	3	2	180°												116 900	38 sec	10	\$ 40.80	6			Henry Lejeante, Paris	
4	3	2	164°	6	11				4.18"	500				70 000	34 sec			\$ 45.00	8	1644		Chance Bros & Co, Birmingham	
5	1	4	90°	9	18	8		91 mm 3.581"	110 mm 4.33"					192 080	38 sec			\$ 95.00	4	14627		Barbier & Binard, Paris	
6	1	3	120°											272 850	34 sec	15		\$ 95.00		15276 15277		do	
7	1	6	60°											128 000	56 sec	30		\$ 95.00	4			do	
8	1	4						91 mm 3.581"										\$ 113.00	8				Sautter, Harlé & Co, Paris
9	1	4	90°					91 mm 3.581"							258 800	39.5 sec			\$ 92.40	6	6547		Henry Lejeante, Paris
10	1	4	90°	16					4.18"	500				115 000	37.5 sec			\$ 92.50	8	1641A		Chance Bros & Co, Birmingham	
11	1	4	90°	8					4.18"	500				110 000	37.5 sec			\$ 90.00	8	1641B		do	
12	HYPERS- RADIANT	3	120°	10	25	12		133 mm 5.247"							604 300	23 sec			\$ 200.00	7	25032 25033		Barbier & Binard, Paris

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

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

W. A. ...

LT COL. ...

Figure 17. Abstract of Information for Lens Apparatus, with corrections, 1900.

Abstract of Information from Foreign Manufacturers Regarding Lens Apparatus Suitable for CAPE COD LIGHT STATION. JULY & AUG 1900.

Apparatus Number	Order	No. of Lenses	Diameter	Lens - Number Elements -				Sphericity of Beams C.P.	Flash	Cost	Design Number	Maker						
				Diaphragm	Antireflective	Field Lens	Wick Lens											
1	3	2	180°	7	13	13	1-2	13.0m 5.108	110m 4.33	113'595	0.35	0.40	10	\$ 4,800.	3 1/2	25 034	Barbier & Binard, Paris.	
2	3	2	180°	3	11		50 19.54			130'000	0.33 1/2		10	\$ 5,000.	5		Sautter, Harlé & Co., Paris.	
3	3	2	180°							116'900			10	\$ 4,080.	6		Henry Lepaute, Paris.	
4	3	2	164°	6	11					70'500	150'000			\$ 4,500.	9	1644	Chance Bros & Co. Birmingham.	
5	1	4	90°	9	18	8	3 1/2 91	130m 5.108	110m 4.33	192'080	2,04'660	0.38	0.45	20	\$ 9,500.	4	14-627	Barbier & Binard, Paris.
6	1	3	120°							272'850		0.28	0.34	15	\$ 9,500.		15 276 15 277	dr
7	1	6	60°							128'000		0.56		30	\$ 9,500.	4		dr
8	1	4					91 36 1/2			205'000			0.40	20	\$ 11,300.	8		Sautter, Harlé & Co., Paris.
9	1	4	90°				91 36 1/2			258'800				20	\$ 9,240.	6	654-7	Henry Lepaute, Paris.
10	1	4	90°							115'000	350'000	0.75	0.75		\$ 9,250	12	A 269 675	Chance Bros & Co. Birmingham.
11	1	4	90°							114'000	330'000	0.75	0.75		\$ 9,000	12	B 1491	dr.
12	HYPER-RADIANT	3	120°	10	25	12	13 1/2 51 1/2	130m 5.108		604'800		0.23		15	\$ 20,000	7	25 032 25 033	Barbier & Binard, Paris.

Figure 18. Abstract of Information for Lens Apparatus, corrected, 1900.

Highland Light North Truro, Mass.

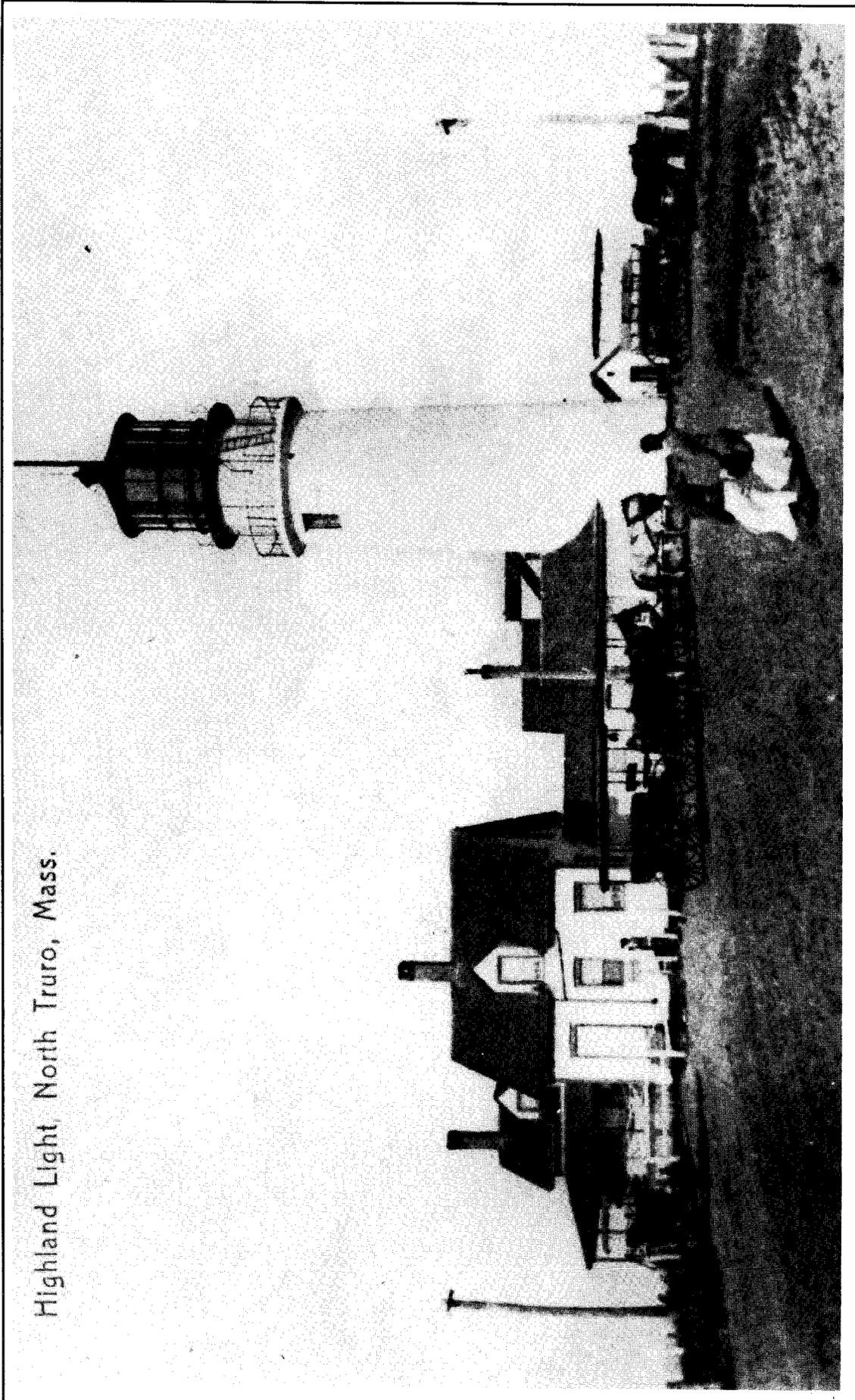
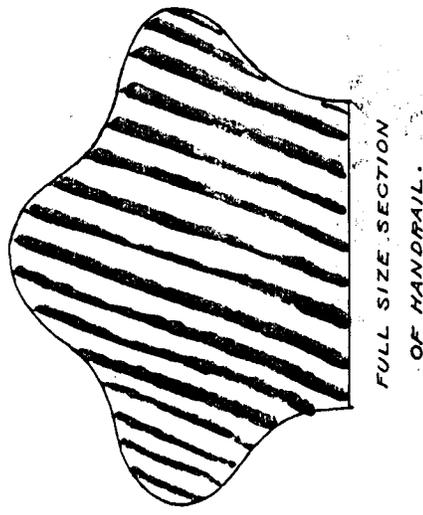


Figure 19. Postcard, "Highland Light," copyright 1905 by Rotograph Co.



FULL SIZE SECTION
OF HANDRAIL.

HANDRAIL FOR CAPE COD
LIGHT TOWER.

OFFICE OF LIGHT-HOUSE ENGINEER, SECOND DISTRICT,
BOSTON, MASS., APRIL 4 1903.

W. S. ...
ENGINEER OF LIGHT-HOUSE DISTRICTS.

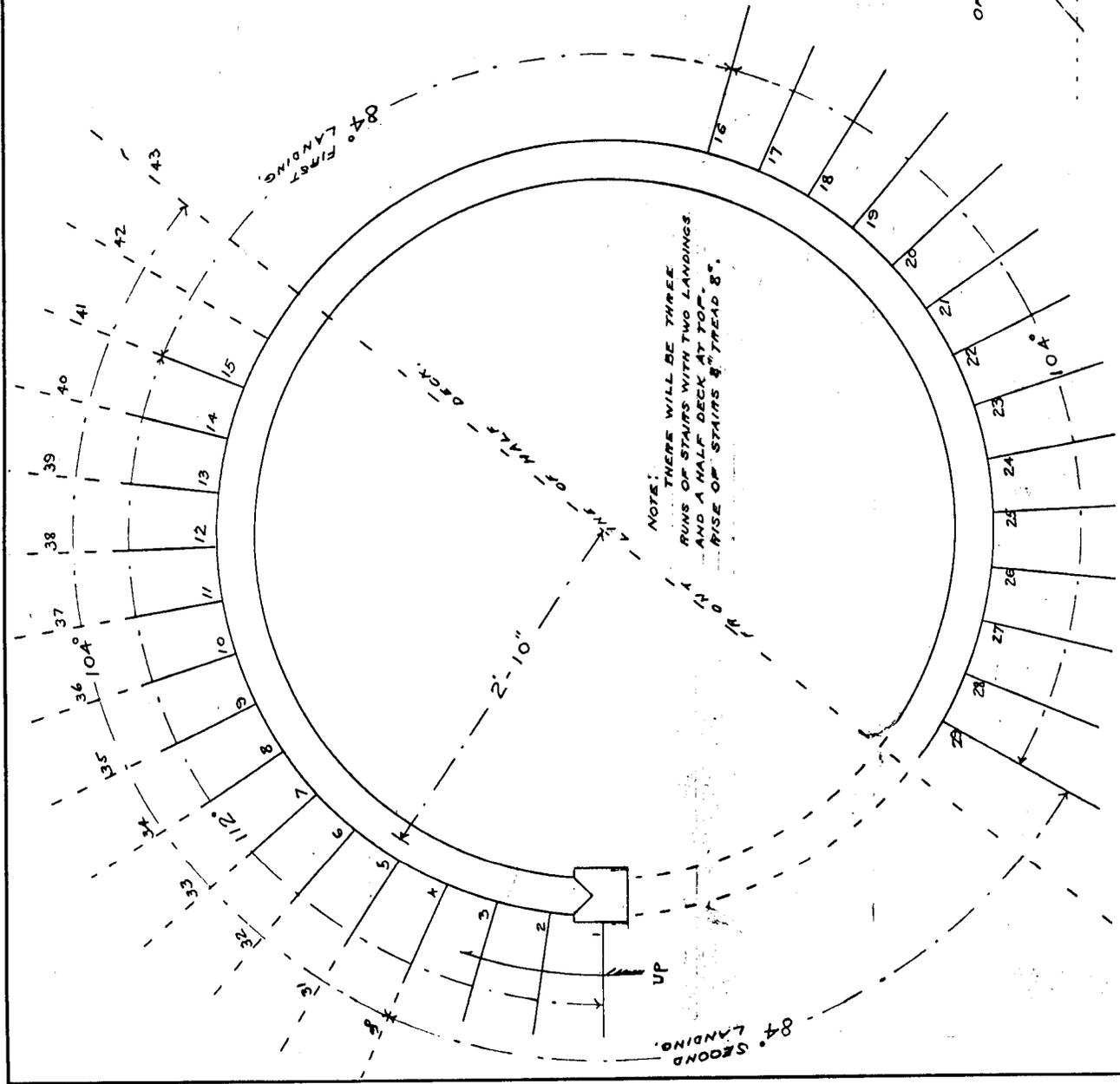


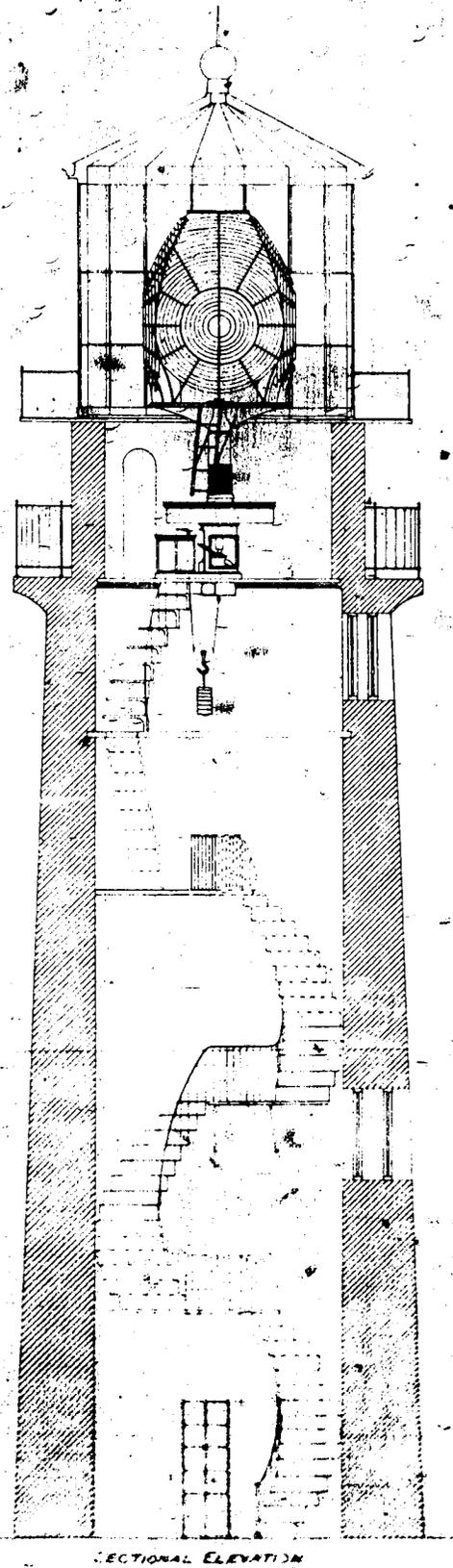
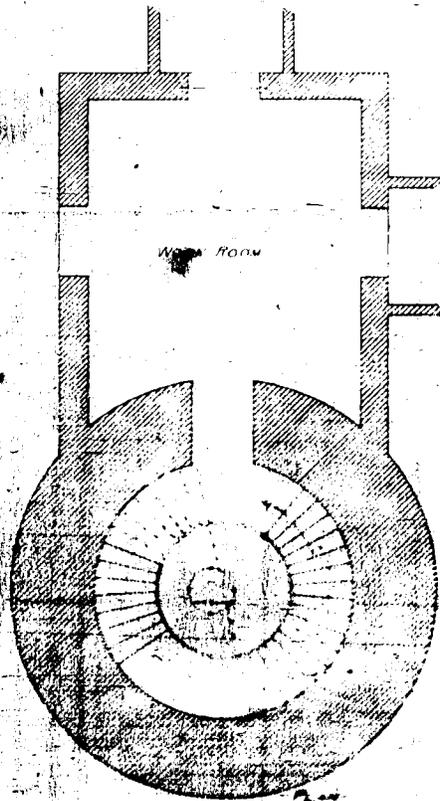
Figure 20. Handrail for Cape Cod Light Tower, April 4, 1903.

CAPE COD LIGHT STATION MASS
SHOWING ILLUMINATING APPARATUS

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

OFFICE OF LT HOUSE ENGINEER, BOSTON, MASS.
MARCH 1907

MAJOR CORPS OF ENGINEERS
ENGR 1 REG 2ND L. H. DISTRICT



SECTIONAL ELEVATION

Figure 21. Cape Cod Light Station, Showing Illumination Apparatus, March 1907.

Alterations to the Site Circa 1900. A clipping-file entry from 1899 details changes made to the fog signal:

A 4-horsepower Hornsby-Akroyd oil engine with Clayton compressor was installed in place of a worn out caloric engine. The interval between the lighting of the fire and the first blast of the whistle with the caloric engine was about forty-five minutes; with the new apparatus it is ten minutes. Various repairs were made.⁹⁵

A clipping-file entry from 1900 reiterates this information, but goes further. It states that the installation of the four-horsepower engine completed "the installation of the fog-signal apparatus in duplicate. . . ." ⁹⁶ It also says that a brick oil house was built south of the fog-signal building, and that a brick floor was laid in the nearby engine house.

A drawing from 1903 (app. P) entitled "Location of Wireless Telegraph Station at Cape Cod Light House" provides detailed information about the northwest corner of the site. Here the drawing depicts the "telegraph house," a cistern, a privy, a cesspool, an oil house, a dwelling with operations room, a mast, and "earth plates." ⁹⁷ This drawing apparently was traced from the 1885 survey plan. It is not particularly accurate concerning structures farther south, in the vicinity of the lighthouse. This is based on the fact that the drawing shows fewer buildings there than are known (from the documentation) to have existed. It may be that, since the focus of the 1903 drawing was the northwest corner of the site, the accuracy of the southern half of the property was thought to be unimportant. An additional oil house was built in 1904.

Alterations after Circa 1900. The Coast Guard CEU maintains a series of similar documents in their collection that are initially entitled "Description of Light-House Tower, Buildings, and Premises" in 1908, and by 1933 are called "Description of _____ Light Station." For Cape Cod, one such report exists for the years 1908, 1910, 1922 (some of the information in this year's form is crossed out and resubmitted for 1927), and 1933. It also appears that the person who conducted the survey in 1933 used the 1927 (and therefore the 1922) notations as his guide, based on the exact same entries presented in a new form. These reports provide a very detailed description of the site for the specified years, and they also permit comparisons to be made that distinguish when changes were made. Complete copies are included in Appendix R. An abridged version compiled from entries relating more specifically to the keeper's dwelling and the lighthouse tower is presented on the following pages.

⁹⁵ July 3, 1899; Cape Cod, Mass., Book 1319, p. 2; Lighthouse Service List of General Correspondence 1791-1900; Clipping File; RG 26; NA/DC.

⁹⁶ Cape Cod, Mass., Entry #134; Clipping File; RG 26; NA/DC.

⁹⁷ "Location of Wireless Telegraph Station At Cape Cod Light House," drawn by C.E. Stumcke, Jr., May 20, 1903; Equipment Dept., U.S. Navy Yard, Boston.

While several of the 1908 entries are different from subsequent entries, it seems that the inspector may have been careless in his initial survey. Since no documentation has surfaced that records any major changes between 1908 and 1910, and since the same person surveyed the buildings two years later, his entries appear to be more exact in the latter descriptions.

