

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name Blue Hill Meteorological Observatory
other names/site number _____

2. Location

street & number Blue Hills Reservation not for publication
city, town Milton vicinity
state Massachusetts code MA county Norfolk code 021 zip code 02186

3. Classification

| | | | |
|--|--------------------------------------|--|------------------------|
| Ownership of Property | Category of Property | Number of Resources within Property | |
| <input checked="" type="checkbox"/> private | <input type="checkbox"/> building(s) | Contributing | Noncontributing |
| <input type="checkbox"/> public-local | <input type="checkbox"/> district | <u>1</u> | _____ buildings |
| <input checked="" type="checkbox"/> public-State | <input type="checkbox"/> site | _____ | _____ sites |
| <input type="checkbox"/> public-Federal | <input type="checkbox"/> structure | _____ | _____ structures |
| | <input type="checkbox"/> object | _____ | _____ objects |
| | | <u>1</u> | _____ Total |

Name of related multiple property listing: _____

Number of contributing resources previously listed in the National Register 1

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of certifying official _____ Date _____

State or Federal agency and bureau _____

In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of commenting or other official _____ Date _____

State or Federal agency and bureau _____

5. National Park Service Certification

I, hereby, certify that this property is:

entered in the National Register.
 See continuation sheet.

determined eligible for the National Register. See continuation sheet.

determined not eligible for the National Register.

removed from the National Register.

other, (explain:) _____

Signature of the Keeper

Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)

Research Facility

Current Functions (enter categories from instructions)

Research Facility

7. Description

Architectural Classification

(enter categories from instructions)

Late Gothic Revival

Materials (enter categories from instructions)

foundation concretewalls concrete, stoneroof copperother _____

Describe present and historic physical appearance.

The Blue Hill Meteorological Observatory was founded by Abbott Lawrence Rotch on February 1, 1885, as a weather station and research facility. Rotch located the observatory atop the Great Blue Hill in the Blue Hills Reservation, a 6,000-acre public park managed by the Metropolitan District Commission of the Commonwealth of Massachusetts in Milton, Massachusetts. Rotch chose the site because the elevation of 635 feet was the highest point within ten miles of the Atlantic Ocean, anywhere on the East Coast south of central Maine. This location afforded early weather scientists a unique opportunity for recording extremes of weather and experimenting with weather-recording instruments.

Construction of the observatory was started by Rotch in 1884 using his own private funds. The original structure consisted of a two-story circular tower and an adjoining housing unit which contained two bedrooms, a dining room and a kitchen. In 1889 a two-story east wing was added to provide additional working space for research, domestic chores, and the library. In 1902 a two-story west wing containing a new library was added to provide additional work space. A steel fire door and brick wall connect the library to the earlier masonry structure. A timbered vault (18 by 35 feet) of cohesive tiles spans the library. The timbered vault tile roof is believed to have been installed by the Guastivino Company using an extremely tenacious mortar developed by Raphael Guastivino, the founder of the firm. Native stone, gathered from the summit of the Great Blue Hill, was used for the two-story tower, adjoining housing unit, and the east and west wings. Copper sheathing was used for roofing.¹ A stone wall and iron fence were erected in 1905 to provide security for the building and instruments and privacy for the staff.

The original stone tower eventually proved to be unsuitable. Wind-driven rain penetrated its walls, damaging the instruments and records. Vibration from the instruments on masts atop the tower contributed to the structural problems.

In 1908 the original tower was demolished and a new reinforced three-story late Gothic Revival concrete tower, 20 feet 6 inches wide and 32 feet 8 inches high was constructed in its place. The concrete construction of the tower was chosen specifically to provide the maximum amount of stability and durability

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

nationally statewide locally

Applicable National Register Criteria A B C D NHL Criteria 1,2

Criteria Considerations (Exceptions) A B C D E F G

Areas of Significance (enter categories from instructions)

National Register Significance:

Science

National Historic Landmark: Science,

Subtheme: Earth, Science, Facet:

Meteorology

Period of Significance

1885-Present

Significant Dates

Cultural Affiliation

N/A

Significant Person

Abbott Lawrence Rotch

Architect/Builder

Arthur Rotch, George T. Tilden

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

Summary

The Blue Hill Meteorological Observatory is the foremost structure associated with the history of weather observations in the United States. Founded by Abbott Lawrence Rotch on February 1, 1885, the observatory took a leading role in the newly emerging science of meteorology and was the scene of many of the first scientific measurements of upper atmosphere weather conditions, using kites to carry weather instruments aloft. Knowledge of wind velocities, air temperature and relative humidity at various levels came into use as vital elements in weather prediction due to techniques developed at this site. By 1895 the observatory was the source of weather forecasts of remarkable accuracy. The observatory remains active to this day, continuing to add to its data base of weather observations now more than one hundred years old, and stands as a monument to the science of meteorology in the United States.²

History

The Blue Hill Meteorological Observatory was founded by American meteorologist Abbott Lawrence Rotch (1861-1912) in 1885. As a young man Rotch became interested in the newly developing science of meteorology and determined to make this field his lifetime career. By the time he graduated from the Massachusetts Institute of Technology in 1884 Rotch had conceived and carried into execution his plans for the erection of a meteorological observatory on the summit of the Great Blue Hill, ten miles south of Boston, Massachusetts. His purpose was to establish an institution free from official control where investigations might be independent of prescribed duties and requirements. Since Rotch was independently wealthy he carried out his plan using his own funds. The observatory building was completed by the end of 1884 and the first regular observations were begun on February 1, 1885. Rotch became the first director of the observatory and maintained it at his own expense until his death in 1912 when he bequeathed it to Harvard University with an endowment of \$50,000.³

See continuation sheet

9. Major Bibliographical References

See Continuation Sheet

Previous documentation on file (NPS):

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

See continuation sheet

Primary location of additional data:

- State historic preservation office
- Other State agency
- Federal agency
- Local government
- University
- Other

Specify repository: _____

10. Geographical Data

Acres of property less than 1 acre

UTM References

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Zone Easting Northing

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See continuation sheet

Verbal Boundary Description

The boundary is the iron and stone wall surrounding the Observatory.

See continuation sheet

Boundary Justification

The boundary includes the entire historic resource nominated in this form.

See continuation sheet

11. Form Prepared By

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 organization National Park Service date May 1, 1989
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in the event of high winds. The tower has a crenelated top and a cornice containing dentils. The windows are double-hung sash with a shallow recessed arch over the windows on the first and second floors.

The new tower provided the durable weather-resistant, vibration-free environment necessary for accurate instrument readings. The first floor of the tower contains the director's office. The weather bureau is on the second floor and a laboratory and access to the roof are found on the third floor. Various wind gauges and other meteorological recording instruments are attached to the roof of the tower. The observatory still retains barometers and other instrumentation dating from the late 19th century. These instruments are used to calibrate the modern instrumentation to preserve the accuracy and integrity of the data base dating back to 1885.

In 1962 a metal tower containing a siderostat for collecting the sun's rays and directing them by mirrors to an optical bench inside the observatory, was erected adjacent to the west wing for studies related to the upper atmosphere. This project was abandoned after a few years; this tower, with its mirrors still present, is no longer in use.

The observatory has been neglected for a number of years. Although the structure is generally weather-tight, due to both solid construction and a copper roof, the reinforced concrete tower is plagued by the elements. The frost-thaw cycle has caused some cracking and spalling of the concrete.

In 1981 the Metropolitan District Commission transferred responsibility for the observatory to the Blue Hill Weather Club, a local group of supporters, who plan to restore the observatory and establish a weather museum on the site. The observatory will be kept open to continue its record of continuous weather observations. The National Weather Service continues to operate an automated weather station in the building.

In 1980 the building was listed in the National Register of Historic Places as part of the "Prehistoric and Historic Resources of the Blue Hills and Neponset River Reservations and Selected Adjacent Lands" nomination by the Commonwealth of Massachusetts.

A white marble stone containing a summary record of climatological data from 1885 to 1984 and dedicated to the memory of Abbott Lawrence Rotch is located on the front yard of the building.

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Under Rotch's leadership, the Blue Hill Meteorological Observatory quickly became famous for its pioneering studies of the upper atmosphere. In 1885 Rotch was able to obtain basic data on the heights and movements of various clouds by means of triangulation measurements. In 1894 Rotch became the first in the world to sound the atmosphere by lifting instruments on kites. Ultimately kites sounded the atmosphere to an altitude of 5 km. and provided Rotch with information concerning fundamental upper air patterns of wind, temperature and humidity and their relationship to surface weather patterns. In 1904 at the World's Fair in St. Louis, Rotch initiated the use of sounding balloons in America. These balloons carried recording instruments beyond even the highest clouds to a height of 17 km.

The study of cloud heights, directions and velocities that Rotch carried out at the Blue Hill Observatory made significant contributions to the knowledge of clouds in the early years of this century. In addition, Rotch was one of the first to suggest the use of daily maps at local Weather Bureau stations to plot the direction of weather patterns. Rotch and Leon Teisserenc de Bort, discoverer of the stratosphere, made extensive upper air kite measurements from ships in the tropical and sub-tropical North Atlantic. These permitted publication in 1911 of a chart of aerial routes, thus pointing the way to the feasibility of transatlantic air travel aided by air patterns.

Rotch was personally known to the leading meteorologists from Europe because he made it a point to attend all of the meetings of the International Meteorological Committee, and on many occasions was the sole American representative. From 1888 to 1891 and from 1902 to 1906 Rotch served as the first professor of meteorology at Harvard University. During his career, Rotch authored 183 scientific papers and several books on the sciences of meteorology and aeronautics. From 1884 to 1895 he served as the associate editor of the American Meteorological Journal. Rotch continued to work at the Blue Hill Observatory until his death on April 7, 1912. Under the terms of his will the observatory was given to Harvard University with an endowment of \$50,000 for operating costs. Harvard operated the observatory until 1971 when it disassociated itself from the site. The Rotch endowment was kept by Harvard.

After 1912 the Blue Hill Meteorological Observatory continued to operate as an active meteorological observatory. Weather observations and recordings have continued to this day, providing modern meteorologists with a record of uninterrupted climatological observations that is unique in the world. Since these recordings were obtained from the same site, with virtually no environmental change, they provide an important index to atmospheric change. This information is of special importance to students of climatic change, in an age where so many weather records are flawed by environmental and procedural changes, and by repeated moves of the observing site over a number of years. For this

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reason, the National Oceanic and Atmospheric Administration designated the Blue Hill Observatory one of 26 International Benchmark stations within the United States.

Since 1885 the staff of the observatory and others have documented the scientific work completed at the Blue Hill Observatory in almost 900 scientific publications. The observations of the observatory have continued on a daily basis since the day it first opened in 1885, making the observatory one of the oldest continually active weather stations in the United States.

The Blue Hill Meteorological Observatory stands as a monument to Abbott Lawrence Rotch and the development of the science of meteorology and is an important site preserving the oldest continuous record of weather observations in the United States.

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Footnotes

1. The descriptive material for this section was taken from the following sources:

Sara B. Chase, "Massachusetts Historical Commission Inventory--Nomination Form--Blue Hill Meteorological Observatory" (Boston, Massachusetts: Society for the Preservation of New England Antiquities, 1979).

William Ralston, Blue Hill Meteorological Observatory (Preliminary Report, No place of publication, no date).

2. Chase, op. cit.
3. Dumas Malone, ed., Dictionary of American Biography (New York: Charles Scribner's Sons, 1943), XVI: pp. 183-184.

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Bibliography

Chase, Sara B. "Massachusetts Historical Commission Inventory-Nomination Form--Blue Hill Meteorological Observatory." Boston, Massachusetts: Society for the Preservation of New England Antiquities, 1979.

Chase, Sara B., and Stephen A. Cole. "National Register of Historic Places Inventory-Nomination Form--Prehistoric and Historic Resources on the National Register of Historic Places of the Blue Hills and Neponset River Reservations and Selected Adjacent Lands." Boston, Massachusetts: Massachusetts Historical Commission, 1980.

Conover, John H. "The Blue Hill Observatory," Weatherwise, December 1984, pp. 297-303.

_____. "Highlights of the History of the Blue Hill Observatory and the Early Days of the American Meteorological Society," Bulletin of the American Meteorological Society, January 1985, pp. 30-37.