PREMISES

1908	1910	1922	1927	1933
Described by: Lt. Col. Edw. Burr	Lt. Col. Edw. Burr	[?] 1st Asst. Supt.	C.H. Robinson, Assoc. L.H. Engineer	No entry
Date: April 23, 1908	March 21, 1910	February 7, 1922	June 8, 1927	1933
Character of light: Flashing white, every 5 seconds	Same	Same	Same	Same
Latitude: 42° 02' 23" Longitude: 70° 03' 40"	Same	Same	Same	Same
Site Area: 10 acres; Inclosed: 6 acres	10 acres, 47 poles; 10 acres, 47 poles	Same Whole	Same Same as 1922	Same Same as 1922
Tower from high water mark: 600 feet	580 feet	Same as 1910	Same as 1910	About 580 feet
Inclosure: Wire fence	Wood and wire fence	Wire concrete	Same as 1922	Wire concrete posts
Wharf or landing: none	Same	Same	Same	Same
Light reached by: road	Carriage	Public road	Same as 1922	Same as 1922

Distance to road, R.R. or landing: station on public road, 2 mi. to R.R. station	Tower is within 30 feet of public road	Post office N. Truro distant 1 1/2 miles	Same as 1922	Same as 1922
Last rebuilt: 1857	Same	Same	Same	Same
Condition: good	Same	No entry	No entry	No entry
Shape of tower plan: circular	Same	No entry	No entry	No entry
Tower form: conical	Same	No entry	No entry	No entry
Tower hgt. from base to vent. ball of lantern: 61 ft.	66' 2"	No entry	No entry	No entry
Focal plane hgt. above mean high water mark: 183 ft.	Same	Same	Same	Same
Tower color: white, by whitewash	White, by paint	White, by whitewash	Same as 1922	Same as 1922
Connection to keeper dwelling: covered way	Same	Same	Same	Same
Tower materials: brick	Bricks and cement	Same as 1910	Same as 1910	Same as 1910
Wall thickness at base: 42" At parapet: 30"	3' 7" 2' 2"	No entries	No entries	No entries

Tower at base - diameter: 11' Inside	14' 9"	No entry	No entry	No entry
Tower at parapet - diameter: 11' Inside	14' 9"	No entry	No entry	No entry
Stairway and Steps: cast iron	Circular	Iron	Same as 1922	Same as 1922
No. of stairway landings: 3	4	No entry	No entry	No entry
Window tower glass size: 8" x 10"	8" x 10" and 9" x 10 1/2"	Same as 1910	Same as 1910	Same as 1910
No. of tower wind.: 3 Sizes: Lower and upper sash 2' 3 3/4" by 22"	Same Both sashes 2' 3 1/2" by 22 1/2"	Same Same as 1910	Same Same as 1910	Same Same as 1910
No. of tower doors: 1 in tower, 1 in parapet	1	One, 3' 0" x 7' 0"	Same as 1922	Same as 1922
Foundation and depth: brick, 6 ft.	Bricks and cement	Concrete	Same as 1922	Same as 1922
Soil type: sandy Protected by: grass	Sandy loam Yes	Sandy	Same as 1922	Same as 1922

LANTERN AND LANTERN FIXTURES

	1908	1910	1922	1927	1933
Order of lantern: first	Same	Same	Same	Same	Same
Shape: polygonal	Same	Same	Same	Same	Same
Diameter, inscribed to glass: 12 ft.	12' 1"	12' 1" and in the clear: 11' 9"	Not given	Same as 1922	Same as 1922
No. of sides in plan: 16	Same	Same	Same	Same	Same
Bars: vertical	Same	Same	Same, 1 1/8" thick	Same as 1922	Same
Hgt. glazed: 9' 6"	9' 11 1/2"	Same as 1910	9' 5 7/8"	Same as 1927	
No. of panels in hgt.: 3	Same	Same	Same	Same	
No. of plates in ea. side: 3	Same	Same	Same	Same	
Thickness of plates: 1/4"	Same	Same	Same	Same	
Size of diff. plates: 47 5/8" 39 3/8" x 28" 25 3/8"	Bottom: 25 1/2" Mid: 39" Top: 47 1/2" x 28"	None given	Top row: 47 5/8" Mid. row: 39" x 28" Bottom row: 25" 16 lbs. ea.	Same as 1927	
Storm panes: none	Same	No entry	No entry	No entry	
Lantern materials: cast iron	Iron and glass	Iron	Same as 1922	Same as 1922	
Roof materials: cast iron	Iron	Same as 1910	Same as 1910	Same as 1910	

Ventilator ball materials: cast iron	Iron	Same as 1910	Same as 1910	Same as 1910
Lightning-conductor spindle: rough iron - copper tip	Copper, platinum tip	Same as 1910	Copper, platinum tip, and grounded	Same as 1927
Lightning conductor: copper to lantern, led down side of tower, 4 ft. into ground	Soft copper 1/8" x 1 1/2" attached to lantern, stapled down side of tower, into pit filled with [c??e] about 30' away & 6' deep	No entry	No entry	No entry
Balustrade and outside gallery: stone gallery deck 24" W, w/iron railing of two rails and 1 1/4 round posts and 1/2" sq. balusters	Iron	Yes	Same as 1922	Same as 1922
Lantern doors: no door in lantern; balcony reached from watchroom, which has double doors	Hinges and latch	Iron, hinged with latch	Same as 1922	Same as 1922
Lantern floor: cast iron	Iron	Same as 1910	Same as 1910	Same as 1910
Watchroom door into lantern: no door; lantern entered by iron spiral stair	Hinges and handle	Same as 1910	Same as 1910	Same as 1910

Parapet: 10' 4"	Circular, 10' diam.	No entry	No entry	No entry
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VENTILATORS

1908	1910	1922	1927	1933
Location: lower part of lantern	Same	Same	Same	Same
Lantern ladders outside: none	Iron	Same as 1910	Same as 1910	Same as 1910
Curtain hooks inside lantern: spring roller curtains	Same	Same	Same	Same

WATCHROOM

1908	1910	1922	1927	1933
Fitted: revolving clock & stove	Pedestal and heating stove, sides sheathed and finished bright	Pedestal and heating stove, sides sheathed	Pedestal, and sides sheathed	Same as 1927
Communication: speaking tube	Same	Same	Telephone	None
To where: 3 dwellings	To dwellings	To two dwellings	Same as 1922	

ILLUMINATING APPARATUS, ETC.

1908	1910	1922	1927	1933
Maker: Barbier & Benard Year: 1901	Same Same	Same Same	Same Same	Same as 1927 Same
Marks & No. on apparatus: Phares & Fanux Paris	No. 25767	Paris	Barbier, Bernard and Turenne	Same as 1922
Order: 1st Inside diameter of central drum: 6'	Same 6' 1/2"	Same Same as 1910	Same Same as 1910	Same Same as 1910
Characteristic: white flash every 3 seconds	Flash every 5 seconds	Flashing white, 580,000 intensity in English candles	Same as 1922	Flashing white, 4,000,000 intensity in English candles
Time of revolution: 20 seconds	Same	Same	Same	Same
Intervals between flashes: 5 seconds	4.1/2 seconds	(Duration of eclipse): 4.8 seconds	Same as 1922	Same as 1922
Duration of flash: 1/2 second	Same	0.2 seconds	Same as 1922	Same as 1922
Panels in lens apparatus: 4	28	Same as 1910	Same as 1910	Same as 1910
No. flash panels: 4	Same Arc of each: 90°	Same as 1910	Same as 1910	Same as 1910
Elements in each panel of lens' central drum: 9	8	Same as 1910	Same as 1910	Same as 1910

Prisms in each panel above lens' central drum: 18	Same	Same, they are flashing	Same as 1922	Same as 1922
Prisms in each panel below lens' central drum: 8	Same	Same, they are flashing	Same as 1922	Same as 1922
Flashes produced: by whole apparatus revolving	Same	Same	Same	Same
Pedestal: special pedestal w/ mercury float	Cast-iron supporting clock and mercury float	Cast iron	Same as 1922	Same as 1922
Service table: none	In work room on ground story	No entry	No entry	No entry
Off-gassing and draft tube: regular 1st order connecting tube	Black iron 7 1/8" D. held in place by collar	Same as 1910	Same as 1910	Black iron 7 1/8" D. held in [space] by [cellar] Same as 1910?
Revolving machinery: rotary carriage, w/ mercury float operated by clock-work	Clockwork	No entry	No entry	No entry

Revolving on: mercury	Same	Mercury float, 5' 7 1/4" inside D. of trough; 10" inside depth of trough; 5' 7" outside D. of float; 11 1/2" depth of float; 600 pounds of mercury required, not renewed since 1901	Same as 1922	Same as 1922
Revolving cord or chain-how led: cord, drops directly from drum	By traveling pulley	No entry	No entry	No entry
Length of drop tube: no tube, open tower w/ guard for weight, 47' drop	Weights face into stairwell and have guard at bottom, could drop 25 feet if necessary	No tube, weight goes in stairwell, about 200 pounds	Same as 1922	Same as 1922
Time revolving machinery runs after 1 winding: 2 1/4 hrs.	Same	Same	Same	Same
Machinery protection: iron frame with glass	Glass case, brass frame	Glass case	Same as 1922	Same as 1922
Regulated by: governor	By flyball governor and weights	By friction fly ball governor	Same as 1922	Same as 1922

LAMPS AND BURNERS

	1908	1910	1922	1927	1933
Lamp & no. of wicks to burner: first order plunger lamp w/ 5 wicks		1" order, 5 wicks, 4 3/8" D. of outside wick	55mm I.Q.V., illuminated with Kerosene, 580,000 English candle intensity; one mantle, 2 1/8" D.	Same as 1922	1000 watt P.S.52 - clear C-7 filament, electric incandescent illuminant-1670 intensity in English candles
Spare lamps: 1		No answer	Two	Same as 1922	Four
Spare lamp burners: 3		1	----	Same as 1922	Same as 1922

CLOSETS IN TOWER

	1908	1910	1922	1927	1933
How used: none		Same	Same	Same	Same

DWELLINGS FOR KEEPERS

1908	1910	1922	1927	1933
Location to light-house: connected by covered way to tower	Single dwelling north of tower	Same as 1910	Same as 1910	Same as 1910
Coloring: white	Same	White, lead trimmings	Same as 1922	Same as 1922
Materials: wood	Same	Same	Same	Same
No. rooms in each dwelling: 6 in Keeper's	Same	Same	6 plus bath	Same as 1927
Heating plant: no entry	Same	Direct hot water	Same as 1922	Same as 1922
Furnished quarters: no entry	Same	All keepers	Same as 1922	Same as 1922
No. of keepers and assts. to each dwelling: 1 keeper single dwelling	Same	Same	Same	Same
Outhouses: No entry	4, painted white with lead-colored trimmings	Two fuel houses and pump house, w/white lead trim.	Same as 1922	Same as 1922

Data for dwelling furnishings - Stove maker: no entry Stove size: no entry Sink maker: no entry Sink size: no entry Pump maker: no entry Pump size: no entry	Same as 1908 ↓	Magee Grand 7-18 Not known 22" x 48" Douglas No. 2	Same as 1922 ↓	Same as 1922 ↓
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WATER FOR DRINKING AND DOMESTIC USES

1908	1910	1922	1927	1933
How procured: rain water from bldg. roofs	Caught on roofs; and from a deep well	From deep driven well and from roofs	Same as 1922	Same as 1922
Quality: good	Same	Same	Same	Same
Ample quantity at all seasons: no	Ample	Same as 1910	Same as 1910	Same as 1910
Insurance of purity: cleaning cistern	Cleaning often, washing roof in first of rain fall	Frequent cleaning	Same as 1922	Same as 1922
Capacity of tank or cistern: 1500 gal. in cellar	In each cellar of dwellings, about 1200 gals. ea.	Cisterns in each dwelling 1200 gals.	Same as 1922	Same as 1922
Material of tank or cistern: brick	Bricks and mortar	Bricks cement plastered	Same as 1922	Same as 1922
Water obtained by: pump	Pump operated by gas engine	Same as 1910	Pump powered by kerosene engine	Same as 1922
Distance from keeper's dwelling: in dwelling	16 feet	Same as 1910	Same as 1910	Same as 1910
Well descrip- tion: no entry	4 1/2" D. iron pipe, 153' deep	4" D. iron pipe, driven well 153' deep	Same as 1922	Same as 1922

The 1899 floor plans of the keeper's dwelling were revised in 1909 for the addition of indoor plumbing. The revised first-floor plan, which was not specifically dated, shows that the kitchen sink was moved to the east end of the south wall (app. L). The revised second-floor plan, which was dated September 1909, was more clearly altered for the addition of a bathroom (app. S). Notes on the drawing record that old doors were reused, that the large dormer on the east side of the roof was added at this time. Confirmation of the installation of indoor plumbing is provided by another site drawing dated November 1909 (app. T), which shows a soil pipe leading from both of the dwellings to a cesspool, as well as the location of a driven well. This is confusing, given that the site descriptions do not mention the bathroom as an extra room in 1908, 1910, or 1922. It is not until 1927 that bathrooms are specifically noted.

Information based on site surveys obtained at the Civil Engineering Unit of the U.S. Coast Guard provided dates of building construction and demolition during the 20th century. The old engine house was torn down in 1908. In 1909, a concrete engine bed was installed for the fog-signal apparatus at the lighthouse.⁹⁸ During that year a foundation was poured for an air-compression tank, presumably for the fog signal.⁹⁹

A drawing dated 1910 gives measurements for screen doors and window screens for the structures at Cape Cod Light Station (app. U). This drawing has been used to date historic photographs by the presence of window screens on the structures. Several of these photographs (figs. 22-25) date to the second and third decades of the 20th century, but evidence for more specific dates was not found. The photographs show that the trim was still painted a contrasting color during this period (gray, based on paint analysis), and the granite edge of the gallery continued to be whitewashed to match the tower. Based solely on photographic evidence, it was during this time that the exterior ladder from the Watch Gallery to the Lantern Gallery was altered from an angled position to a vertical position.

No additional documentation surfaced from the years 1910 to 1922. The Coast Guard's attention was most likely consumed by World War I. However, based on the station description forms, minor changes occurred during this time period. These included changing the enclosure fence from wood and wire to wire and concrete; changing the tower's foundation from bricks and cement to concrete; changing the duration of the eclipse or interval between flashes—from 5 seconds in 1908, to 4.5 seconds in 1910, to 4.8 seconds in 1922; and changing the duration of the flash from .5 seconds to 0.2 seconds. The lamps and burner system were changed to a 55-mm. incandescent oil vapor (I.O.V.) system fueled by kerosene. The method of heating may have been changed to direct hot water. Data for the dwelling furnishings (i.e., stove, sink, and pump) were supplied for the first time, but it does not necessarily suggest that changes were being made.

Likewise, very little changed between 1922 and 1927. Again based on the station description forms, a telephone connecting the tower's Watch Deck with the keepers' dwellings replaced a

⁹⁸ Concrete Engine Bed, 1909; drawing #1561; USCG CEU Providence; Warwick, RI.

⁹⁹ Drawing #1548; USCG CEU Providence; Warwick, RI.

speaking tube as the means of communication, and the engine for the water pump was changed from a gas to a kerosene type.

A recreation room and drill building were erected somewhere in 1927. These buildings were not necessarily on the lighthouse property; they could have been part of the nearby Highland Lifesaving Station site, or at the telegraph house's site north of the lighthouse complex. A new well was dug in 1928.¹⁰⁰

Four undated historic photographs (figs. 26-29) reflect a change in roofing materials on the dwellings and connector buildings, to hexagonal shingles probably made of asphalt. Based on the automobiles in the pictures, and on the absence of wooden siding shingles on the buildings (known to have existed in 1936), this series of photographs probably dates from the 1920's to the mid-1930's. The first photograph reflects no obvious change in roofing materials, but the clarity of the image is poor. The new roofing is very evident in the later three images. The third in the series (fig. 28) also shows that a porch element was changed from open bracing to an enclosed skirt with latticework camouflaging the foundation.

By 1932, plans were being drawn for electrifying the station (app. V). It is difficult to discern if these plans implied that the whole station would be electrified for the first time, or if only the tower light (or lamp) would be converted. The plan for cable locations suggests that cable came from the main feed (pole) to the fog-signal house, and then fed power to the tower and to the main keeper's dwelling only. Later documentation confirms that these cables were underground. On the other hand, one notation records that in the tower lantern: "6 - T.14-250 watt lamps, 60° apart on 4" circle replaced by 1000 watt P.S. 52 d. bulb." This infers that the lantern had already been outfitted with electric bulbs, but was perhaps powered electrically from a generator. No documentation has surfaced to pinpoint when this conversion took place, and the station descriptions for 1922 and 1927 document the lamp as one (55mm I.O.V. with a mantle) fueled with kerosene. The station description for 1933 clearly agrees with the specifications on the 1932 plan: the lamp is a 1000 watt P.S.52 - clear C-7 filament, electric incandescent illuminant, with an intensity of 1670 English candles. One additional piece of information derived from this drawing is that the clockworks and weight through the floor of the watchroom (see fig. 21) were no longer needed to operate the illuminating apparatus. The apparatus was now entirely powered by a motor.

A 1945 drawing showed the type of lamp and lamp stand at Cape Cod Light Station (app. W). These details were traced from the 1932 electrification plan, with the necessary changes made. By then only one light bulb was needed for the main light, instead of the two depicted in the 1932 drawing. The later drawing may have been made in preparation for changing the illuminating apparatus: a new plan was submitted and approved during the winter of 1946 for the replacement of the first-order lens with a 36-inch drum rotating beacon (app. X). This drawing indicates that the work included the installation of a new steel floor plate over the original deck ring. The new plate was 10 1/2 feet in diameter and three-eighths of an inch thick, in three sections. Its addition was necessary because the deck ring had a center opening 7 feet in diameter—appropriate for the large

¹⁰⁰ Property Data Itemization Supplement to Form N-USO-13, December 10, 1943; files, USCG CEU Providence; Warwick, RI.

first-order Fresnel lens that was being removed, but far too large for the new Crouse-Hinds 36-inch, double-drum rotary beacon being installed. (A hole only 3 inches in diameter had to be cut in the center of the plate for the new beacon's drive shaft.) A somewhat larger opening was created to access the Watch Deck below.

Documents indicate that a radio beacon was installed northeast of the keeper's dwelling in 1932, and that a pump house was erected in 1937, possibly immediately to the east of the keeper's dwelling, over the location of the well. A property data itemization form from 1938 provides the following information for that year: tennis courts were added, again possibly at the lifesaving station or telegraph site; electrical systems were improved; and a water tank and a fence were added.

At some point prior to 1936, the frame structures were sided with wooden shingles. This is known from a snapshot dated 1936 found in the Coast Guard files that shows this change.¹⁰¹ Three somewhat later photographs (figs. 30-32) reflect both the 1932 radio-beacon installation and the new wood-shingle siding. All of these photographs predate 1946, based on the presence of curtains (in closed position) in the Lantern; they indicate that the Fresnel lens, which was replaced in 1946, was still present.¹⁰² Judging by the style of automobiles in the images, the first photograph can be dated to the late 1930's or 1940's, and the other two to the mid-1940's. The latter two images show that the staff attached to the lantern, believed to be the Kane signal staff that was installed in 1898, was removed by this time. No documentation recorded its removal.

These three photographs are the first to show the connecting structures after they were painted to contrast with the color of the dwellings. It is thought that the same color (most likely white) was used on all of the structures immediately after the dwellings were sided with clapboards in 1881. In the years thereafter, the brick tower continued to be whitewashed, but the frame dwellings were often painted a different color, and the brick connecting structures were always painted to match the dwellings. After the dwellings were sided with shingles circa 1930, however, the connecting buildings were always painted to match the color of the tower.

It is likely that a garage was built between 1943 and 1947, or was created by the conversion of the former barn (see figure 32). The garage is not included in a survey from 1943, but it is in the survey from 1947.¹⁰³ Based on blueprints, a pilot-balloon observation platform was constructed in 1944 and attached to the brick oil house south of the fog-signal building.

¹⁰¹ "Antenna - C. Cod Radiobeacon," drawing dated 7-1-36; files, USCG CEU Providence; Warwick, RI.

¹⁰² "Curtains were *only* used to cover classical Fresnel lenses, since sunlight focused back through the glass prisms would cause enormous heat in the center of the lens, as well as discoloring of the glass prisms. Curtains or lens covers were *not* used with modern rotating beacons such as the DCB-36." Entry in transmittal letter of HSR draft comments, USCG Lieutenant-Commander Dan R. May to CRC Manager Myra F. Harrison, June 20, 1994.

¹⁰³ Proceedings by Special Board of Survey, February 7, 1947; files, USCG CEU Providence; Warwick, RI.

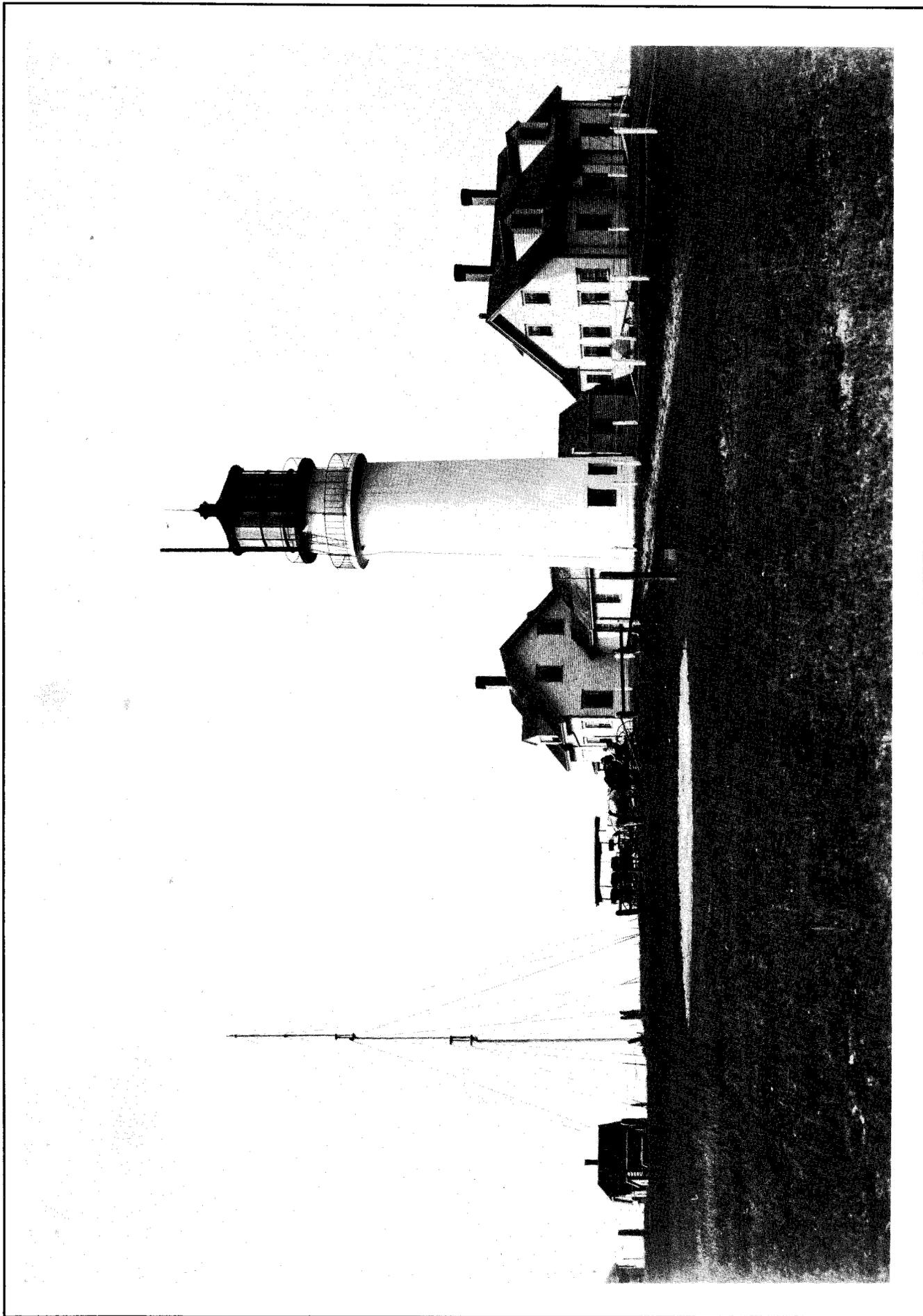


Figure 22. Cape Cod Light, looking north, between 1910 and circa 1920.