_____. and Alan A. Smith. "Blue Hill 1885-1985," Mount Washington Observatory News Bulletin, Spring 1985, pp. 4-6.

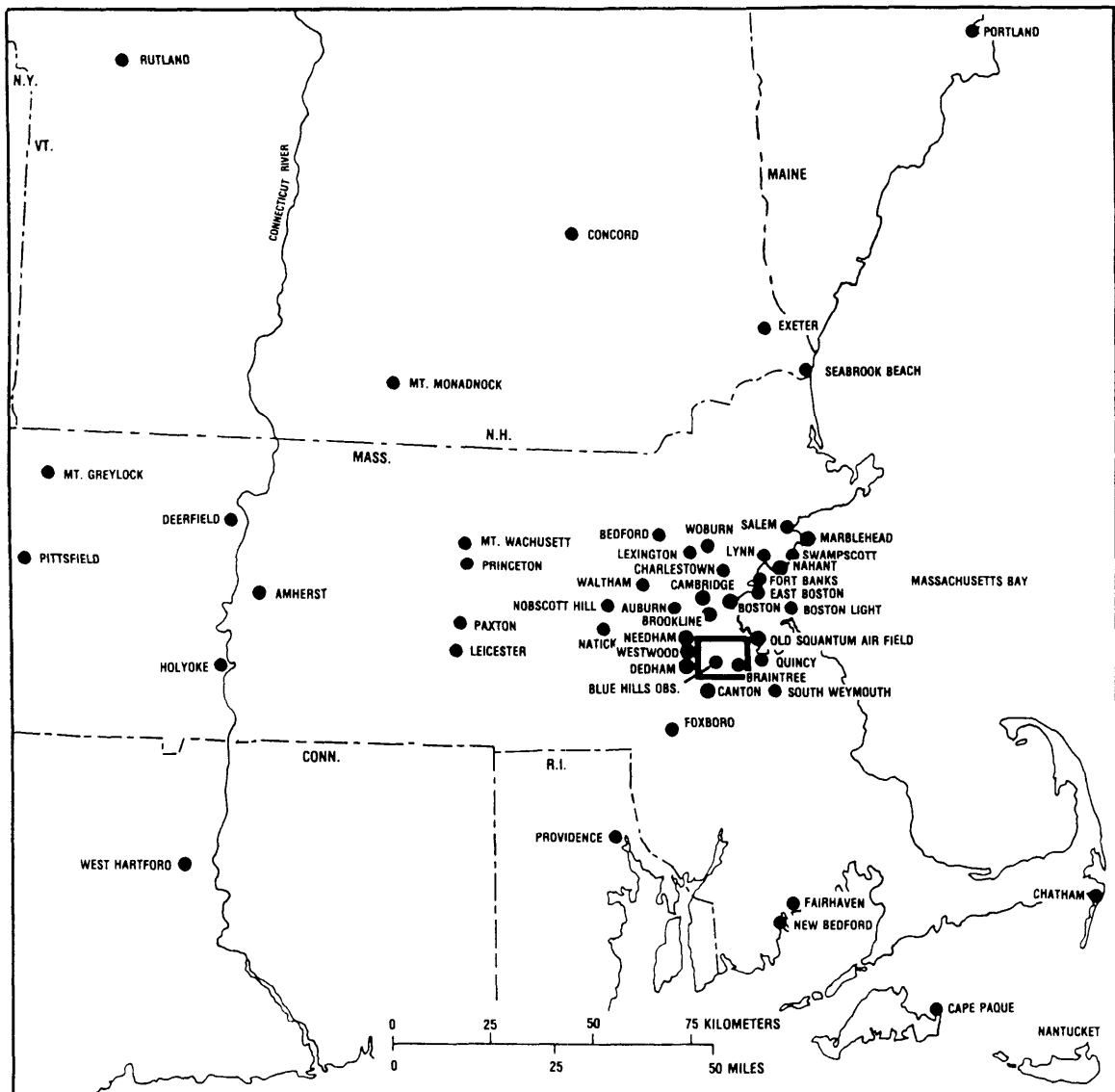
Creedon, Francis P. The Blue Hill Meteorological Observatory Historic Structure Survey Report--Preliminary Report. Unpublished Report, 1982.

Malone, Dumas, ed., Dictionary of American Biography. New York: Charles Scribners Sons, 1943, XVI: pp. 183-84.

No Author. "A Reinforced Concrete Meteorological Observatory," The American Architect, October 7, 1908, pp. 117-118. (Reprinted from Cement Age.)