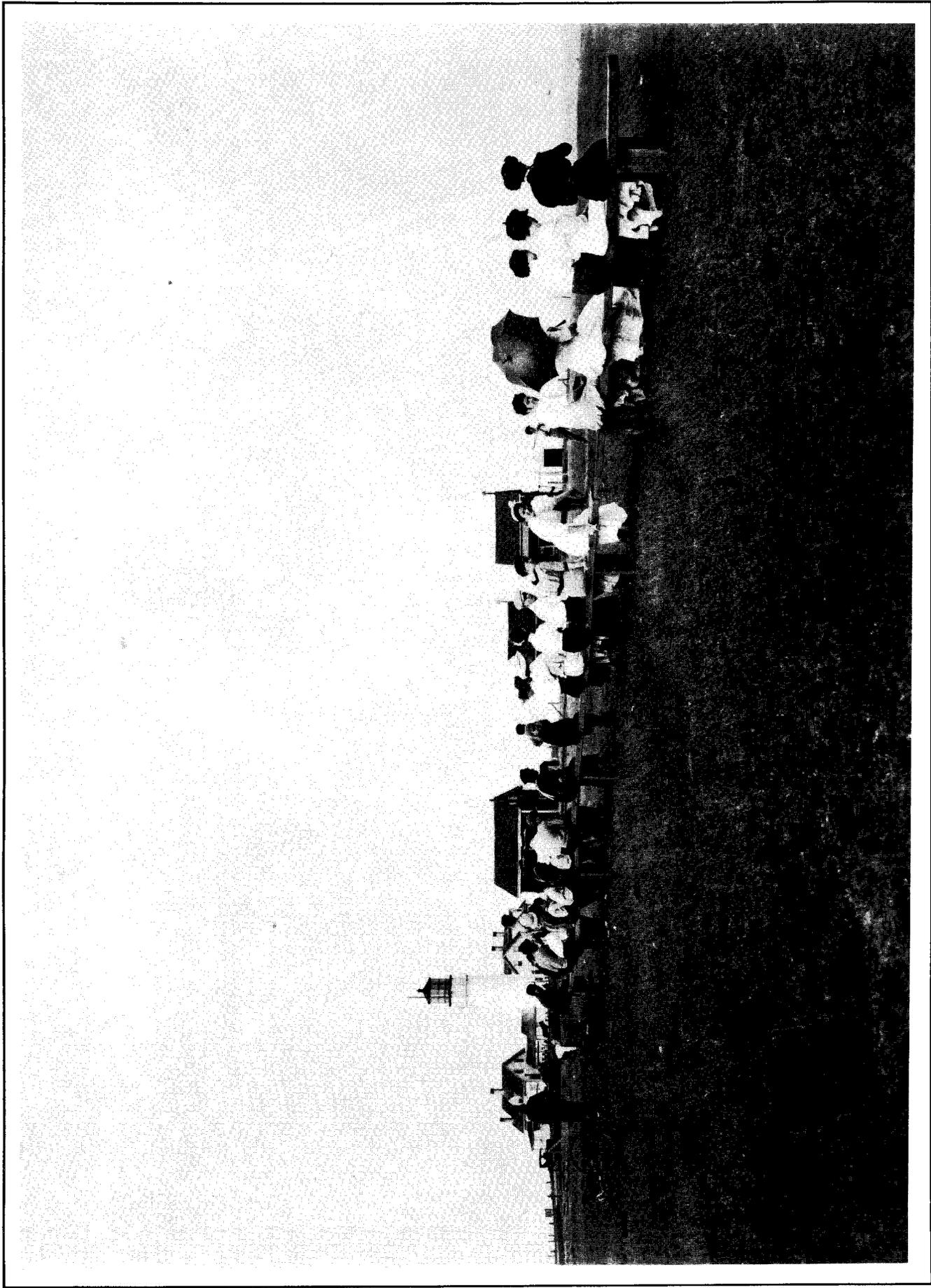


Figure 23. Ballplaying in field southwest of Cape Cod Light, between 1910 and circa 1920.

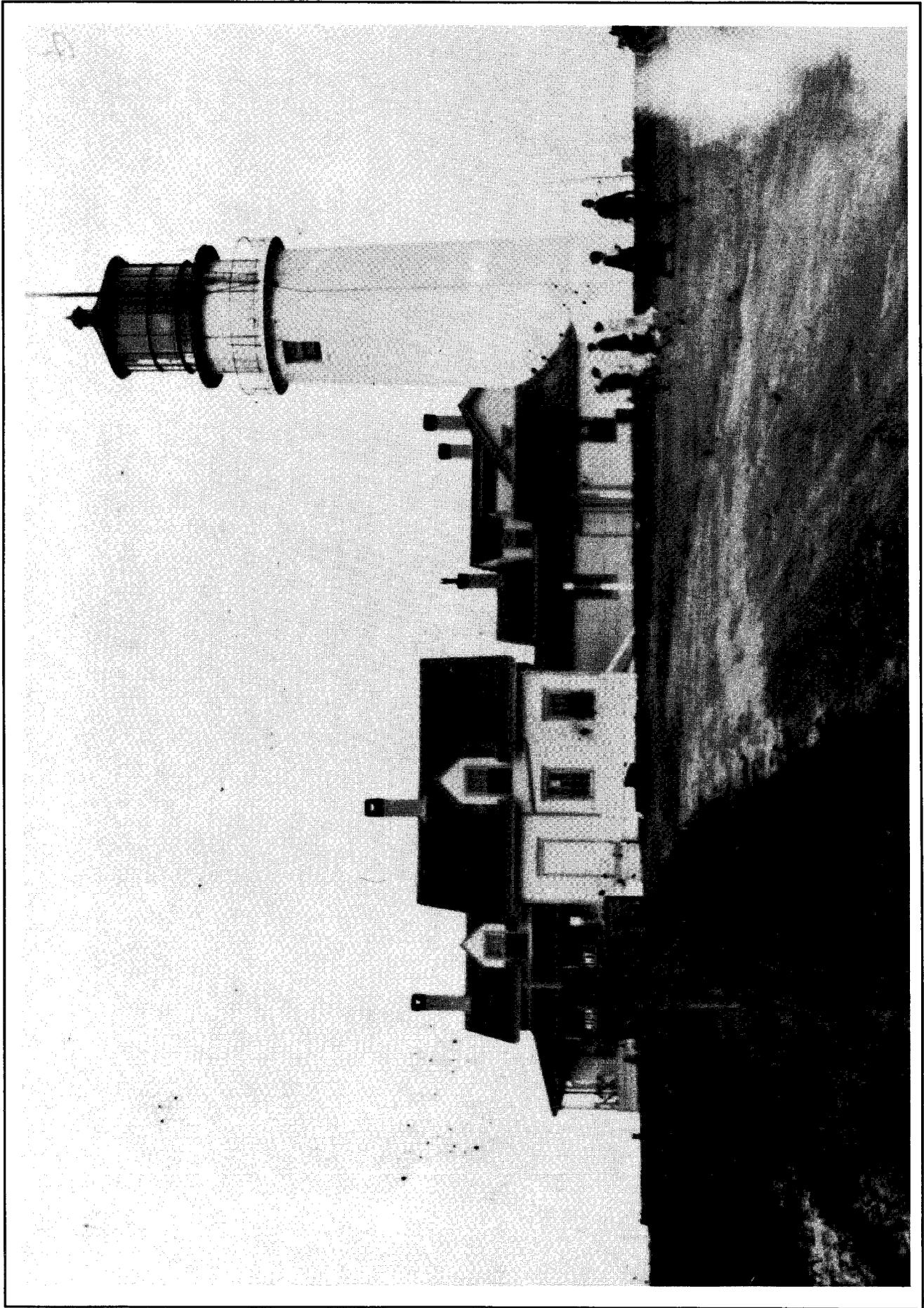


Figure 24. Cape Cod Light, looking east, between 1910 and circa 1920.

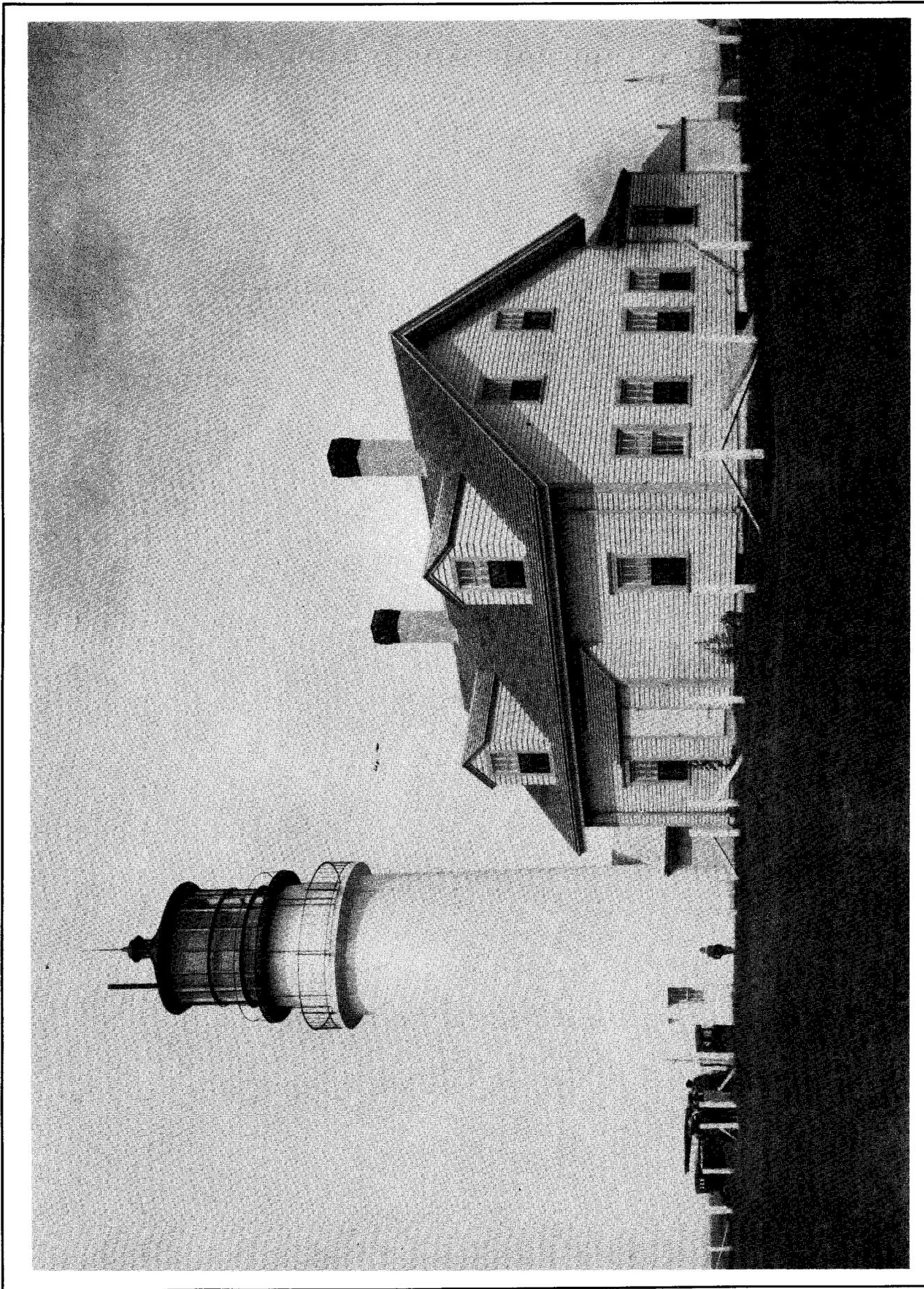


Figure 25. Cape Cod Light, looking west, between 1910 and circa 1920.



Figure 26. Cape Cod Light, looking southwest, circa 1925.

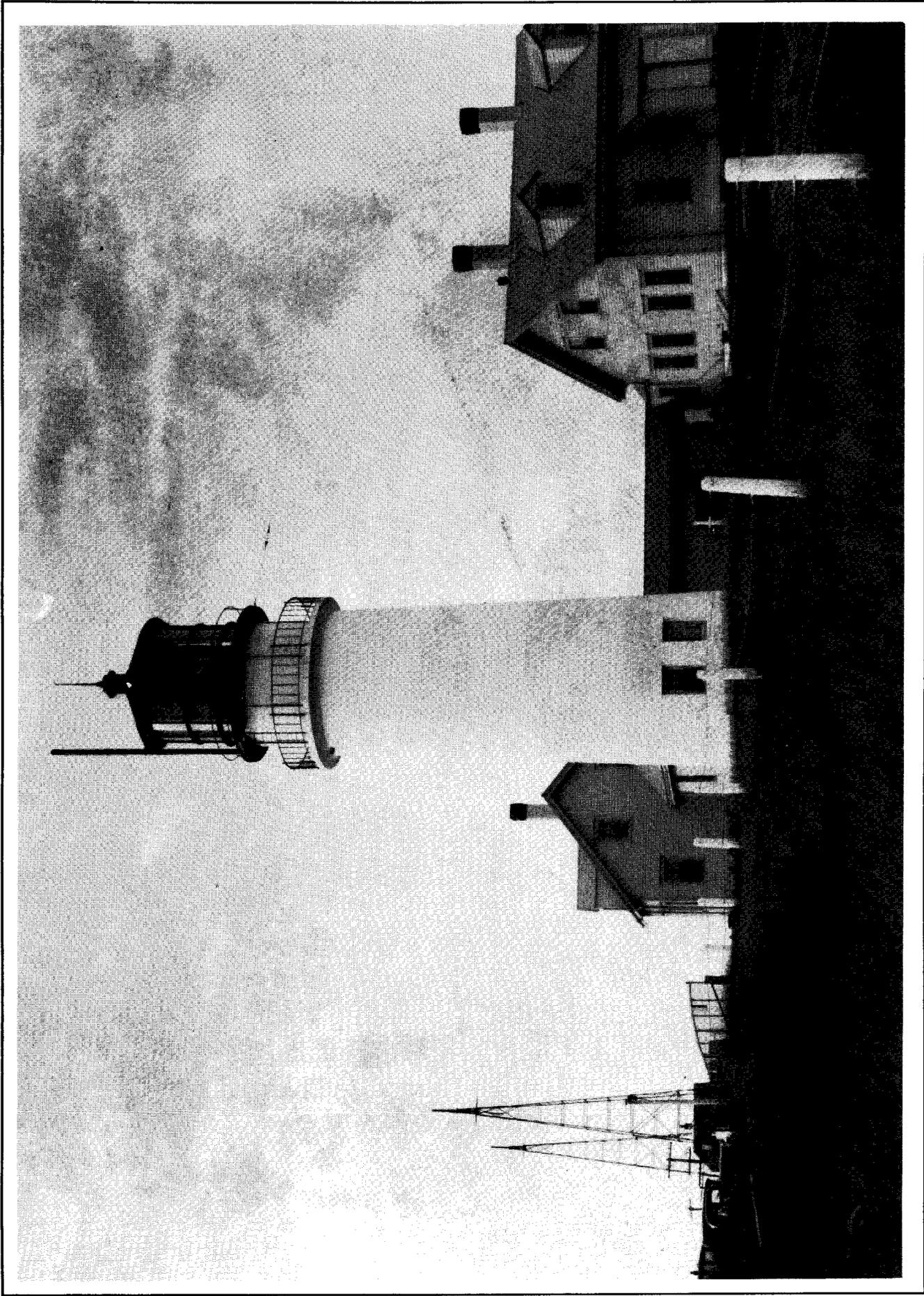


Figure 27. Cape Cod Light, looking north, between circa 1930 and circa 1935.

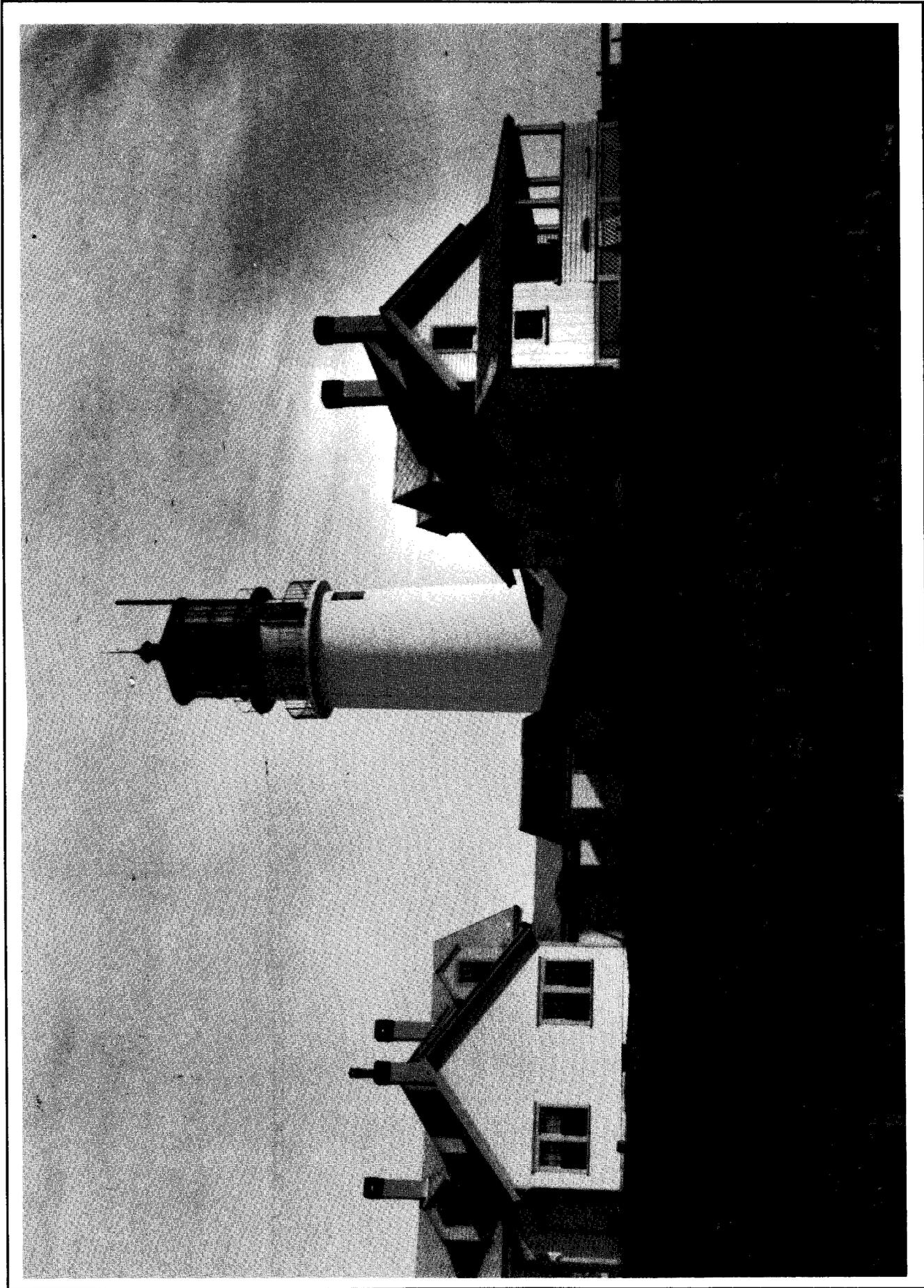


Figure 28. Cape Cod Light, looking south, between circa 1930 and circa 1935.

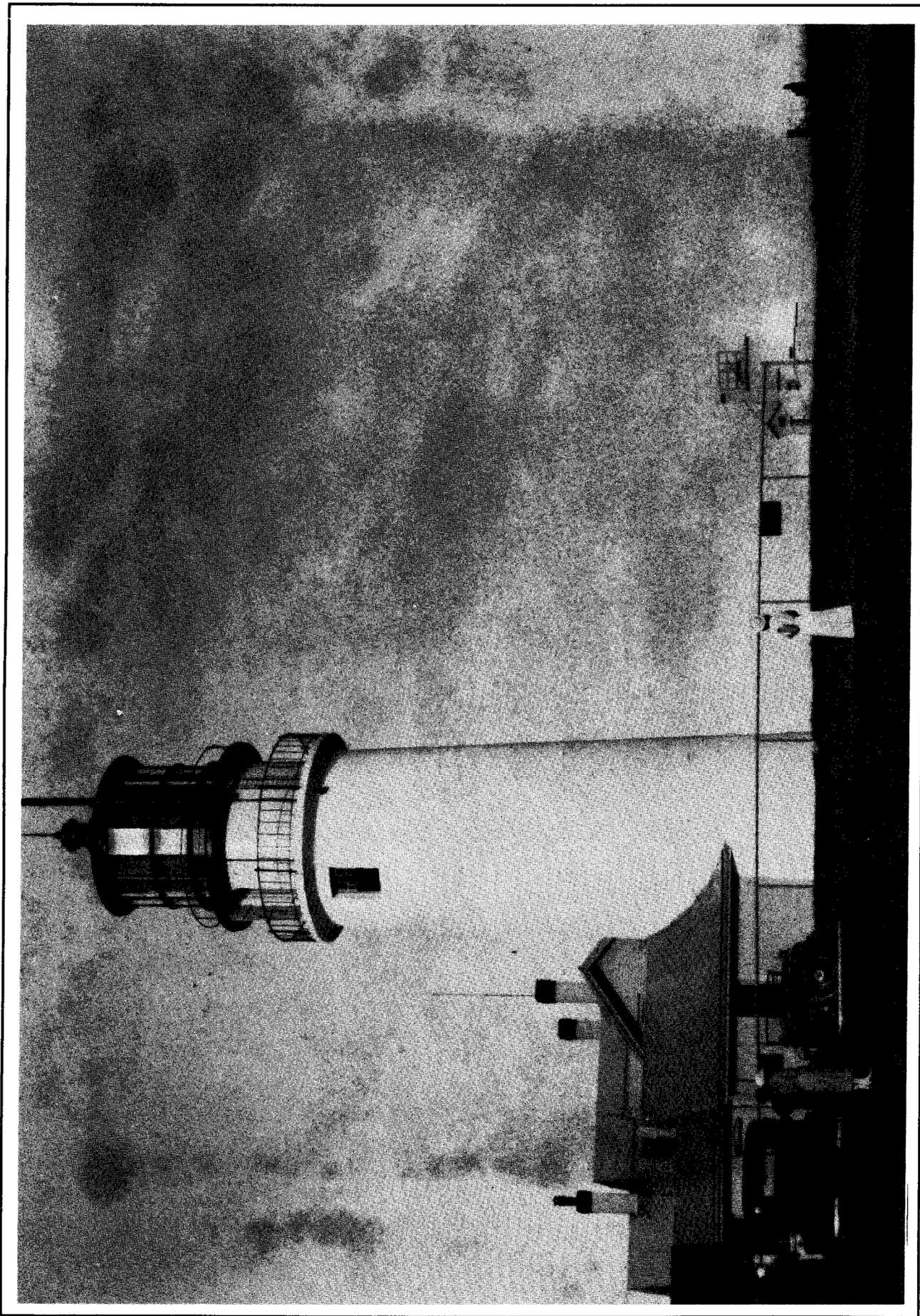


Figure 29. Cape Cod Light, looking east, circa 1935.

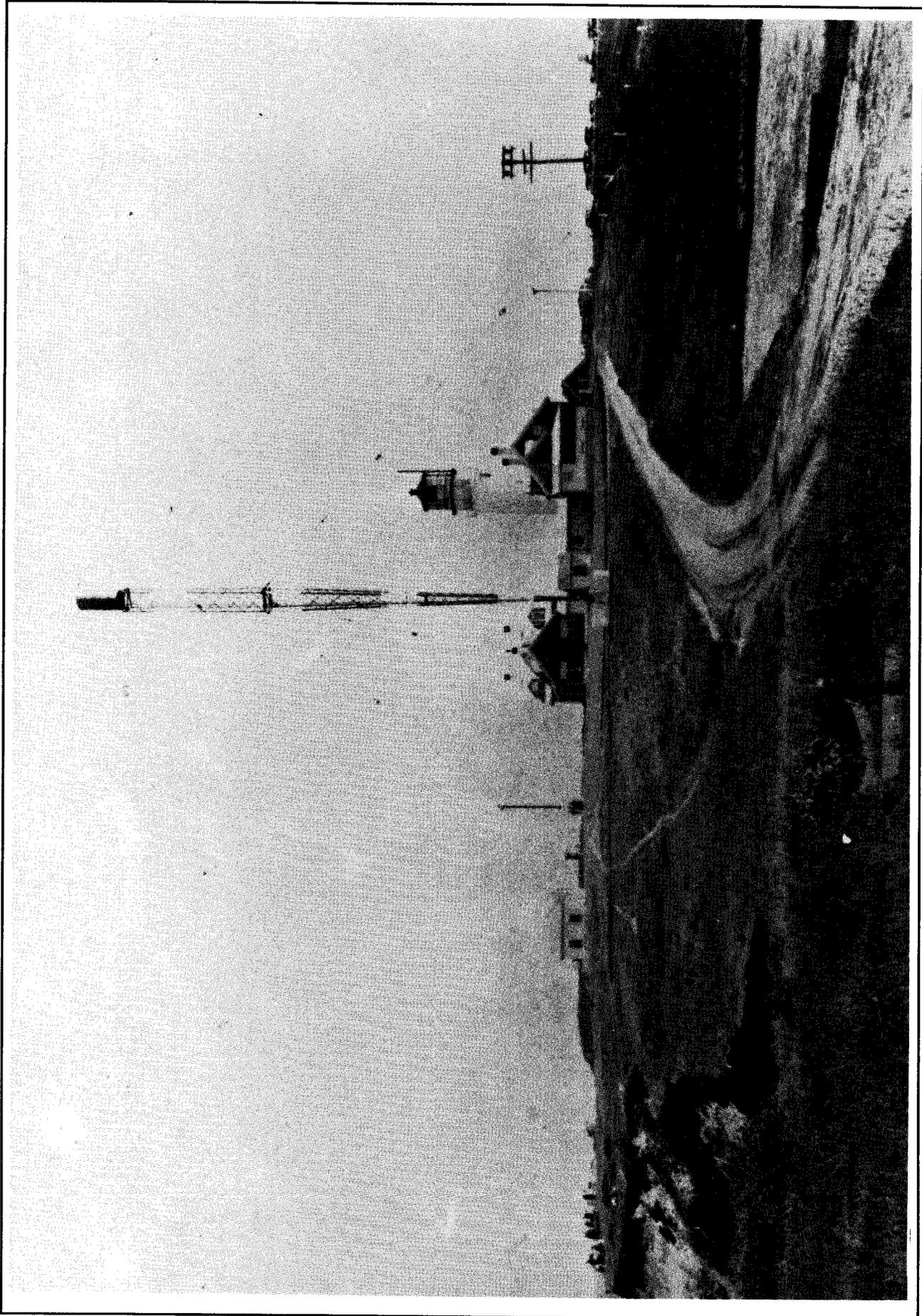


Figure 30. Cape Cod Light, looking south, between circa 1935 and 1946.

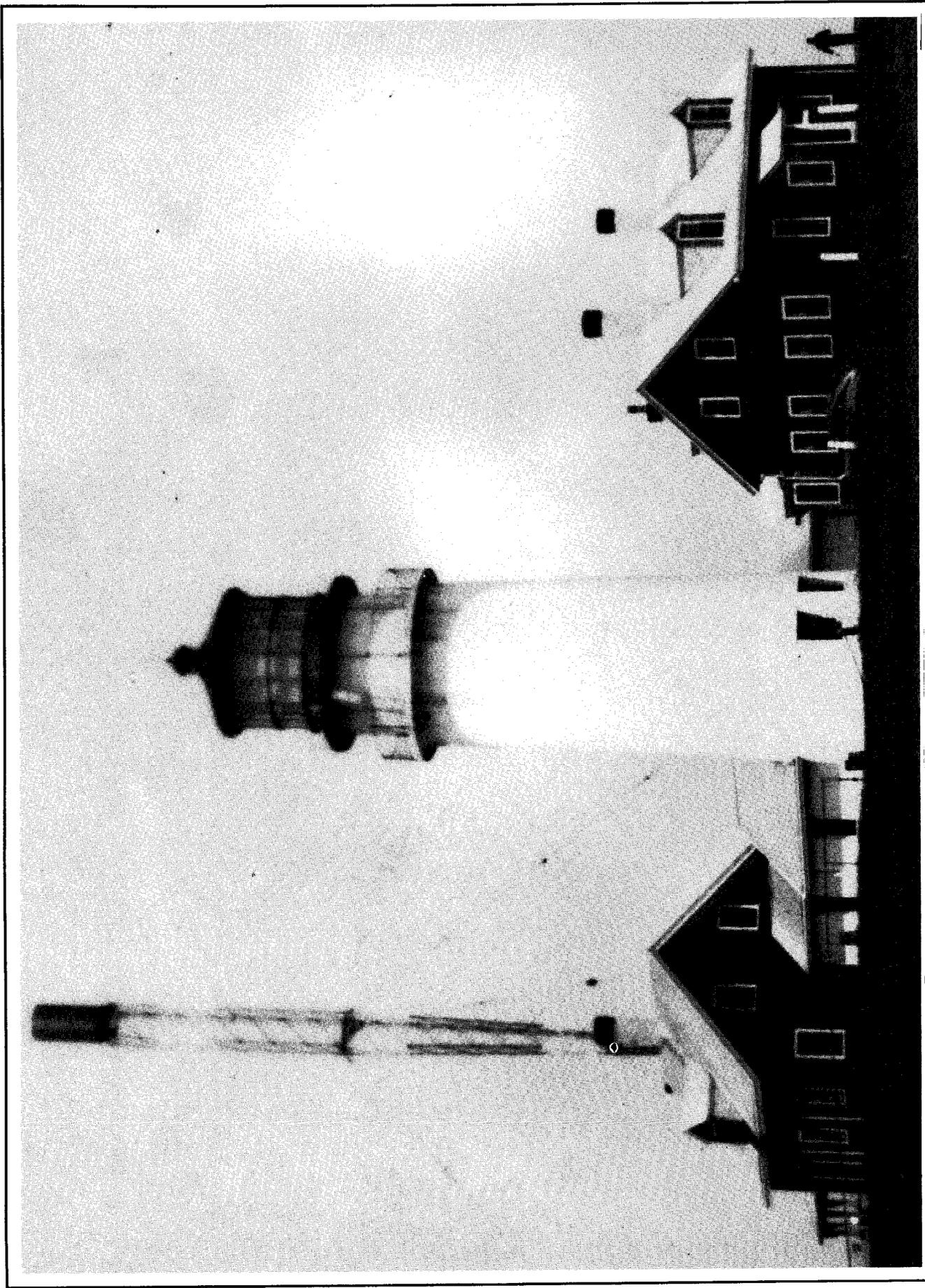


Figure 31. Cape Cod Light, looking north, before 1946.



Figure 32. Cape Cod Light, after 1944 and before 1946.

1947 to Present

The U.S. Coast Guard

The Coast Guard, as stated previously, was made responsible for aids to navigation in 1939. Technical improvements in lighthouse operation—especially automation—have continued at a rapid pace since that time, despite frequent internal Coast Guard reorganizations. Reflecting this increased complexity, the concept of a Light Station evolved and eventually became a formal designation.¹⁰⁴ This recognized that the lighthouse no longer could be viewed as an isolated entity, but was part of a complex that might include dwellings, utility buildings, boats, fog signals, and radio apparatus. This emphasis was visible at Cape Cod Light.

As was the case with its predecessor agencies, the Coast Guard divided the country administratively into a number of districts. The frequent internal reorganizations of the Coast Guard lie outside the scope of this study. At the present time, Highland Light is administered by three units of the Coast Guard. The overall operation and administration of the site is the responsibility of Group Woods Hole (Woods Hole, MA); the authority for aids to navigation rests with the First Coast Guard District Office (Boston, MA); and the management of real property is under the supervision of the Civil Engineering Unit Providence (Warwick, RI).

Activities at the Highland Light

A 1949 Report of Attended Light Stations documented that the light at Cape Cod Station then flashed for 0.35 seconds, and that the eclipse or interval between flashes was 4.65 seconds. It was also noted at that time that the station exterior was painted, and that the light tower was painted and whitewashed throughout.¹⁰⁵ Figure 33 shows the site after 1946 but before 1956. These dates are based on the absence of lantern curtains and the presence of the garage, which was demolished in 1956.

A smattering of archival material shows that several inspections took place at the site in 1950. A report titled *Cape Cod Light* and hand-dated 1950 (no month or day) indicates that for the light tower:

The tower structure is in good condition and well painted. The two windows at ground level show evidences of rot in the sills, sash and frames which should be replaced although the need is not urgent. The crew will replace a few shingles that are missing. In the passageway connecting the tower to the two dwellings there are spots where the plaster should be replaced. The station crew will accomplish this work, using plasterboard

¹⁰⁴ Holland, draft National Historic Landmark nomination, Chap. 5.

¹⁰⁵ Report of Attended Light Stations, September? 1949; Box File, USCG Region I, Major Aids to Navigation, 1900-1962, Box 17, Massachusetts (Box File); RG 26; NA/MA.

to make the repairs. The door on the South side of this passageway is in poor condition but does not require immediate replacement. Approximately four feet of gutter along this passageway is rotten.

The lantern lens and lens drive are in good condition with the following exceptions. One of the coupling screws is sheared off and the station does not have the proper tools to effect replacement.

The upper balcony is in good condition as is the lower balcony except for a few railing verticals that are eaten away. These are now will [sic] painted which should check further corrosion.

There are several cracked lantern panes but they do not leak to any appreciable degree so replacement is not warranted at this time.¹⁰⁶

Similar information was supplied for the single dwelling, including the notation that the chimneys, roof, walls and foundation, galley range and sink, boiler, framing, and floors were in good condition:

The gutters are in satisfactory condition but the trim at the ends of the ridge roof is rotten.

The plaster on the porch ceiling is falling off and should be replaced. The ceiling is not flat but changes slope at about its center so a flexible type of wallboard should be used to effect replacement.

The plaster on the galley walls is loose from the lath but is otherwise sound and does not require replacement at this time. The wall plaster is sound . . .

The outside door to the galley is in fair condition. Replacement is not urgent.

The finish coat of plaster is peeling off in spots on the stairway to the second floor.

The plaster is loose in places in two bedrooms and will be replaced with sheet rock by the crew.

The door frame at the bottom of the bulkhead entrance to the basement is rotten . . .

There are no leaks in the heating or water piping except a slight leak where the piping connects to the boiler. The water pressure is poor and some rust often comes through when the water is first turned on so the building should be repiped in the near future. . . .

The light fixtures are old and the station has recently had two short circuits in the wiring. An electrician should go over the wiring and replace any that has poor insulation.

The smoke pipe between the boiler and the chimney is rusted out and will be replaced by the station crew.

The windows in this building are in satisfactory condition.¹⁰⁷

¹⁰⁶ "Cape Cod Light," report hand-dated 1950; Box File; RG 26; NA/MA.

¹⁰⁷ See footnote 106.

A single page dated August 3, 1950, and possibly originally attached to the above report, notes that the station was in excellent condition, despite being short four crew members: "Crew was in process of painting tower inside and out. . . . Storm windows and screens are needed for the single dwelling, and an oil or gas range is recommended for cooking (to replace the old coal stove). R.J. Carson"¹⁰⁸

On August 1, an inspection report was submitted that confirmed that the aids to navigation were in generally good working order, that the condition of the structures was good, that the tower and dwelling were protected against lightning with suitable lightning rods, and that a modern sanitary system was installed in all dwellings. The major noted deficiency regarding living conditions was that the water from the deep well had not been analyzed lately for purity.¹⁰⁹ The inspector's report to the Commander of the 1st Coast Guard District included the lack of water analysis among other deficiencies, one of which was that the cellar stair had no top landing. In addition, the inspector commented that the station, including the lifeboat station, "quartered and subsisted" 11 men for both the light station and the lifeboat station, all living in the "three old keeper's dwellings. The remaining two are unused and vacant except for coal ranges in galley."¹¹⁰ Two (other?) dwellings were showing rapid deterioration, and possibly were those related to the original telegraph and lifesaving sites. Only one tub and no shower was available to these 11 men, which was probably neither convenient nor sanitary. Cooking depended on getting the draft needed to operate the coal-burning kitchen range, so poor weather conditions affected "proper and prompt preparation of meals."¹¹¹

The Commander of the 1st Coast Guard District informed the Commandant (INS) at the end of September that a water analysis would be made, and the cellar door would be relocated to swing outward. In addition, a study would be made about constructing a cellar landing and replacing the coal-burning range with an oil-fired range. A shower was to be installed as soon as funds were available, without additional study. The two apparently surplus buildings, whichever ones they were, would have to wait until wartime requirement issues were resolved, when a decision could then be made regarding their salvage possibilities.¹¹²

¹⁰⁸ See footnote 106.

¹⁰⁹ Inspection report by G.W. McKean, Captain, Eastern Inspector, 1 August, 1950; Box File; RG 26; NA/MA.

¹¹⁰ Memorandum, Eastern Inspector to Commander, 1st CG District, 11 August 1950; Box File; RG 26; NA/MA. The fact that the crews of the light station and the lifeboat station were considered together reflects the way in which administrative and technological changes gradually caused the originally separate lightkeeping and lifesaving functions to come together within an expanding U.S. Coast Guard.

¹¹¹ See footnote 110.

¹¹² Memorandum, Commander, 1st CG District, to Commandant (INS), 28 September, 1950; Box File; RG 26; NA/MA.

Wartime (World War II) requirement issues may have been resolved by 1952. On March 7 of that year, a Board of Survey decided that the double keepers' dwelling with five rooms and a bath on each side was not to be disposed of at this time, but that the barn (or garage) was worthless.¹¹³

Inspection records from the same year provide a less pleasing picture of the station. The inspector, who was the Chief of the Aids to Navigation Section, reported that:

1. [Not applicable]
2. The old quarters (Keeper's house) were dingy and grimy and poorly stowed. Bath room was dirty. The double dwelling vacant at present was indifferently secured and showed some evidence of interior deterioration. If not needed for beach patrol it should be surveyed for demolition and removal.
3. Inside whitewash of light tower showed considerable evidence of flaking. Lens drive was very noisy.
4. Fog signal oscillators have been removed inboard because of bank caving in, due to erosion undermining.¹¹⁴

The inspector recommended that the double dwelling either be disposed of or properly secured and preserved; that the keeper's dwelling be cleaned and modernized with "linotile," woodwork, and paint, etc.; and that the interior of the tower be repainted with whitewash.¹¹⁵ A single page, labeled "(p. 4)" but with no previous pages, and signed with the same name (W.B. Chiswell) as the 1952 inspector, notes that the "Crouse Hinds beacon was excessively noisy although bearings had just be (sic) renewed," that the "cliff in front of light is undercutting rapidly from sea action," and that the "Light & Dwelling are in general good condition and repair."¹¹⁶

The Coast Guard may have accomplished some postwar reorganization in 1952, because the status of Highland (Cape Cod) Light was changed at that time from a "sub-unit of Lifeboat Station,

¹¹³ Proceedings of Board of Survey, D-32-52, March 7, 1952; files, USCG CEU Providence; Warwick, RI.

¹¹⁴ Memorandum, Chief, Aids to Navigation Section, to Chief of Staff, via Chief, Operations Division, May 20, 1952; Box File; RG 26; NA/MA.

¹¹⁵ See footnote 114.

¹¹⁶ W.B. Chiswell, no date; Box File; RG 26; NA/MA.

Cape Cod to that of a separate district unit in Group Race Point."¹¹⁷ An additional note clarified that Group Race Point was now also renamed as Group Cape Cod, and that the site should be redesignated as "Light Station (Lookout) Cape Cod, Mass."¹¹⁸

The barn/garage was demolished in 1956. A storage shed and an outhouse were torn down in 1957.

In mid-August of 1957, specifications were submitted for changing the heating and domestic hot-water system at Highland Light. The description was "intended as a guide in converting the existing coal fired gravity circulating heating system to a closed, forced system of hot water heating complete with 'year around' domestic hot water, automatic controls, with all appurtenances, etc."¹¹⁹ The new heating system probably replaced the system that dated to the turn of the century when the major renovations occurred at the station.

An undated "Allowance List" references the "Cape Cod Light and Lookout Station."¹²⁰ This list postdates 1952, due to the official wording of the site's name, and predates 1957, due to the fuel source named for the heating system. The list noted that the lens was still a 36-inch Crouse-Hinds double-drum beacon, and that the main illuminant was an electric lamp with 1,000 watts, 120 volts, and a T-20-C13 filament. It also provided measurements for storm panes, presumably for the lantern, since the measurements matched those provided for the same in the site survey of 1927, except that only two each are listed. Listed dwelling equipment included heating systems for all three dwellings (all fueled by nut coal), cooking ranges, refrigerators, etc. Only the heating systems were specifically categorized by dwelling. The keeper's dwelling retained a system manufactured by H.B. Smith, size W-26-5. Two cooking ranges in the dwellings were Queen Atlantic No. 308's, also fueled by nut coal, and a third was a Caloric Gas Range, Model D7468U, fueled by bottled gas. It is unknown which ranges were located in which dwelling. Only one hot-water heater was listed: a 45-gallon model made by A.O. Smith Corp., Kankakee, IL, Model PG-45.

In April 1958, the Safety Board at Cape Cod Light Station recommended that a new railing for the weight deck in the light tower be fabricated, and that several places needed welding at the outside "catwalk" railing.¹²¹ It is not known if the latter work related to the railing of the watch gallery or that of the lantern gallery, since both railings have since been altered. A new fog signal

¹¹⁷ Memorandum, Commander 1st CG District, to Commander CG Group, Cape Cod, June 9, 1952; file A 4-2; Box File; RG 26; NA/MA.

¹¹⁸ See footnote 117.

¹¹⁹ Specifications and cover sheet from H.D. Wear, AAC Chief, Civil Engineering Section, August 15, 1957; Box File; RG 26; NA/MA.

¹²⁰ Allowance List, USCG Cape Cod Light and Lookout Station, form #CG-9946A (8-46), no date; Box File; RG 26; NA/MA.

¹²¹ Memorandum, Commander, First CG District (by direction H.B. Wear), to Commanding Officer, CG Base, Woods Hole, Mass., L9-3, April 29, 1958; Box File; RG 26; NA/MA.

(not building) was added in 1958, since the earlier signal horns and their concrete footing were being threatened by erosion.

Two photographs show the site in the late 1950's. Figure 34 is dated 1959. Figure 35 postdates 1958, based on the presence of the new fog signal, but predates 1961, based on the presence of the old assistant keepers' dwelling. Figure 35 indicates that the pilot-balloon observation platform attached to the brick oil house south of the fog signal building had been removed by that time.

A full set of plans was drawn in 1959 for a modern double dwelling and labeled "Family Quarters."¹²² A Board of Survey was requested to be convened nine months later in order to establish the status of the existing, unoccupied double (assistant keepers') dwelling at Cape Cod Light Station, which had been authorized for retention in a no-repair status in 1952.¹²³ By September 1960, the structure had been declared excess real property,¹²⁴ and the demolition contract was awarded to James M. Silva of Provincetown by the end of 1961, based on the findings of the Board of Survey Report.¹²⁵ For the first time in more than a century, the lighthouse complex would be without one third of its connected triumvirate, and the tower and keeper's dwelling would stand alone. A new modern duplex, the "Family Quarters," was constructed as an unattached unit and completed in 1963.¹²⁶

Two photographs show the completed duplex, as well as changes made to the keeper's dwelling and other structures on the site. The earlier of the two images is a postcard, which was not reproduced here because it is so indistinct.¹²⁷ The later photograph (fig. 36) postdates 1966, because it does not show the lookout tower, which was demolished that year.¹²⁸ It was taken before circa 1977, however, because it shows the fog-signal building and paint locker near the cliff, which were approved for demolition in 1977.