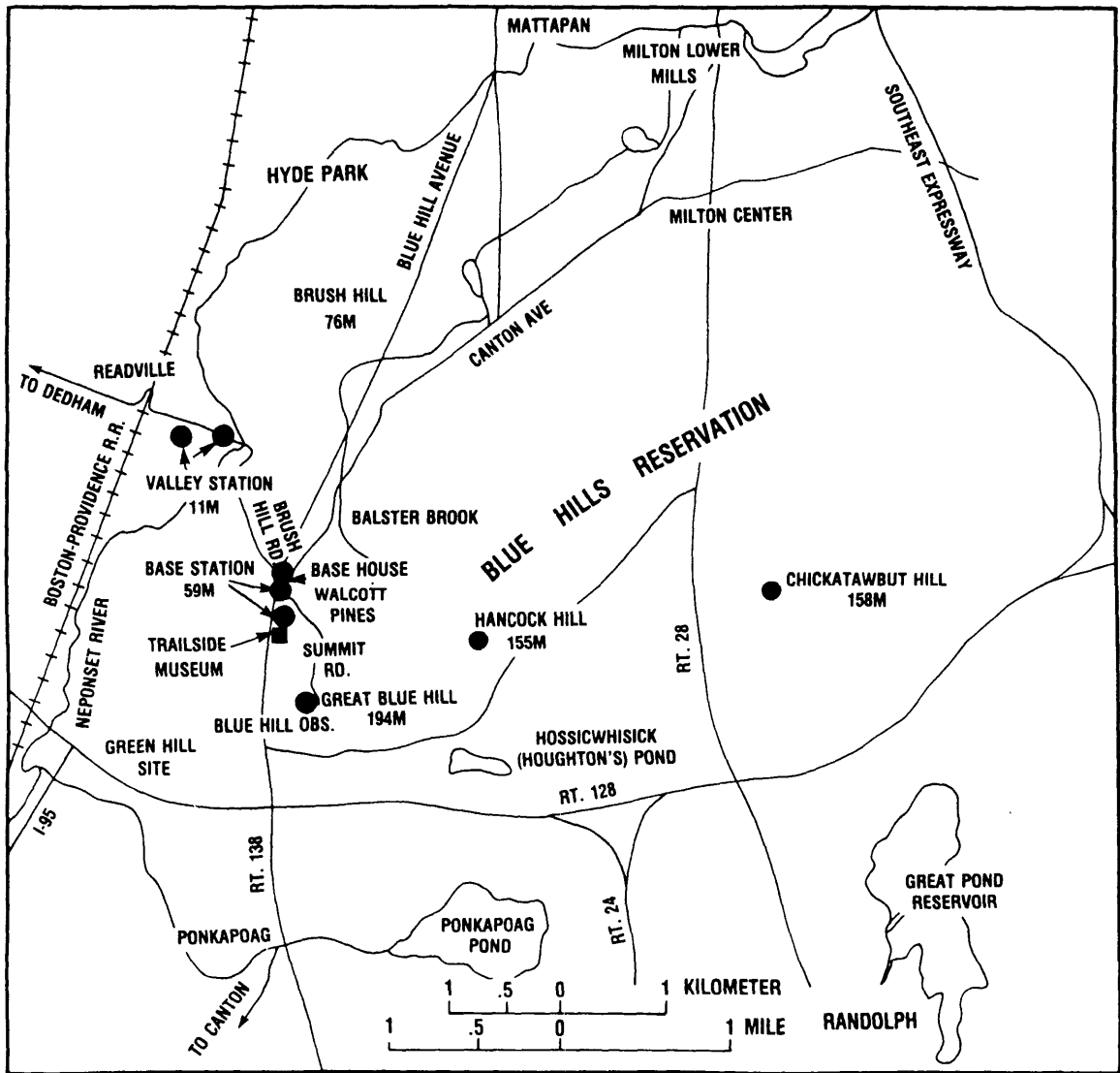
Ralston, William. Blue Hill Meteorological Observatory--Preliminary Report. No place of publication, no date.