¹²² "Family Quarters - Three Bedroom," drawings 1-14, dated 9/11/59; drawing files, CG Dwgs. #107211-107220; USCG CEU Providence; Warwick, RI.

¹²³ Memorandum, D.J. Lucinski, District Comptroller, to? Chief, Civil Engineering Section, A20, June 28, 1960; Major Aids to Navigation; RG 26; NA/DC.

¹²⁴ Report of Excess Real Property, September 2, 1960; USCG CEU Providence; Warwick, RI.

¹²⁵ Report of Changes to Federal Real Property, December 29, 1961; USCG CEU Providence; Warwick, RI.

¹²⁶ Report of Changes to Federal Real Property, June 24, 1963; and drawing file, New Family Quarters Plot Plan, CG Dwg. #5477, April 25, 1961 (last revision "Corrected to 'As Built' Drawing," March 8, 1963. USCG CEU Providence; Warwick, RI.

¹²⁷ Published by Cape Cod Photos, Orleans, MA; undated, but postdates 1963 demolition of assistant keepers' dwelling and completion of new duplex structure. Research files, Cultural Resources Center (CRC), National Park Service (NPS).

¹²⁸ Report of Changes to Federal Real Property, June 2, 1966; USCG CEU Providence; Warwick, RI.

Figure 36 reveals that the main doorway of the keeper's dwelling had by that time been returned to its original location. If one looks carefully at the image, one can see that the entrance steps have been moved to the south bay of the main block of the dwelling's west elevation. The extant hood and partial porch enclosure at this doorway were not added at this time. Figure 36 also shows that the large 1932 tower for the radio direction-finder beacon was replaced with a smaller one in the same location after 1966.

An internal telephone system must have replaced the old marine telegraph system, because a Board of Survey suggested removing the telephone communication between Race Point LBS (Life Boat Station) and Cape Cod L/S (Light Station) in 1964. The reason for the suggestion included the fact the commercial telephone service had recently become available in the area even though the majority of poles had been installed in 1938 and 1939.¹²⁹

Erosion had always been a problem at the site, as mentioned in several reports throughout the years. A 1971 Board of Survey Report documented that the original 1796 land acquisition at Cape Cod Light amounted to 10 acres, and found "that the ocean side of the property has a constant slow erosion problem." (In addition, it documented that this site had a manned light.) The board was of the opinion "that an up-to-date land survey would reflect considerably less acreage than the 10.0 acres shown in the present records."¹³⁰ The Coast Guard's District Civil Engineering Unit contains five different Record of Erosion plans, the first dating to September 1973, the last dating to April 1986. While several of these drawings may have addressed the rate of erosion, none of them record the number of remaining acres.¹³¹ It is curious to note that the land survey completed in 1885 records the amount of land to the edge of the bluff as 4.822 acres (see fig. 10).

The 1976 Annual Report of Real Property almost casually recorded that the name of the station was officially changed.¹³² The name of "Highland LTSTA" (or light station) was now official. Documentation clearly shows that throughout the years the station was recognized by two names, Cape Cod Light (the official name since 1797) and Highland Light. However, the former may have become too confusing as many additional lighthouses were built on Cape Cod. What is interesting is that the official name change occurred as late as it did.

The 1976 Annual Report also contains the fact that a ladder and safety-rail assembly were installed.¹³³ This may refer to the exterior ladder that currently ascends from the watch gallery to the lantern gallery. This assumption is based solely on the fact that the ladder does not appear in the 1959 photograph (fig. 32), but is evident in the post-1966 photograph (fig. 36).

¹²⁹ Board of Survey No. D-17-64, April 30, 1964; USCG CEU Providence; Warwick, RI.

¹³⁰ Board of Survey Report, March 29, 1971; USCG CEU Providence; Warwick, RI.

¹³¹ Record of Erosion: September 21, 1973; August 11, 1975; December 6, 1978; July 8, 1985; and April 22, 1986. Drawing files; USCG CEU Providence; Warwick, RI.

¹³² Annual Report of Real Property, November 18, 1976; files, USCG CEU Providence; Warwick, RI.

¹³³ See footnote 132.

As stated previously, the fog-signal building and the paint locker were approved for demolition in 1977. The Record of Erosion drawing dating to December 6, 1978, does not show the outbuildings, confirming that they had been razed by that time.

The hood and partial porch enclosure at the main doorway of the keeper's dwelling, as explained earlier, were not built when the doorway was reestablished as the main doorway prior to 1966. The date of the hood and enclosure is unknown, but documentation found in National Register nomination forms suggests that they were added after 1980.

The last documented changes took place when the beacon was replaced with a fully automated signal. Drawings from June 1987 provide for the installation of the Crouse-Hinds DCB-224 rotating beacon and the supporting equipment necessary to operate it. (Two of the 24 drawings are included as Appendix Y.) Most of the equipment required to support the operation of the beacon is housed in the first adjoining room immediately to the north of the tower. Other work specified in 1987 included: the tower's exterior galleries were sandblasted and painted; the east window opening in the room adjacent to the tower was bricked in; a large plate glass window in the west wall of the same room replaced the smaller, original window opening; glass blocks replaced the double-hung sash in the tower's window openings; and the partition that prevented direct internal access from the tower to the keeper's dwelling was installed.¹³⁴

Although no written documentation was found, a Coast Guard official related information regarding alterations to the keeper's dwelling.¹³⁵ Much of the interior had been renovated circa 1992, due to burst water pipes. The first story retains very little fabric that was not replaced at this time. Paint analysis confirmed a visual assessment: the only first-story interior elements that predate the circa-1992 renovation are the doorway surround and door of the main west entrance, and all of the trim associated with the stair hall, except for the one remaining door. More fabric was left intact on the second story, but it represents various periods, beginning with the 1900 renovation. (See appendix B, Paint Analysis.) It is believed that the windows and majority of exterior trim were replaced at this time, but the dwelling retained its shingle siding, and the tower and connecting structures remained painted.

Photographic evidence indicates that the exterior stair to the porch was relocated at some point from the west to the north side of the porch. This change occurred after 1946, based on figure 33. It may have occurred as late as 1992, based on the use of pressure-treated wood. Two first-story window openings also were removed: one from the north elevation of the ell, facing onto the porch, and one from the north wall of the north vestibule. Again, these alterations may have occurred as late as 1992, but their exact dates are unknown.

The smaller radio beacon evident in figure 36 was removed in 1992.¹³⁶

¹³⁴ Cat II Automation Plans, 24 drawings, June 15, 1987; drawing files; USCG CEU Providence, RI.

¹³⁵ Personal conversation with Senior Chief Petty Officer Chris Coleman, USCG, Provincetown, MA.

¹³⁶ Personal conversation with USCG Lieutenant-Commander Dan R. May.



Figure 33. Cape Cod Light, after 1946 and before 1956.

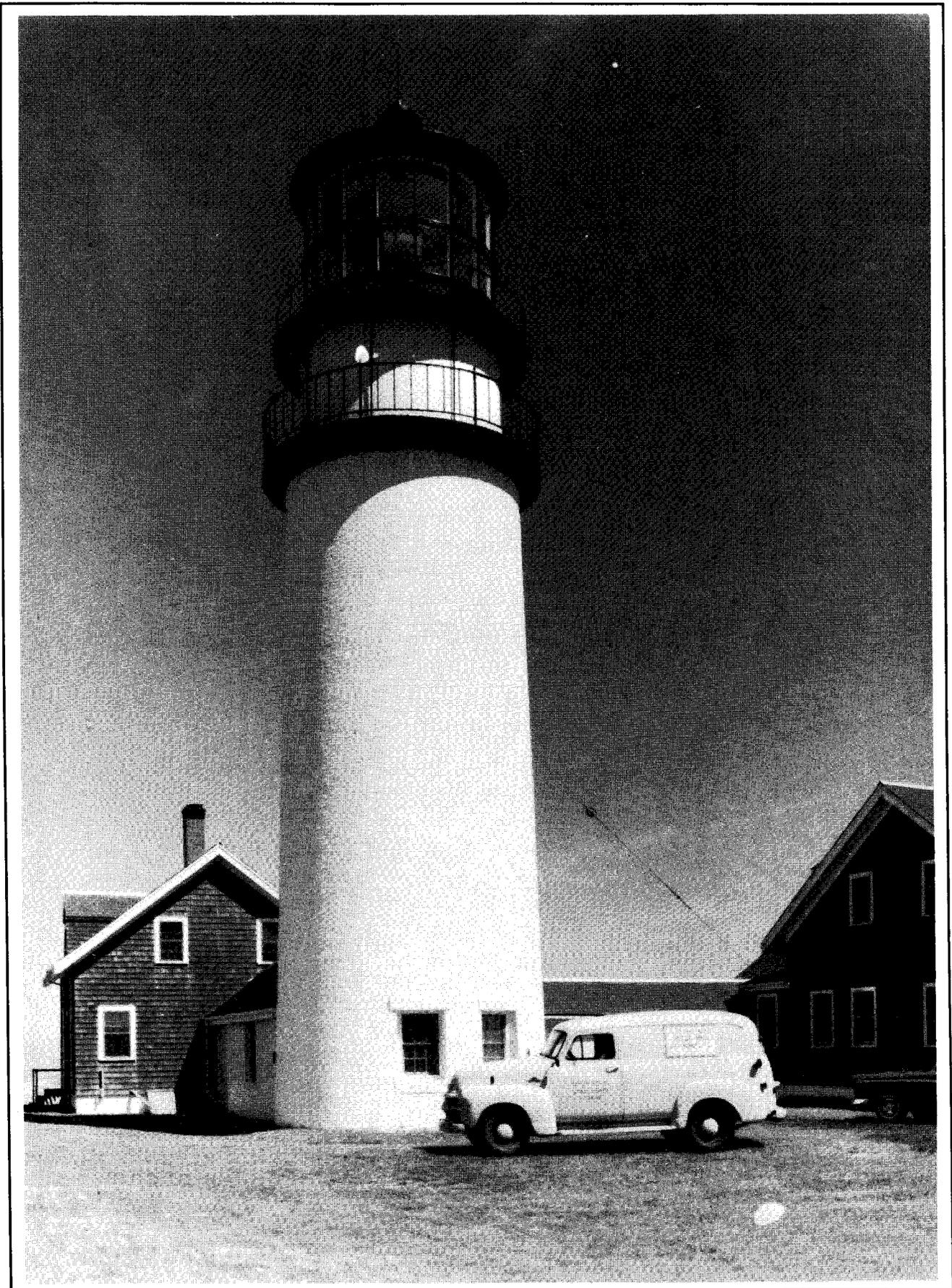


Figure 34. Cape Cod Light, looking north, 1959.

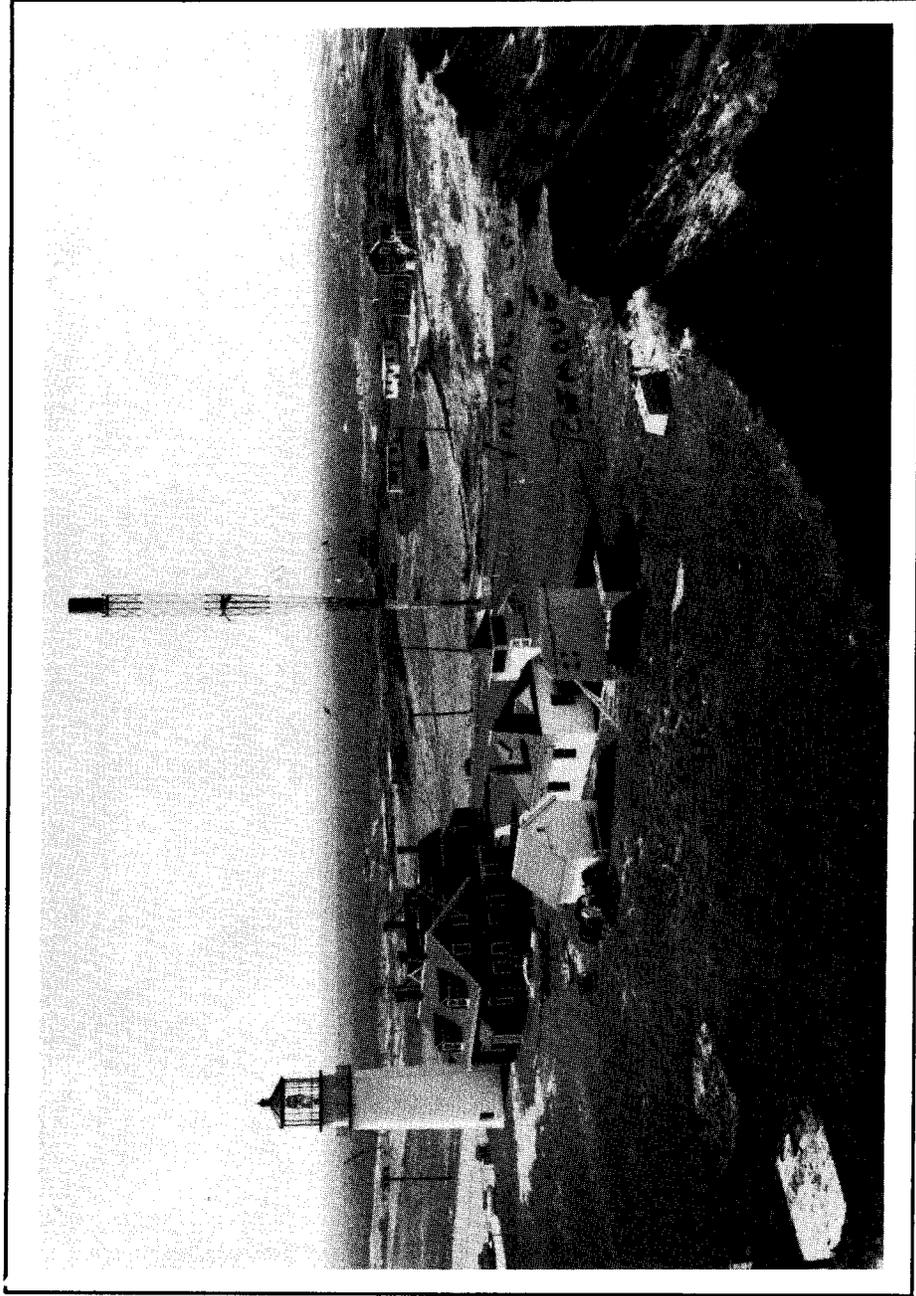


Figure 35. Cape Cod Light, after 1958 and before 1961.

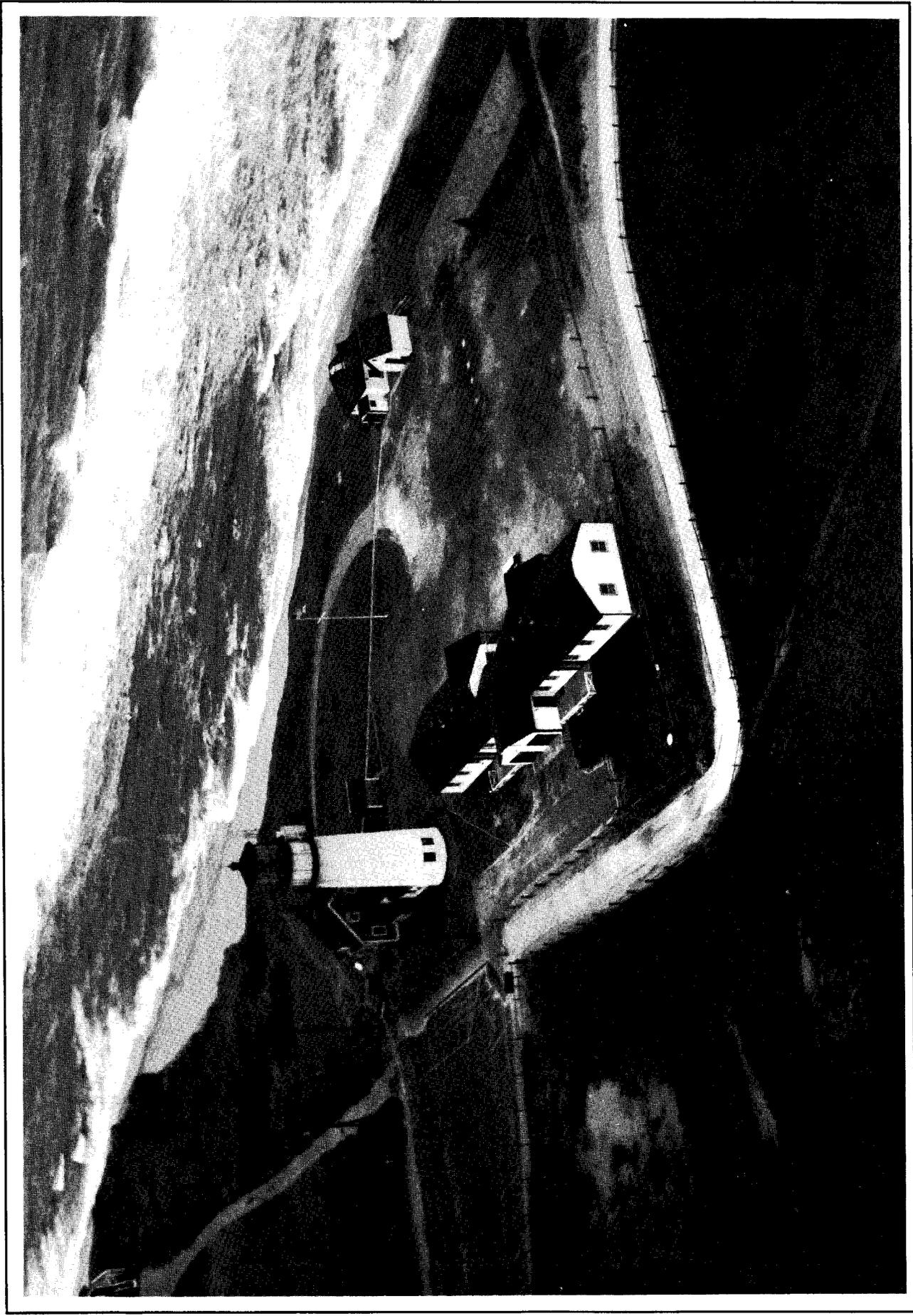


Figure 36. Cape Cod Light, aerial photograph looking north, between 1966 and 1977.

Summary History of the Highland Light

The Highland Light site has been fully operational since 1797. It has been home to three consecutive light towers, providing continuous illumination from Cape Cod's eastern banks to seafarers for almost two centuries. Despite the many changes in the administration of the nation's aids to navigation, the beacon's importance to mariners has never lessened throughout its history. The beacon itself and its supporting structures have been replaced, altered, and/or repaired in order to meet changing requirements or technological advances. However, the footprints of the extant light tower, the keeper's dwelling, and the two passages that connect the two have never changed since the buildings' construction in 1856 and 1857.

The most obvious changes to the site in the 19th century were two-fold. One was operational: a fog signal was installed, along with two small supporting structures. The other was cosmetic: the original board-and-batten siding on the dwellings was replaced with clapboards.

Perhaps the most encompassing building changes, however, occurred in the first decade of the 20th century. At that time, the floor plans of both dwellings were completely reworked and dormers were added, the ell of the keeper's dwelling was raised to include a second story, and a porch was installed to wrap around two of the ell's sides. Shortly thereafter, a new Fresnel lens was installed in the tower, the beacon characteristic was changed from fixed to flashing, and a new iron staircase replaced the original spiral staircase that had wound around a center pole in the tower.

A series of alterations also occurred in the 1930's. The wood roofing material was replaced with asbestos shingles near the turn of the decade, and the dwellings' clapboards were replaced with shingles. A very large radio beacon tower was also erected during this time period. To the casual visitor, the 1932 electrification of the beacon would have been less evident. (The old Fresnel lens, which was retained to intensify the newly generated light, also concealed its source.) However, this replacement—more than any alteration—undoubtedly provided the most relief for the keepers from the labor-intensive job of keeping the old lamps fueled and lit. Even the 1947 installation of the Crouse-Hinds beacon, which was highly advanced technologically, may not have caused such a radical change in the keepers' routine.

Many buildings were added to and removed from the site during the Second World War and subsequent years. (A chart on the following page records the construction and demolition of the majority of the buildings affiliated with the operation of the extant light station.) In addition to the slow disappearance of site's supporting structures during this time frame, three changes occurred that had a dramatic impact on the site. First, the old assistant keepers' dwelling was razed in 1961 to make way for a new duplex dwelling for Coast Guard personnel, which greatly changed the landscape. Second, the beacon was fully automated in 1987, which precipitated other changes to the fenestration of the tower and the connecting buildings. Last, a water pipe burst in the keeper's dwelling circa 1992, prompting the replacement of most first-story building fabric and all windows.

Although these modifications have altered the site throughout its existence, it has retained a great deal of its historical integrity. Its use has not changed, and its two most important structures remain intact.

Recap of Structure Lifespans at Highland Light Station

BUILDING+	Docu. Date→	1855	1885	1903	1932	1944	1958	1966	1977	1994
Lighthouse		1857	X	X	X	X	X	X	X	X
Keeper's Dwelling		1856	X	X	X	X	X	X	X	X
Asst. Keeper's Dwelling		1857	X	X	X	X	X	1961R		
Brick Passageways-KD -AKD	?		X	X	X	X	X	X	X	X
	?		X	X	X	X	X	1961R		
Wood Houses (3)	1873?		X	X	?					
Barn	1797?		R by 1885							
Hen Houses	X		X	?						
Fog Signal	1873		X	X	X	X	X	X	1977R	
Engine/Coal House	1873		X	X	1908R					
Barn/converted to Garage			by 1885	X	X	X	1956R			
Brick Oil House/Paint Locker				1900	X	X	X	X	1977R	
Merchant Marine Telegraph			X	X	X	?				
Radio Beacon					1932	X	X	X	X	1992R
Pump House						1937	X	X	?	
Pilot Balloon Observatory						1944	X	1960R		
Lookout Tower							1945	1966R		
Radio Dir. Finder Bldg.						?	1957R			
Duplex								1963	X	X

X = structure documented at that date, either through photographs or archival references

R = date building was razed

II. PHYSICAL DESCRIPTION

EXISTING EXTERIOR APPEARANCE

A week-long site visit was conducted during the last week of March 1994. Two architectural conservators and an historical architect measured, photographed, and noted all existing conditions. A ladder was provided by the Cape Cod National Seashore to allow thorough investigation of the roof systems and materials.

For the interior description, the rooms in each building have been assigned numbers. These numbers are B01-108 and 201-205 for the Keeper's Dwelling. Room titles are also provided for ease of reference.

For the exterior descriptions, some liberty has been taken to simplify the directional names of the structures' elevations. For example, the "north elevation" is actually oriented north-northwest.

[Note: in this section, the terms Keeper's Dwelling, Connector at the Keeper's Dwelling, Tower Connector, and Tower have been given initial capitalization, to highlight their individuality.]

Keeper's Dwelling

The Keeper's Dwelling consists of two sections: the main house, and an extension projecting from the east half of the north elevation. The main house contains the majority of rooms; the extension, or ell, has a large wraparound porch and contains the kitchen and an upstairs bedroom. Measurements of both portions are provided on plans and elevations included in appendix A.

West Elevation

This elevation is depicted in figure 37.

Main House

The west elevation of the main house, like that of the ell, is clad with unfinished wood shingles. These have an exposure of approximately 5 inches, and are trimmed with plain boards painted white. The foundation is of brick. The exposed part of the foundation varies between eight and nine courses of brick in height, and is painted white. There are two window openings in the foundation. Both have wood frames painted dark green. One opening has been blocked with a wood panel from the inside. The other contains a three-light sash. The trim of the latter is original to the 1856 construction period. A hose bib is located near the top of the foundation level between the two window openings. Approximately two courses above the foundation level at the center of the elevation is a small aluminum hood. It was probably for utility service.

At the south end of the west elevation is a covered entry protecting the main doorway (fig. 38). The covered entry is approximately 3 feet 6 inches deep and 6 feet 10 inches high, with a gable roof. The exterior walls are shingled, with a course exposure averaging 5 inches. The trim is plain and painted white. A piece of plywood has been placed on the south side, at the base of the covered entry. (It is wedged underneath the first few courses of shingles.) Its purpose is undetermined. However, it appears that the shingles at this corner have been chewed by the present owner's dog; the plywood may be acting as a barrier to prevent further damage. The roof of the entry is covered with wood shingles that match the coursing of the house's wall shingles.

Three risers ascend to the floor of the covered entry. The treads and risers of the steps are built of pressure-treated lumber. The floor of the covered entry is composed of 3-inch-wide boards running east-west. The interior walls of the covered entry are plywood painted white.

A white aluminum storm door covers the main doorway. The storm door is divided vertically into three sections; the top two sections are acrylic plastic. The main door is wood with three horizontal, recessed panels below six lights of glass.

There is one window opening at first-story level. It contains a double-hung, one-over-one vinyl window with plain wood trim painted white. It has a white aluminum storm window. A metal outdoor light fixture with three sockets is located near the north corner of the west elevation.

A gabled dormer is cut into the roof line approximately centered over the first-story window opening. The dormer contains one window opening. The opening holds a double-hung, one-over-one vinyl replacement window with plain wood trim painted white, and having a white aluminum storm window. The dormer is sheathed in unfinished wood shingles, with plain white trim boards on the sides and double-layered wood trim at the roof pitch.

A plain wooden cornice board at the top of the wall is painted white. Sections of wooden gutter, also painted white, run the length of the roof on either side of the dormer. The south section has two drain holes, one at either end. The south hole retains its outlet pipe, elbow, and downspout down to grade. The north hole has lost its pipe, leader, and downspout. The north section of gutter has one drain hole, just north of the dormer. It retains its outlet pipe and elbow, but lacks its downspout. The elbows and downspout are of corrugated, rectangular, unpainted aluminum.

The roof is covered with red asphalt shingles. A PVC vent pipe protrudes from the roof near the north end. A brick chimney at the center of the ridge line (fig. 39) has been painted white. On the chimney the date 1857 is painted in black letters. The top three courses are corbeled. The top five courses are painted black. The chimney is flashed on three sides with metal flashing; the west side is covered with a troweled material. The flashing has been painted to match the color of the roofing.

Ell

The west wall of the ell of the Keeper's Dwelling (fig. 40) is set back 12 feet from the west wall of the main house. An open, one-story porch extends along the entire west wall of the ell and along much of the north wall, where it ends at an enclosed area (the north vestibule). This porch and vestibule will be discussed shortly. The west wall of the ell is covered with unfinished wood shingles with plain white-painted trim boards. It has two window openings; each contains double-hung, one-over-one sashes with a white aluminum storm sash over them. Plain white trim boards surround each window opening.

There is one dormer window on the west roof slope of the ell; it extends down through the eaves line. The sides of the dormer are wood-shingled and trimmed out with plain boards painted white. The roof of the dormer is a gable roof. The window contains double-hung, one-over-one sashes with aluminum storm sash.

The height of the ell roof at the ridge is about 8 feet above the porch roof. The roof of the ell and its dormer are covered with red asphalt shingles and trimmed in plain white boards. A wood gutter, also painted white, extends along both eaves. A brick chimney, once whitewashed, is located on the ridge at the north end of the ell roof. Its top six courses are painted black. The top three courses are corbeled and there is an opening under the chimney cap that is oriented east to west. Step flashing at the chimney has been painted red to match the color of the asphalt roof.

The wraparound porch is seen in photographs as early as 1903, but was altered in the 1930's. It is supported by wood foundation posts. These posts are spaced unevenly, ranging from 7 feet 1 1/2 inches to 7 feet 11 inches on center at the northeast corner. Sections of pressure-treated, unpainted wood lattice run between the posts to screen the area under the porch. The northwest corner of the porch rests on a concrete-block pier. This appears to have been added as reinforcement for this corner, where four steps of pressure-treated wood descend to grade.

The floor of the porch consists of boards 3 3/4 inches wide that run east-west on the west section of the porch and north-south on the north side of the porch. The boards are mitered at the northwest corner.

The perimeter of the porch is enclosed by a half-wall approximately 2 1/2 feet high and capped by a flat board 10 1/2 inches wide and painted white. The wall's corner boards are unpainted. Four columns and two pilasters—one at each end of the porch—rest on the half-wall and support the roof above. These are spaced approximately 7 feet apart. They are painted white and taper from the base to the neck. Their bases are 10 inches square (See figure 41.)

The west exterior wall of the north vestibule (fig. 42) is covered with vertical beaded boards 6 inches wide and painted white. It contains a doorway leading into the interior of the vestibule. The main door here is wood, six-paneled, and painted white; it is covered by an aluminum storm door. A paint ghost around the doorway frame suggests that its trim is a replacement.

The ceiling of the porch, probably a 1950's replacement, is covered with large plywood panels with battens, all painted white. A ceiling light fixture made of metal and glass is located at the north end of the porch.

The hipped roof of the porch is covered with red asphalt shingles. A plain cornice board with wooden gutter, both painted white, extends along the porch roof line.



Figure 37. Keeper's Dwelling, west elevation.



Figure 38. Keeper's Dwelling, covered entry at south end of west wall.

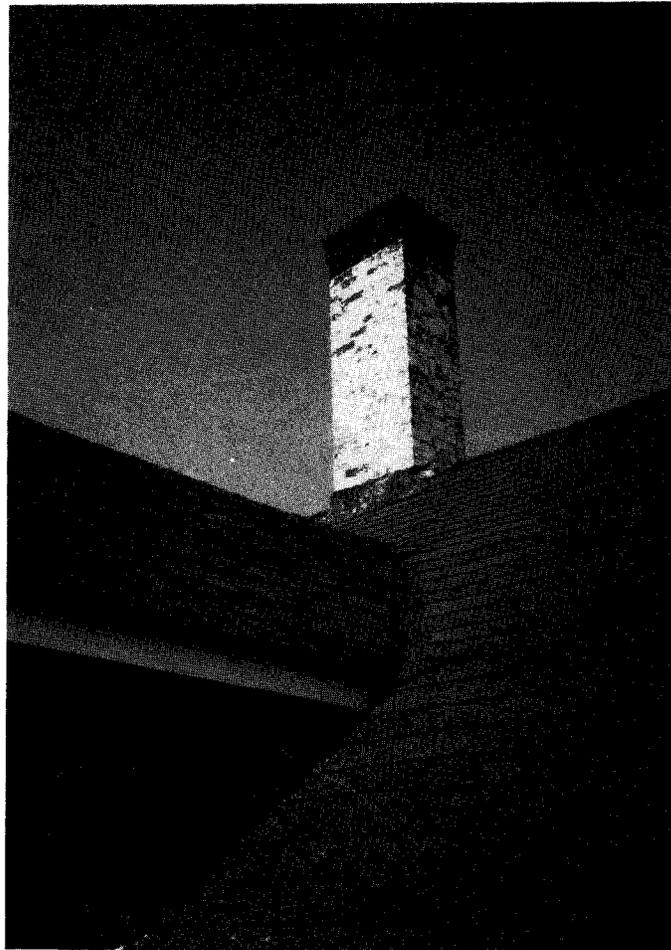


Figure 39. Keeper's Dwelling, brick chimney with date of 1857.

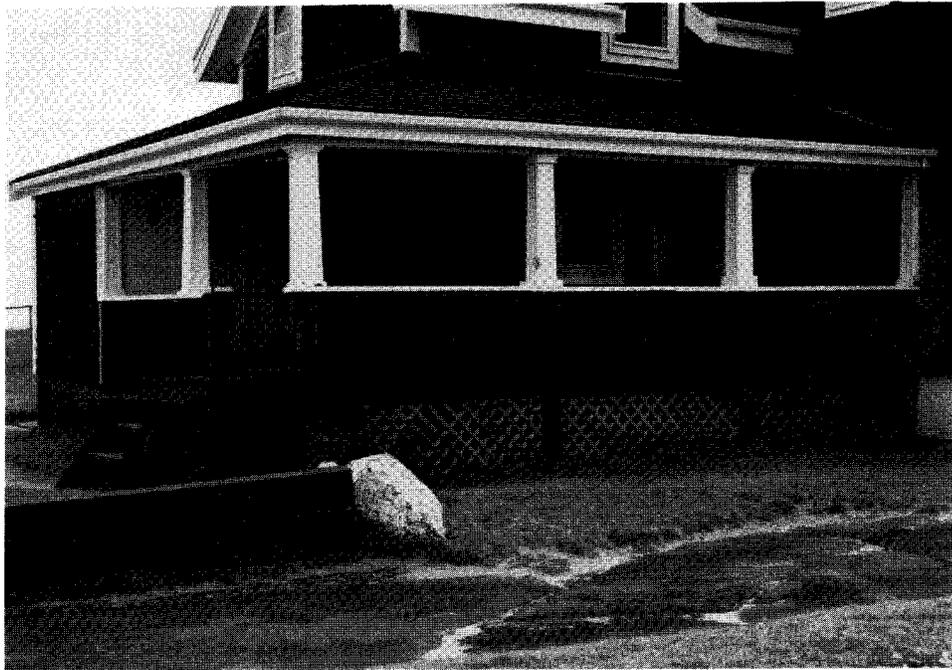


Figure 40. Wraparound porch on Keeper's Dwelling ell.

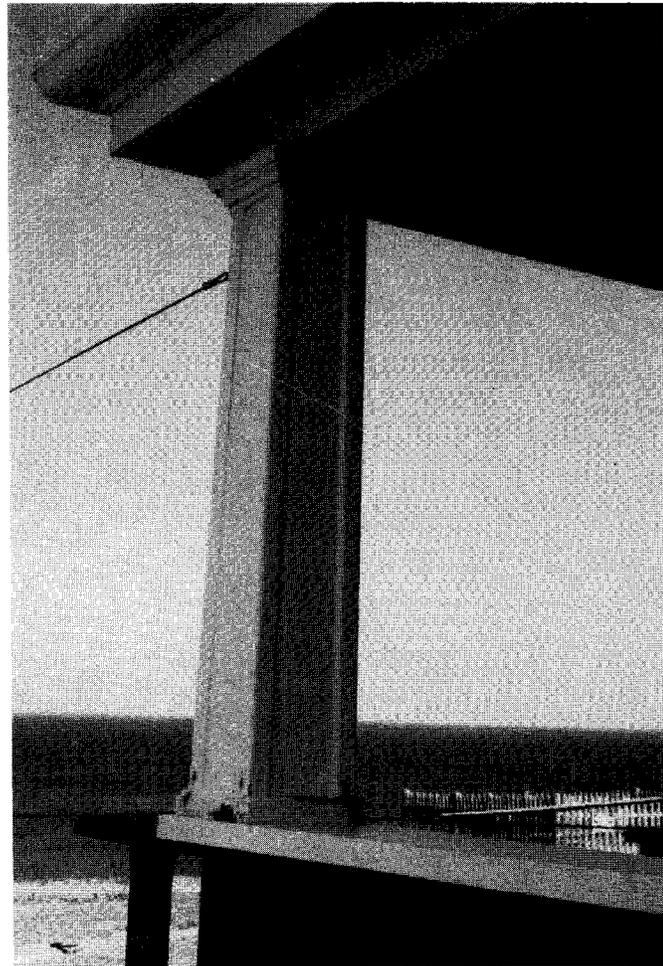


Figure 41. Detail of porch column.

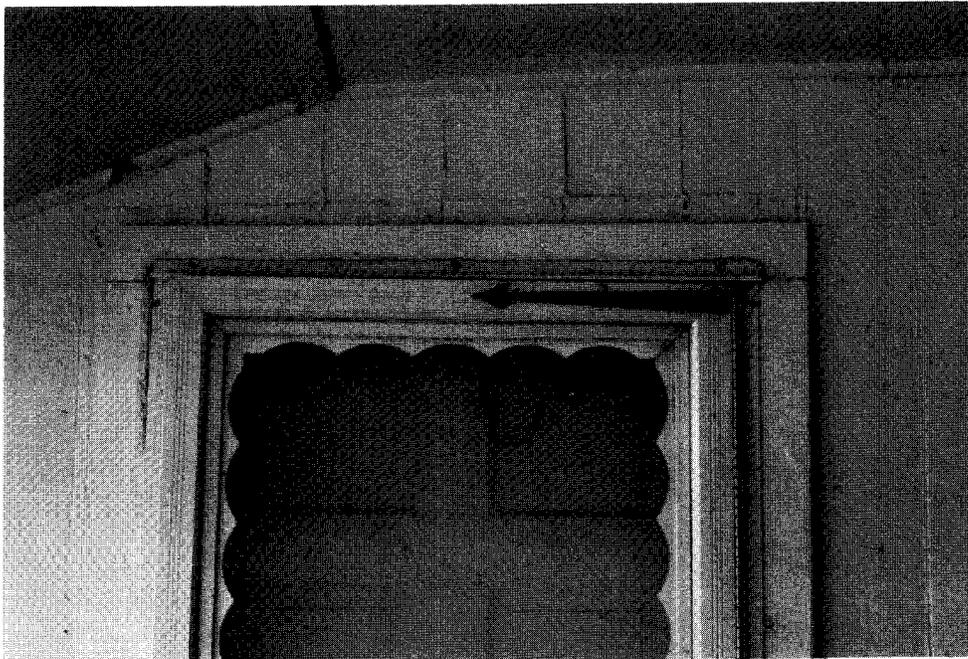


Figure 42. Keeper's Dwelling ell, west exterior elevation of north vestibule.



Figure 43. Keeper's Dwelling, second story of north elevation.

North Elevation

Main House

The previously mentioned ell covers most of the east half of the north wall of the main house. The west half of this wall is clad with unfinished wood shingles. These have an exposure of approximately 5 inches, and are trimmed with plain boards painted white. The foundation is of white-painted brick. There is a single window at second-story level. It contains double-hung, one-over-one sashes and an aluminum storm sash. The raking end of the roof has an overhang of about 12 inches, and is trimmed with two plain, overlapped boards painted white.

Ell

The wraparound porch covers much of the north wall of the ell (approximately 15 feet). The rest of the wall is covered by the north vestibule, which juts out past the ell. The ell's north foundation is made of 12 courses of brick that have been whitewashed or painted white. There is a three-light sash in a window opening near the northwest corner.

The first-story wall within the porch is clad with unfinished wood shingles with plain white-painted trim boards. The same is true of the first-story wall of the vestibule, and the second-story wall above the porch and vestibule. Located at the northeast corner of the vestibule wall, just below the porch roof line, is a bracket that once held a now-missing gutter.

The floor of the north section of the porch consists of boards 3 3/4 inches wide that run north-south. The boards are mitered at the northwest corner, where they meet the east-west boards of the west section of the porch.

A window with double-hung, one-over-one sashes and an aluminum storm sash is located at second-story level, toward the east end of the wall. The raking end of the ell roof (fig. 43) has an overhang of about 12 inches here, and is trimmed with two plain, overlapped boards painted white.

East Elevation

Main House

Most of the east foundation wall is covered by soil that has accumulated in front of it. (The area around the basement window opening, near the midpoint of the wall, has apparently been kept clear.) The window opening has a three-light sash. An electrical junction box is located above this window on the shingled section. The electrical conduit rises out of the ground to the south of the window opening and a hose bib is adjacent to the junction box.

The east elevation above foundation level (fig. 44) is clad with unpainted wood shingles and trimmed with plain corner boards painted white. There are three windows at the first-story level. They are trimmed in the usual way, and contain double-hung, one-over-one sashes with storm sashes.

Two dormer windows are located in the east roof slope of the main house, above the two northern first-story windows. They do not break the eaves line, but extend upward. Oddly enough, each has its own gable roof, whose peaks are of unequal height (the roof of the south dormer is slightly lower). Both dormers are clad with unpainted wood shingles and trimmed with plain white-painted corner boards. The raking ends of their roofs are finished with two plain, overlapped boards painted white. The window openings in the dormers contain one-over-one double-hung sash with white aluminum storm sash.

The roof overhang is approximately 18 inches. A plain cornice board with wood gutter runs the length of the roof on either side of the dormers. A metal elbow without a downspout is located south of the dormers. A broken bracket for the missing downspout exists five shingle courses below the end of the elbow.

The east roof slope of the main house and its dormer roof are covered with red asphalt shingles.

Ell

While some soil has accumulated up against the south end of the ell's east foundation wall, most of the white-painted brick foundation here is exposed. The east wall of the ell is flush with the east wall of the main house, and is sided identically to it. Located where these two walls intersect is a window opening that contains a single-light, casement sash with an aluminum storm window. It is trimmed with plain white-painted boards.

At the north end of the ell's east wall, the north vestibule (fig. 45) projects eastward. The foundation of the vestibule consists of wood posts covered with pressure-treated lattice panels. The walls of the vestibule are shingled and trimmed with plain, white-painted corner boards. There is a doorway in the south wall of the vestibule. It is accessed by three green-painted concrete steps with a pipe railing. A brass or bronze disk is embedded into the east corner of the bottom step (fig. 46). It is embossed with a date and the words: "U.S.COAST & GEODETIC SURVEY BENCH MARK - FOR INFORMATION WRITE TO THE DIRECTOR, WASHINGTON, D.C. - \$250 FINE OR IMPRISONMENT FOR DISTURBING THIS MARK- TB M-NO16-RESET 1958." The doorway (fig. 47) is covered by a white aluminum storm door. The main six-panel door is of wood painted an off-white color. The gable roof of the vestibule is asymmetrical: the short south slope projects to protect the south doorway, while the long north slope covers the remainder of the vestibule. The east gable end has typical white-painted rake trim. The soffit of the south roof slope is a white-painted plywood panel that covers three rafters that extend from the entry ridge. The plywood is cut around the rafter ends.

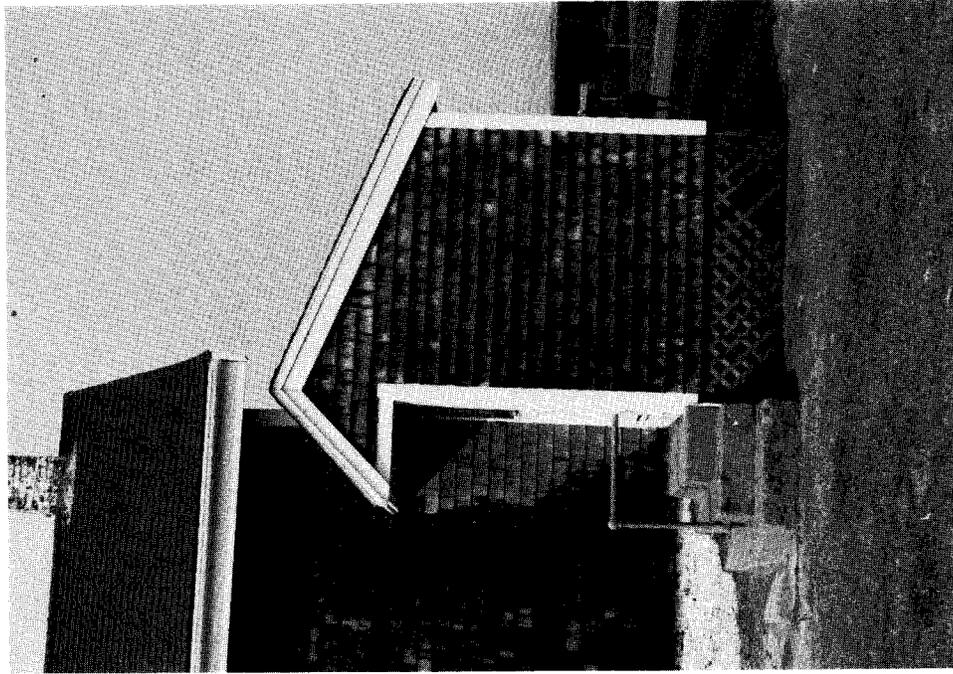


Figure 45. Keeper's Dwelling ell, east exterior elevation of north vestibule.