BLUE HILL METEOROLOGICAL OBSERVATORY
SITE LOCATION MAP



BLUE HILL METEOROLOGICAL OBSERVATORY

SITE LOCATION MAP

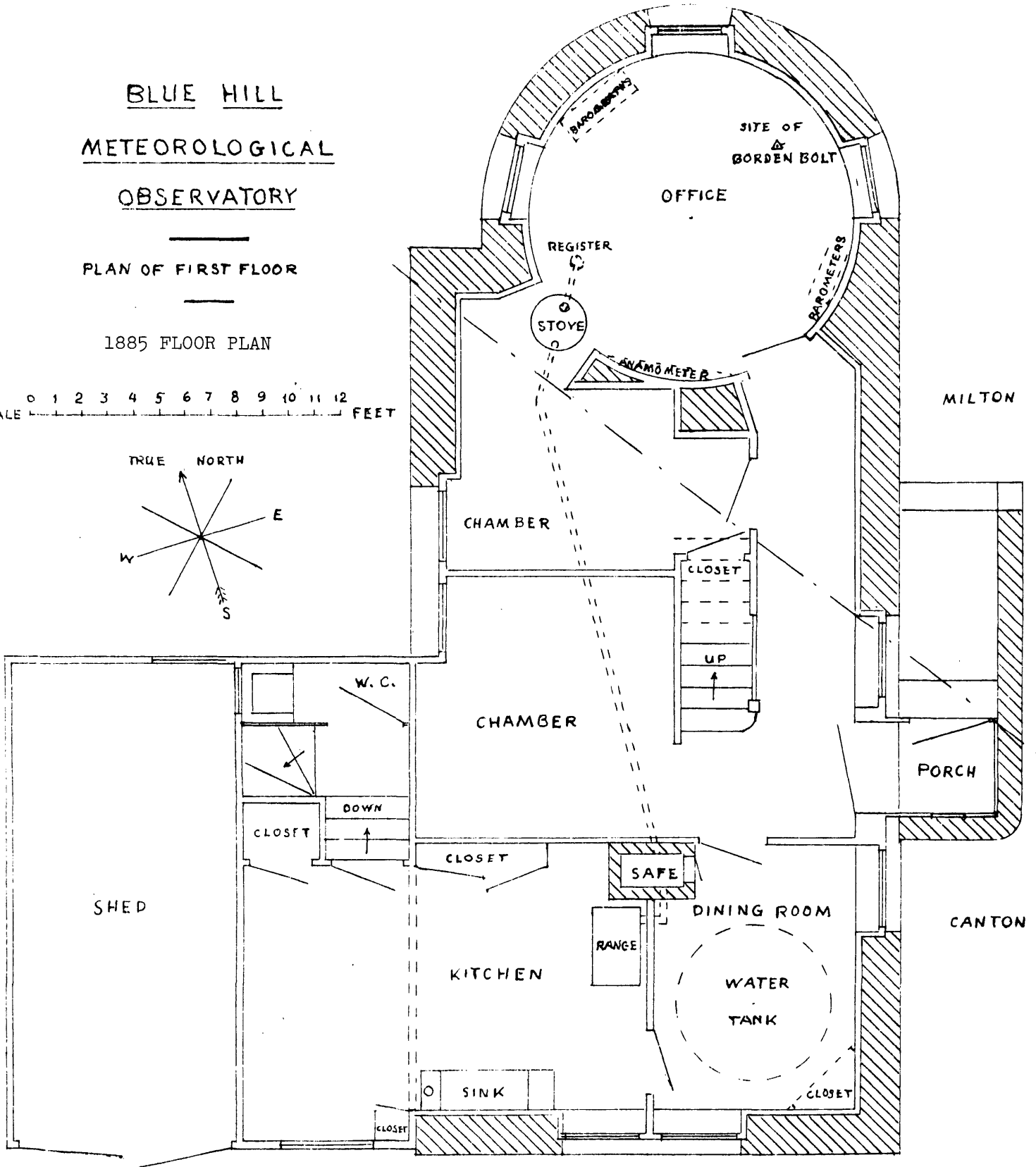
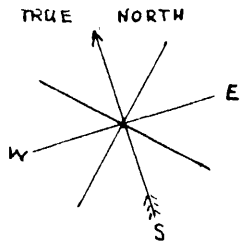