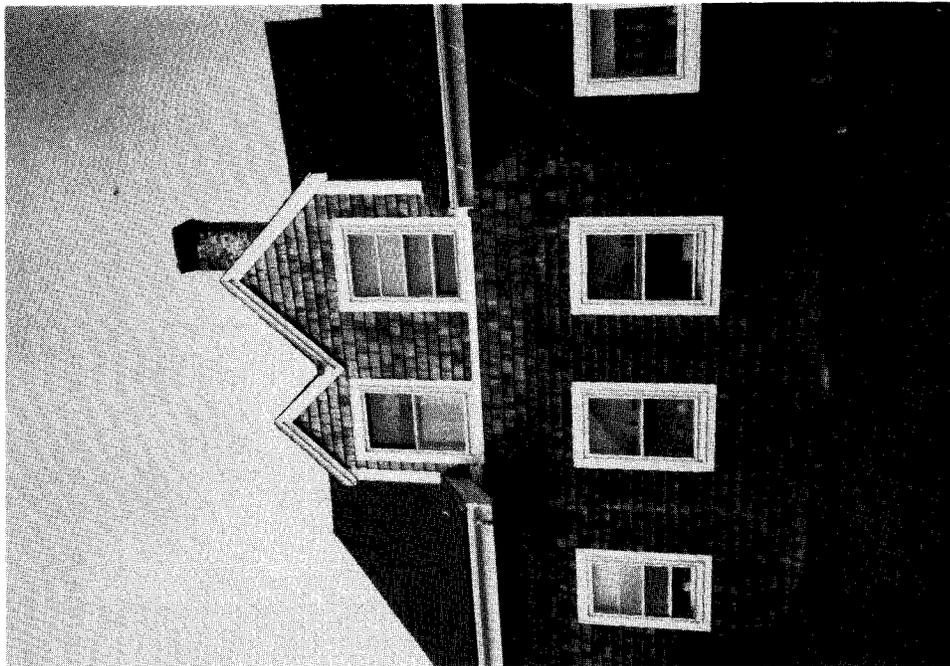


Figure 44. Keeper's Dwelling, east elevation.

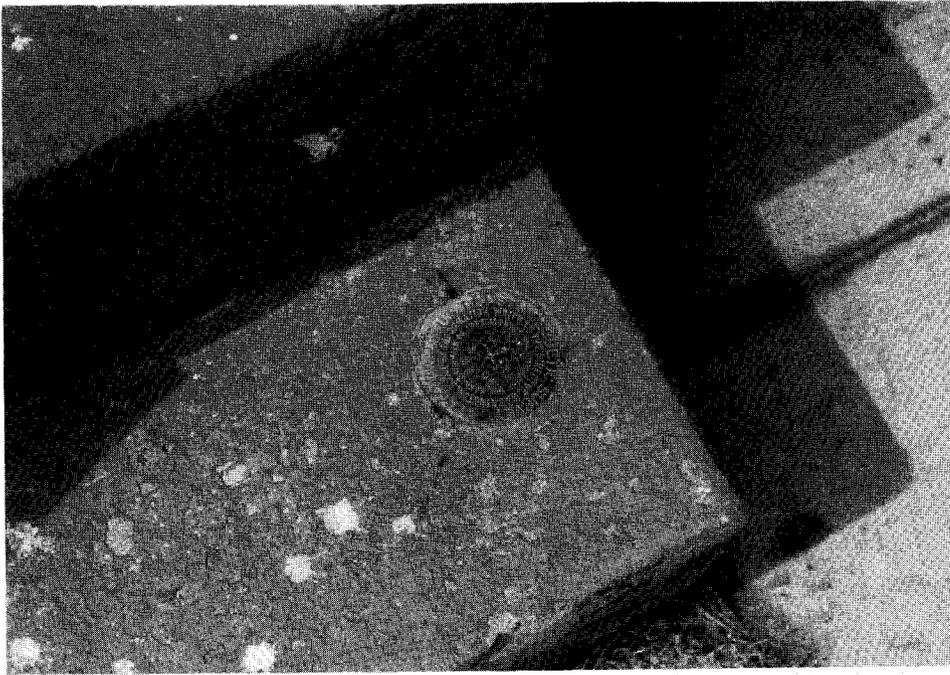


Figure 46. Keeper's Dwelling ell, north vestibule, concrete steps with embedded disk.

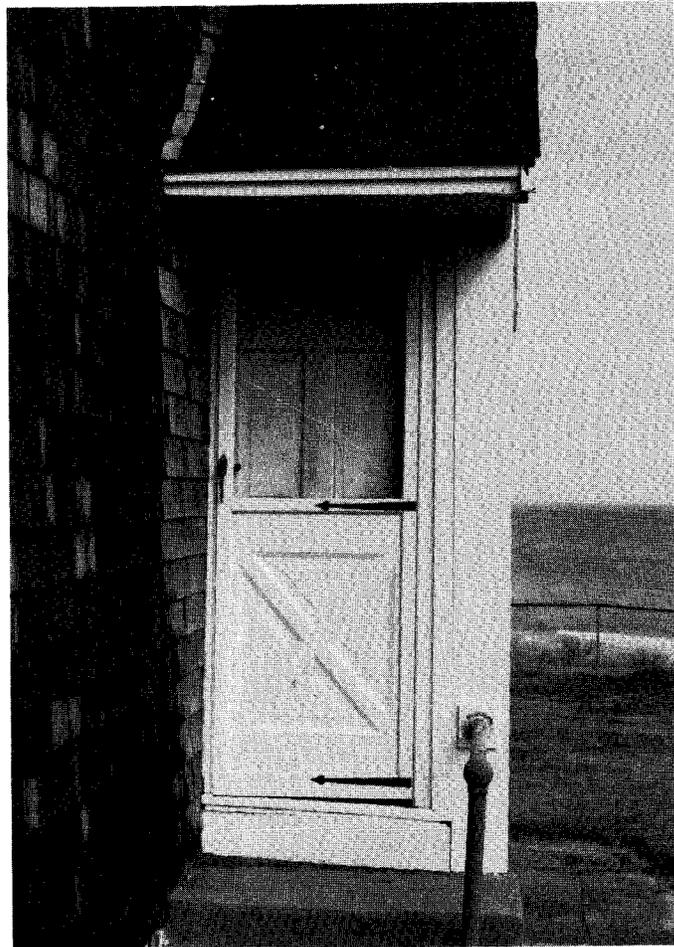


Figure 47. Keeper's Dwelling ell, exterior south doorway of north vestibule.

South Elevation

Main House

The south elevation of the main house (fig. 48) abuts the Connector at the Keeper's Dwelling. The foundation is of white-painted brick. A bulkhead with red metal doors is located near the center of the exposed foundation wall. The bulkhead leads to the basement of the Keeper's Dwelling. An electrical meter, water pipe, and metal bracket are at the base of the south elevation, near the west end.

The wall above foundation level is clad with unfinished wood shingles with the usual plain white corner boards. There is one first-story window opening, near the west end of the wall. It has double-hung, one-over-one sashes with a white aluminum storm sash. Two evenly-spaced one-over-one double-hung windows, also with white aluminum storm sash, are located on the second floor.

The raking end of the gable roof is trimmed with the usual overlapped white-painted boards. The upper board flares slightly to piece around the gutter ends. The roof overhang is 18 inches.

One bracket for a downspout remains on this elevation, indicating that a gutter extended along the cornice of the adjacent Keeper's Connector (fig. 49).



Figure 48. Keeper's Dwelling, south elevation, seen from Tower.



Figure 49. Keeper's Dwelling, south elevation, bracket for missing downspout.

Connector at the Keeper's Dwelling

The Connector at the Keeper's Dwelling is a simple rectangular brick building, whose north side is attached to the Keeper's Dwelling, and whose south side is attached to the Tower Connector. (See the interior description of Rooms 107-111). The angle of the Connector relative to the Keeper's Dwelling is 5 degrees towards the east (see app. A). It sits lower than the Keeper's Dwelling by approximately 10 inches. The size of its bricks is 7 1/2 by 2 1/4 inches. Only the 17th course of brick was laid as all headers. The bricks have been painted with a thick coat of cementitious wash. This coating was applied with a type of stiff bristle brush: horizontal brush marks are visible on the brickwork (fig. 50).

The building has no remaining usable exterior entries. Two segmentally arched doorway openings, one at the south end of the west wall and one in the middle of the east wall, have been closed with white-painted plywood on the interior side. The east doorway is inset into the wall. It has a concrete threshold, also painted white. There is one window, in the middle of the west elevation (fig. 51). It is set into a segmentally arched opening in the brick wall, and contains double-hung, six-over-six wood sashes with an aluminum storm sash.

At the top of both east and west walls is a plain cornice board below the overhanging eave. Both cornice and eave are painted white. The built-in wood gutters on the east and west elevations are also painted white. The west and east elevations each had two downspouts, one at either end of the wall. The west elevation's south downspout is attached to the north wall of the Tower Connector (fig. 52). The other three downspouts are missing, but their outlet tubes remain. Step flashing at the joint between the Connector at the Keeper's Dwelling and the Tower Connector to its south is painted white. The roof is covered with red asphalt shingles.

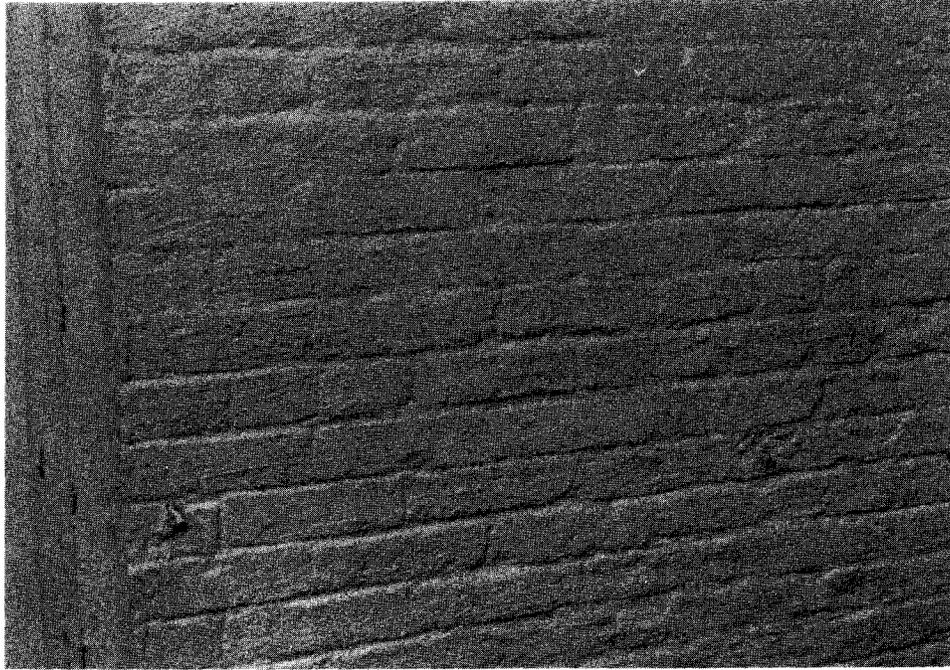


Figure 50. Connector at the Keeper's Dwelling, brick sizes and brush marks on east elevation.

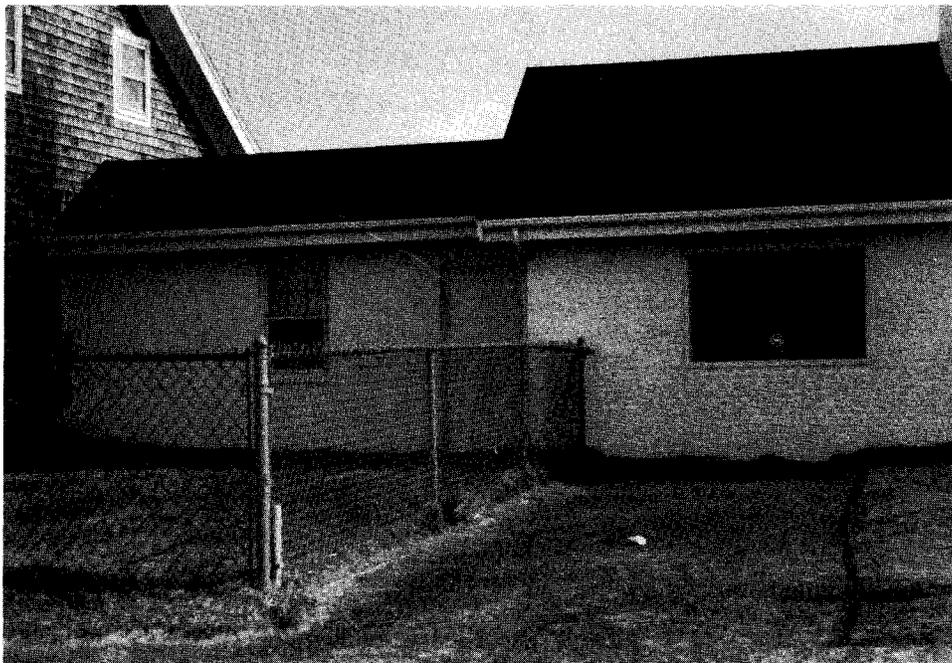


Figure 51. Connector at the Keeper's Dwelling and Tower Connector, west elevation.

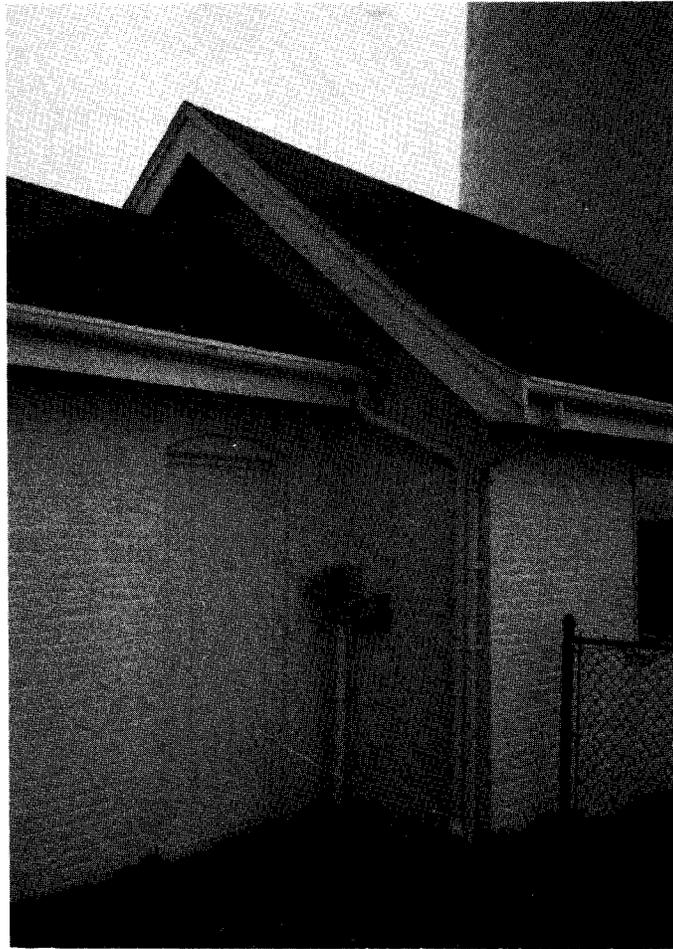


Figure 52. Connector at the Keeper's Dwelling and Tower Connector, west elevation: blocked entryway, outlet tubes, and downspouts.

Tower Connector

The Tower Connector is a rectangular brick building slightly larger and taller than the Connector at the Keeper's Dwelling, which it abuts on its north side. Its south side connects with the Tower. The bricks of the Tower Connector measure 7 1/2 by 2 1/4 inches, and are painted white. An electric meter is located at the north elevation of the Tower Connector on the west side.

There is one doorway, on the east wall where the Tower Connector abuts the Connector at the Keeper's Dwelling. It is protected by a concrete-block entry (fig. 53). Above the doorway is a triangular pediment covered in weathered wood shingles and trimmed with plain boards painted white. A single-bulb metal outdoor light fixture is located above the door. The doorway opening contains a steel door that leads into the tower entry (Room 109). The concrete step at the exterior of the entry was installed in 1900. The east wall also has a segmentally arched window opening that was filled in with brick in 1987 (fig. 54). This infill is recessed 4 inches from the plane of the wall; its bricks are also painted white, but are of a larger size than the wall bricks. On the west elevation of the Tower Connector, an original window opening was enlarged and a single plate glass window was inserted in 1987 (fig. 55).

The plain cornice, eave overhangs, and gutters are of white-painted wood. Sections of wood trim have been attached to the overhang of both the Connector at the Keeper's Dwelling and the Tower Connector to meet the cornice boards of the entry. The west elevation had two downspouts, one at either end of the wall. Only the one at the north end remains, but the south one retains its outlet pipe. The east elevation had one downspout, at its south end. This has disappeared, but its outlet pipe and elbow remain.

The roof of the Tower Connector is covered in red three-tab asphalt shingles. The north end of the roof overhangs the lower roof of the Connector at the Keeper's Dwelling. Its raking eaves are trimmed with the usual plain white overlapped boards. The lower rake board has a series of eye screws in it. They begin just above the ridge of the Keeper's Connector roof line; their function is undetermined. The east-side raking eave intersects the roof ridge of the concrete-block entry. The north slope of the entry roof extends under the rake to abut the face of the north wall (fig. 56).

The south end of the Tower Connector roof curves to follow the Tower. The step flashing here is painted white.

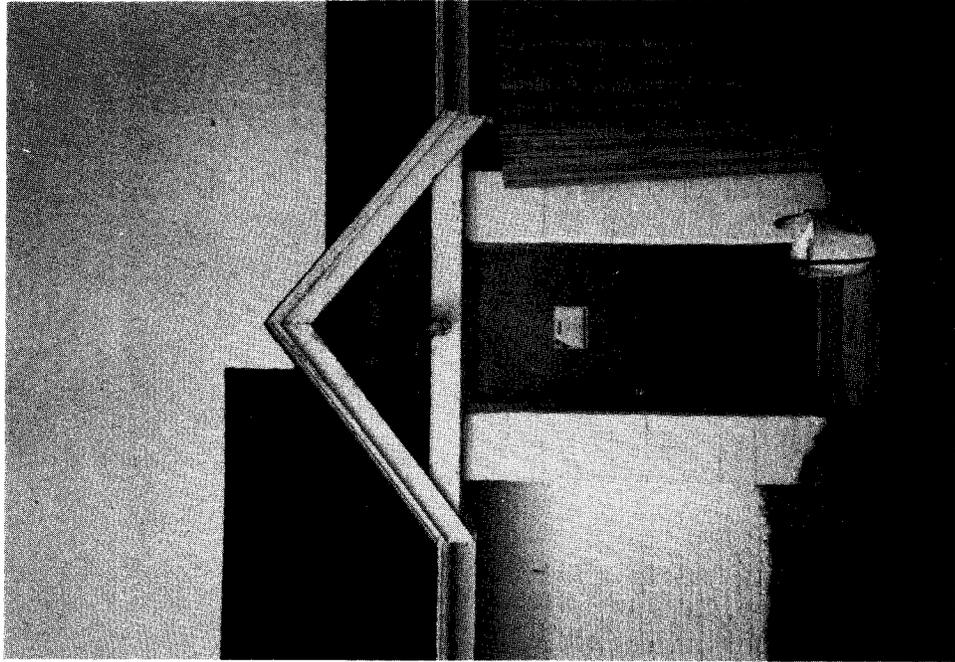


Figure 53. Concrete-block entry at junction of Connector at Keeper's Dwelling and Tower Connector, east elevation.

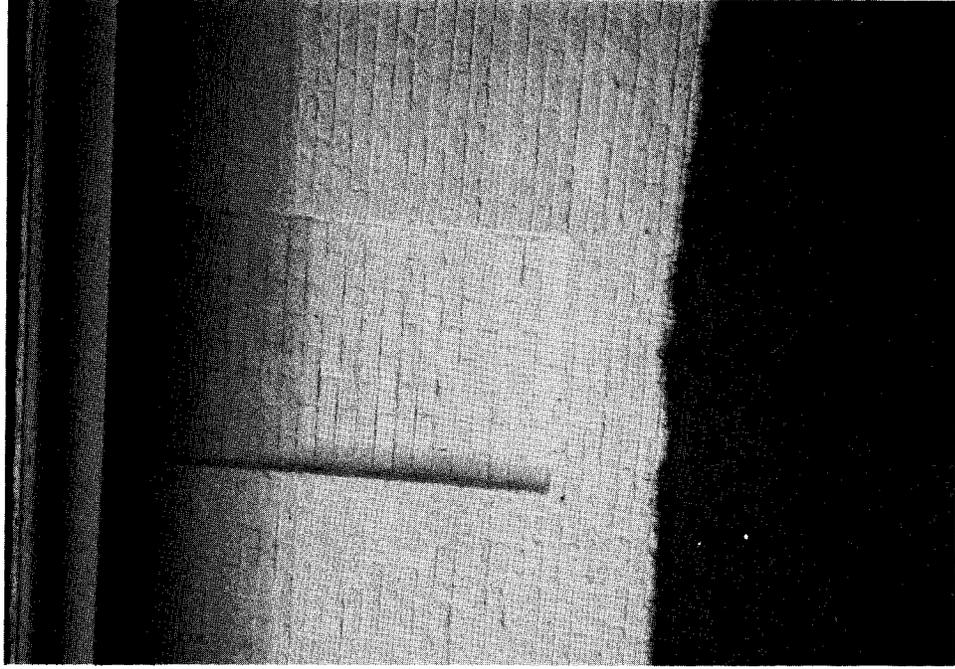


Figure 54. Tower Connector, blocked window on east elevation. Note larger brick size.