BLUE HILL
METEOROLOGICAL
OBSERVATORY

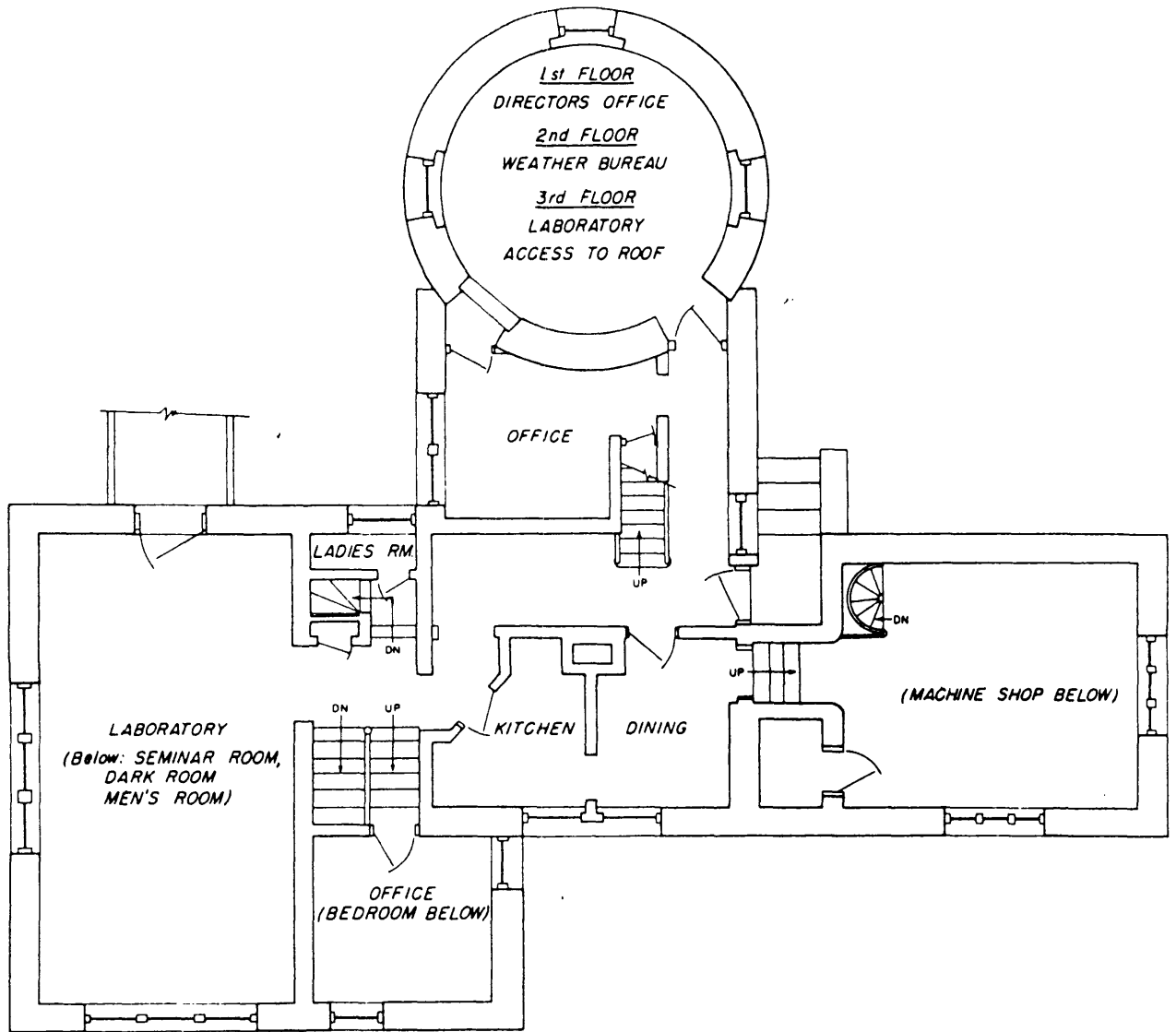
PLAN OF FIRST FLOOR

1885 FLOOR PLAN

SCALE 0 1 2 3 4 5 6 7 8 9 10 11 12 FEET



Redrawn from faded photograph on which the building measured $2\frac{3}{16}'' \times 2\frac{15}{32}''$
 Scale $\frac{3}{16}'' = 1'0'' \pm$
 Ebenezer Gay March 1985
 Harvard Collection of Historical Scientific Instruments



BLUE HILL OBSERVATORY

1962 FLOOR PLAN