Figure 55. Tower Connector, west elevation.



Figure 56. Tower Connector, roof overhang at junction with Connector at Keeper's Dwelling.

Tower

The Tower is located at the south end of the Tower Connector (fig. 57). It is 66 feet high to the top of the lantern house vent ball, excluding the spike. The Tower consists of three sections: the long, tapering, cylindrical shaft; the straight-sided Watch Deck and Watch Gallery; and the straight-sided Lantern and Lantern Gallery.

Shaft

Walls

The main shaft is of brickwork painted white. Its walls are approximately 3 feet 7 inches thick at the base and approximately 2 feet 2 inches thick where it meets the Watch Gallery. The brick size is 7 1/2 by 2 1/4 inches, which matches the brick size of the two connecting buildings. Two lightning-rod grounding cables, both painted white, run down the east and west sides.

Window Openings

The south elevation of the shaft has two window openings located approximately 10 brick courses above grade. They measure 3 feet wide by 4 feet high (fig. 58). Each has a granite sill and lintel, both painted white. Cement parging on the top exposed surface of the sills slopes to the exterior. Both window openings are filled with 6-inch square glass blocks in panels four units wide by six units high. Gray mortar fills the joints between the glass blocks. In the second row of glass blocks, vents replace the two center blocks. These vents are made of unpainted metal and are fixed in place by screws on the exterior. There is a third window on the northwest elevation of the shaft (fig. 60), immediately below the Watch Gallery (at the level of the interior Weight Deck). The size of the opening and glass-block panel is similar to those of the south-elevation windows.

Watch Deck and Gallery

Walls

The exterior wall of the Watch Deck is 7 feet 1 1/4 inches high. It is also of white-painted brick. It is surrounded by the Watch Gallery, which is the lower of two observation decks (fig. 61).

Floor

The floor of the Watch Gallery is composed of 15 granite blocks, with a curved underside that is painted black. The length of each block is approximately 2 feet 6 inches, and the depth is 2 feet 6 inches. The top of the joints between the blocks are covered with a protective strip of sheet

metal. A 3-foot-high iron railing with balusters and square posts runs around the perimeter of the Watch Gallery. It is painted black. Eight tie rods connect the Watch Gallery to the Lantern Gallery above it. These were installed in 1868, and are today all painted black.

Doorways and Doors

A doorway on the north side of the Watch Deck wall leads to the interior of the Watch Deck. The doorway is arched, 2 feet wide, and 5 feet 9 inches high. The exterior door is of board-and-batten-construction, the six vertical wood boards being secured by three horizontal battens. The door is painted white. There are two other doors inside this one; they will be discussed in the interior description. An iron ladder on the west side of the Watch Gallery leads to a narrow circular opening in the floor of the Lantern Gallery (fig. 63). The ladder is painted black. Immediately to the north of the ladder is a large support for a former signal staff, also painted black.

Lantern and Lantern Gallery

Walls

The walls of the Lantern consist of 16 window panels joined by vertical iron mullions painted black. The panels are 9 feet 11 1/2 inches high by just over 2 feet wide. Each panel is divided horizontally by other black-painted iron mullions into three sections. The lower sections are 2 feet 7 1/2 inches high. They consist of thin-gage aluminum sheet. Slotted sheet-metal covers at the base of these sections connect to interior vents. The middle sections are 3 feet 4 3/8 inches high, while the upper sections are a little less than 4 feet high. Both of these sections are of plexiglass set into the frame with sealant. Each upper horizontal mullion has a hand-hold cast into it (fig. 65), which is also painted black. Together, these hand-holds form a continuous inner handrail around the Lantern Gallery.

Floor

The floor of the Lantern Gallery is composed of four cast-iron sections that have been bolted in place, which are continuous with the floor at the interior. A slotted lip 5 inches high runs around the Lantern Gallery where a pipe railing has been installed (fig. 64). The entire assemblage is painted black. A radio or other antenna is attached to the railing on the south side of the gallery.

Doorways and Doors

The only access to the Lantern Gallery is the circular opening in the floor, with its ladder down to the Watch Gallery.

Roof

The cap of the Lantern consists of eight metal sections bolted together (fig. 66). The peak of the roof is capped by a slotted ventilator for the Lantern Deck. The lantern cap is painted black.



Figure 57. Highland Light Station, west elevation.

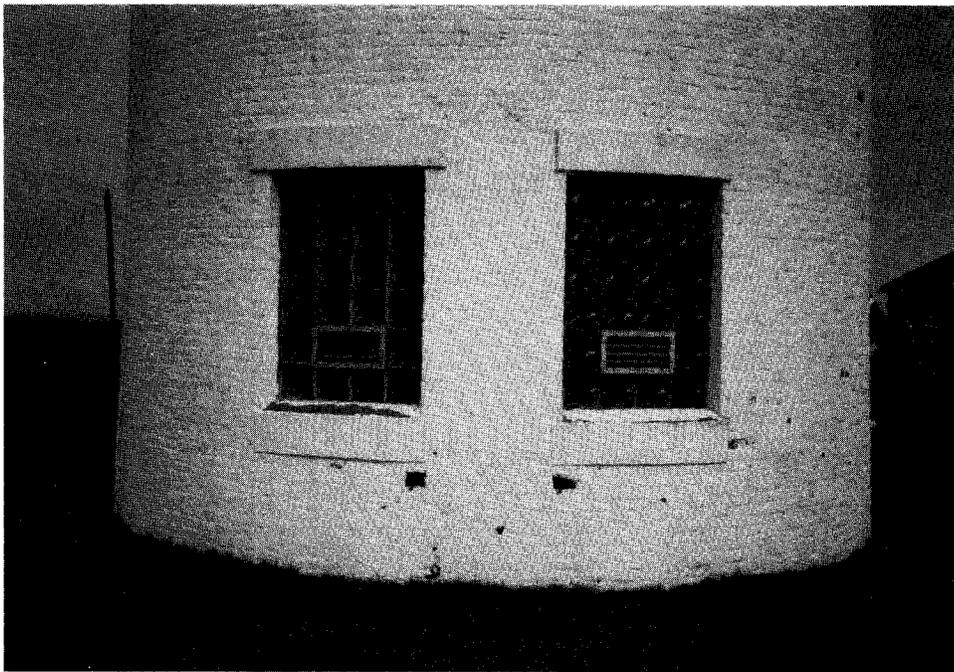


Figure 58. Tower, windows on south elevation.

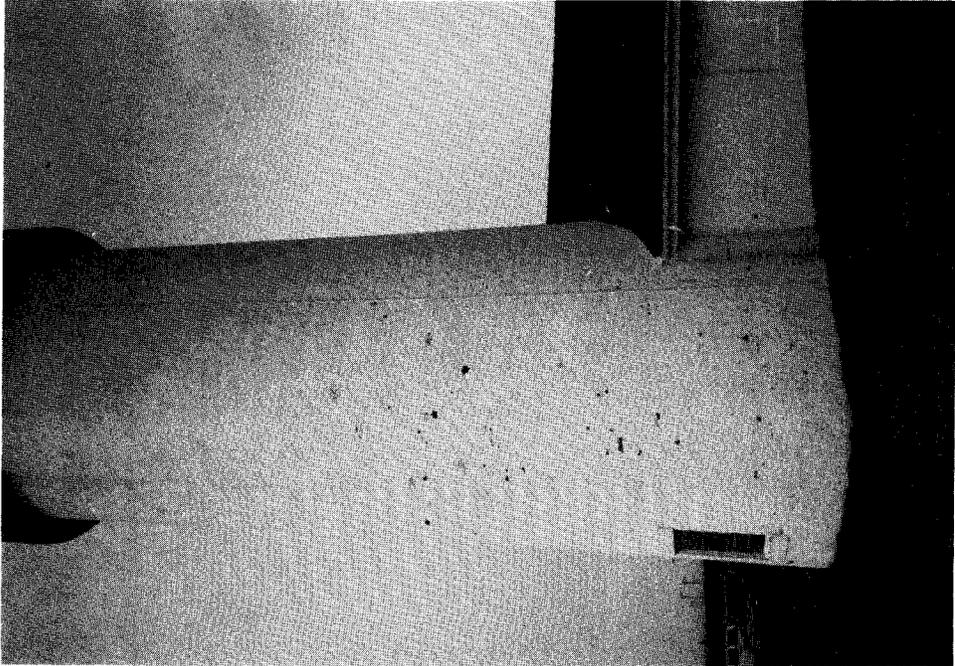


Figure 59. Tower, east elevation.

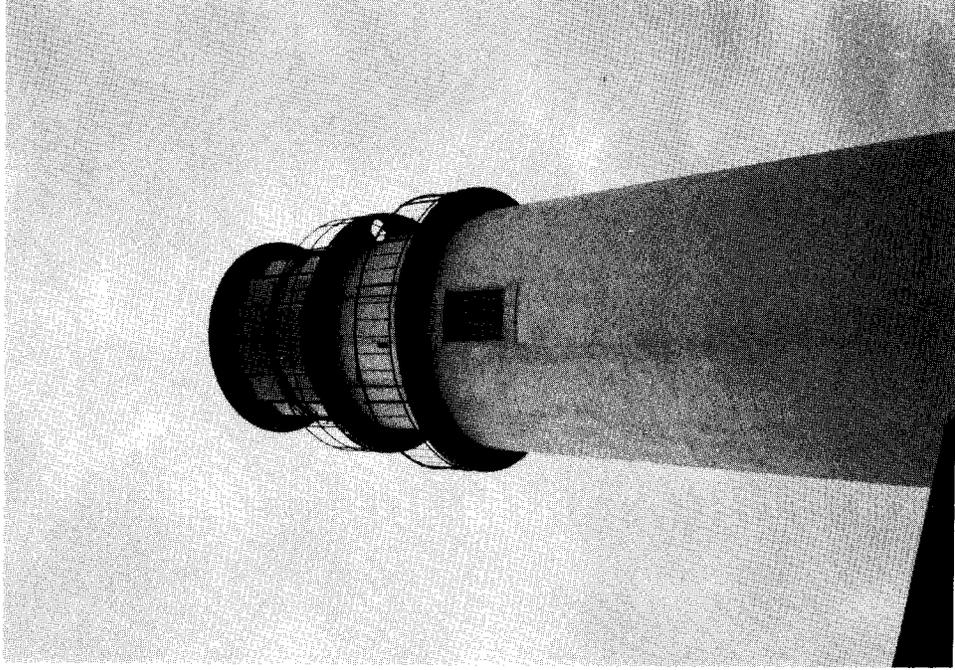


Figure 60. Tower, northwest elevation.

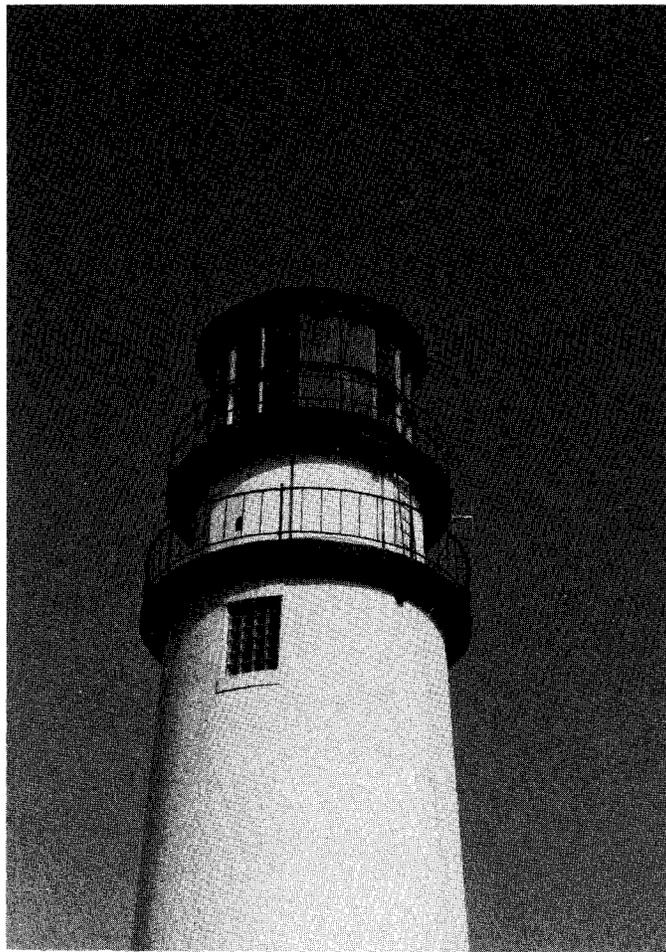


Figure 61. Tower, northwest elevation.



Figure 62. Tower, detail of joints in granite-block floor of Watch Gallery.

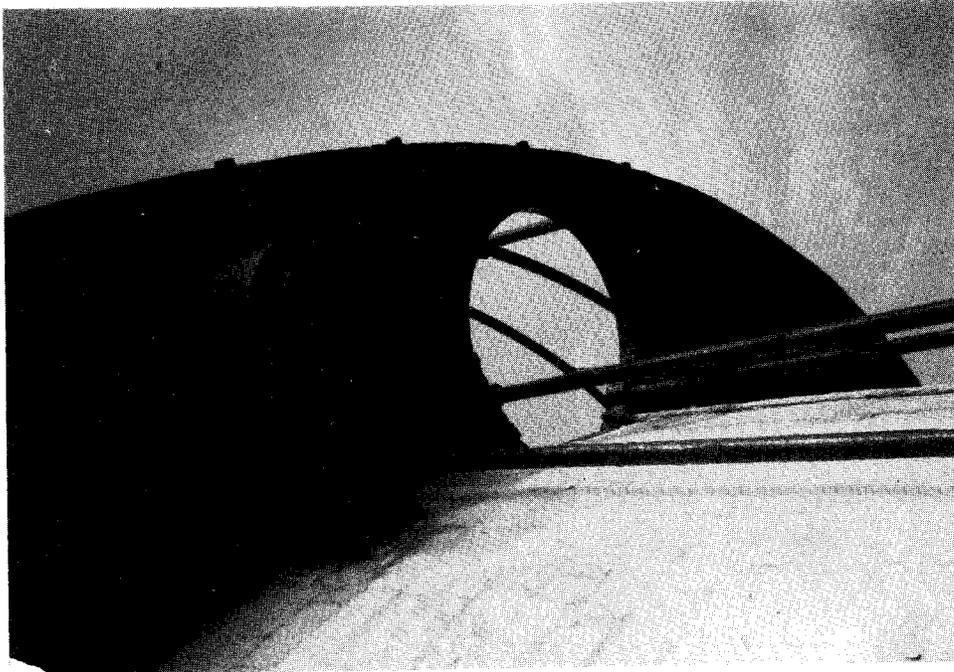


Figure 63. Tower at Watch Gallery: pipe support, tie rod, and underside of Lantern Gallery, showing ladder opening.

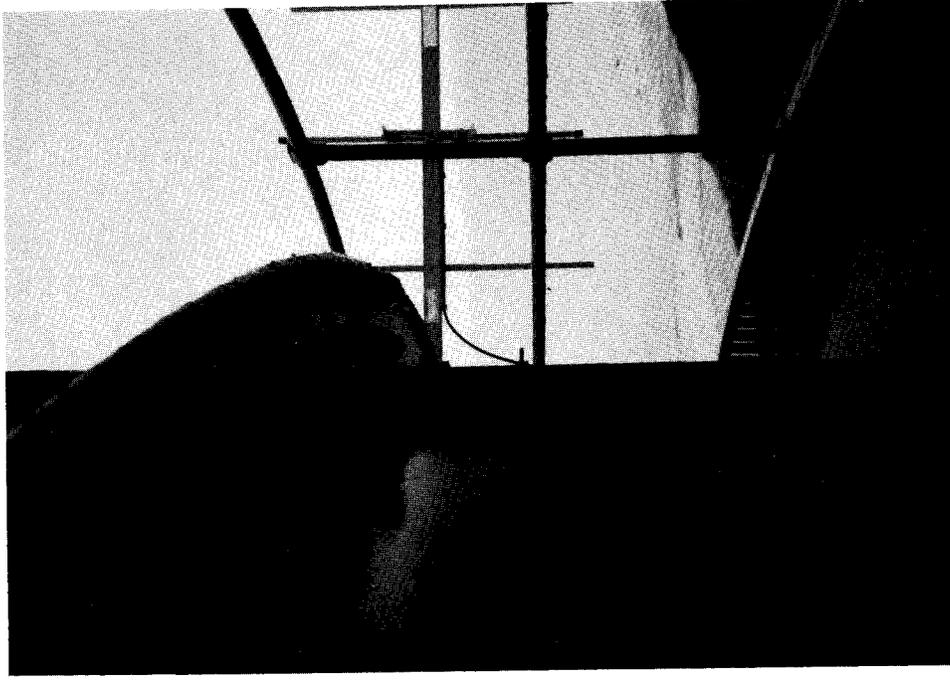


Figure 64. Tower, railing of Lantern Gallery.

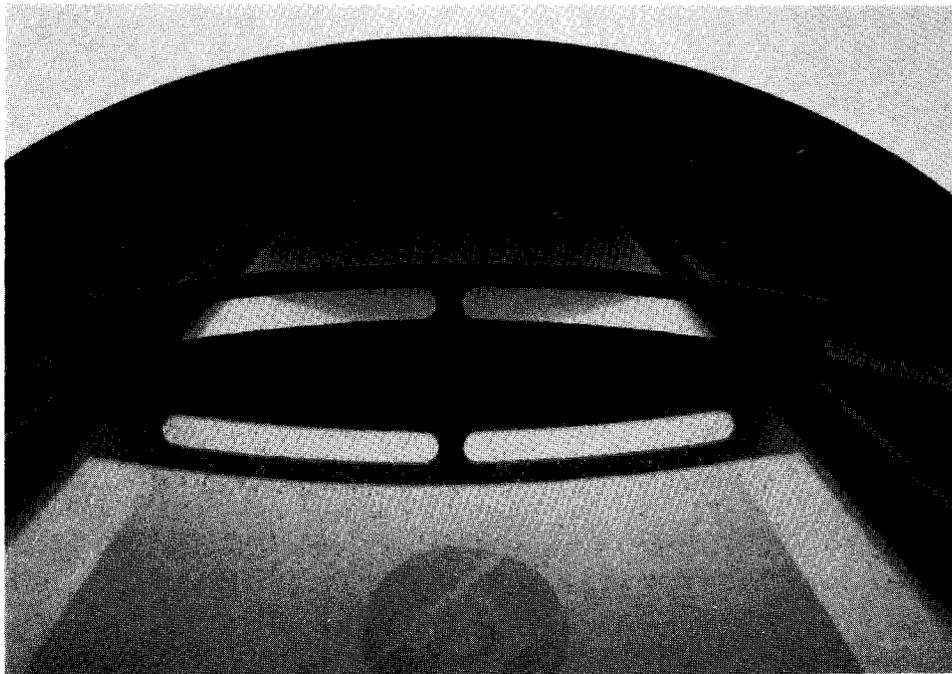


Figure 65. Tower, detail of handrail along horizontal mullion of Lantern Gallery window wall.

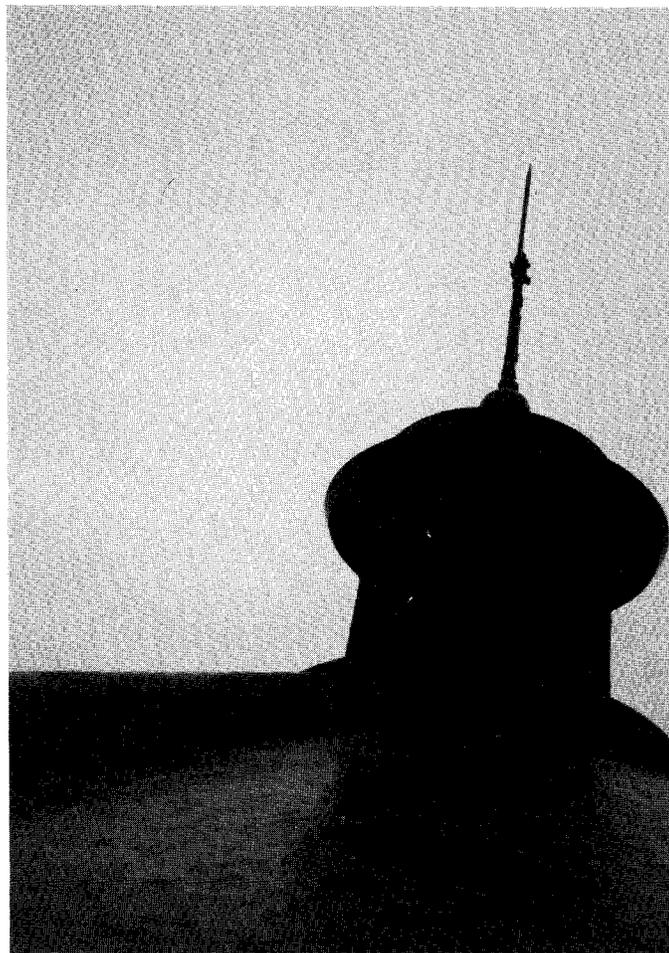


Figure 66. Tower, vent cupola of Lantern.