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 Hale Laboratory

other names/site number

2. Location

street & number 740 Holladay Road ☐ not for publication

city, town Pasadena ☐ vicinity

state California code CA county Los Angeles code 034 zip code 91106

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	Noncontributing
☒ private	☒ building(s)	1	2 buildings
☐ public-local	☐ district		sites
☐ public-State	☐ site		structures
☐ public-Federal	☐ structure		objects
	☐ object	1	2 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)	Current Functions (enter categories from instructions)
Research Facility	
Private Library	Private Library

7. Description

Architectural Classification (enter categories from instructions)

Spanish Colonial Revival

Materials (enter categories from instructions)

foundation concrete
walls concrete
Mission tiles
roof
other

Describe present and historic physical appearance.

The Hale Solar Laboratory is a T-shaped reinforced concrete structure of Spanish Colonial Revival design with a chimney, mission tiles, rough plastered walls, and deep set windows. The building is set back on a rectangular lot on Holladay Road, behind a plastered wall, in Pasadena, California. [1]

Designed in 1924 by the architectural firm of Johnson, Kaufman, and Coate, of Pasadena, California, the Laboratory's dimensions are 21 feet x 49 feet with two sections: the observatory and telescope, and the library and living room. The third wing, which forms the "T" is below grade and contains dynamos, transformers, and the heating and ventilating plant. There are six rooms in all, built for $14,000.

The portion of the building facing Holladay Road has two sections. The northern portion has a gabled, tiled roof, the gable end facing north. A chimney interrupts this roof line on the east. Two deep set plain windows pierce the roughly plastered wall. Each window has a smaller rectangular tile inset near the roof line. The second section facing Holladay Road is the telescope tower, 21 feet square with a domed top 14 feet in diameter and rising 30 feet from ground level. A long rectangular window similar to those in the adjacent portion of the building can be found with a blue tiled inset within a quatrefoil recess set closer to the roof line. The roof is flat with a parapet wall 2.5 feet high. In the center of the tower, descending from the spectrograph room in the basement, is a well 10 feet in diameter and 78.5 feet deep.

Facing to the south in the tower is the front door. This arched entrance is approximately 15 feet tall. Set into the upper portion of the arch are astronomical details including the sun and its rays. Because of Hale's interest in Egyptology, he commissioned the well known sculptor, Lee Lawrie, to create two bas-reliefs. The cast stone bas-relief over the doorway is a tribute to Akhnaton (the King of Egypt and worshipper of the sun god, Aton) symbolized by the sun's rays that end in the hands that grasp the symbol of life--a copy from a Theban tomb. Another bas-

☐ See continuation sheet

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:
[X] nationally [ ] statewide [ ] locally

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

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

Areas of Significance (enter categories from instructions)	Period of Significance	Significant Dates
National Register: Science	1924-1952	
National Historic Landmark: Science, Subtheme: Physical Science, Facet: Astronomy		

Cultural Affiliation
N/A

Significant Person
George Ellery Hale

Architect/Builder
Johnson, Kaufman, Coate

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

Summary

The Hale Solar Laboratory is significant because of its association with its owner-builder, George Ellery Hale. Hale was an internationally famous scientist, a trustee behind the endowment of the Huntington Library and Art Gallery in San Marino, California, and a trustee and organizer of the California Institute of Technology.

The Hale Solar Laboratory was Hale's office and workshop for the later years of his life. Hale's scientific contributions were many, especially in the area of astronomy. Hale was one of the first scientists to compare observations in physics laboratories here on earth to what is seen in the heavens. He, more than anyone else, is the person most responsible for the rise of the science of modern astrophysics in the United States.

The Hale Solar Laboratory is also significant as the site of many scientific discoveries, the most famous being Hale's refinement of the spectrohelioscope, a device that made it possible to observe the hydrogen-rich prominences of the sun.

[ ] See continuation sheet

9. Major Bibliographical References

See Continuation Sheet

☒ 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 # _____

Primary location of additional data:
- ☐ State historic preservation office
- ☐ Other State agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other

Specify repository: _____

10. Geographical Data

Acreage of property 0.672

UTM References

	Zone	Easting	Northing
A	1 1	3 9 6 6 7 0	3 7 7 7 2 7 0
B			
C			
D			

☐ See continuation sheet

Verbal Boundary Description

Assessor map number 5327-7-39' commencing at the NE corner of Lombardy Rd. and Holladay Rd., go south 282.29', then east 313.43', turn 95' south, then go 300' west, and then north 95.34 to point of origin.

☐ See continuation sheet

Boundary Justification

This is the original lot purchased by George Ellery Hale in 1923,

☐ See continuation sheet

11. Form Prepared By

name/title Harry Butowsky
organization National Park Service date May 1, 1989
street & number 1100 L Street, N.W. telephone (202) 343-8155
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★U.S.GPO:1988-0-223-918

relief by Lawrie is positioned over the fireplace in the library. Many scientific journals and books belonging to George Ellery Hale remain in the basement.

The sycamore trees flanking the entrance, the loquat trees, and the arbutus that surround the Hale Solar Laboratory were planted in 1928. The design for the landscaping was done by Beatrix Farrand, who also designed the grounds, the parking court with its dwarf myrtis hedge and sour citrus trees and the drive which centers on the dome.

The observatory is at the end of a long driveway which is lined with mature plants. The street facing facade is no longer visible, but the path leading to the entrance remains intact. The 1924 annual report from Mount Wilson describes the lot as 95 feet x 300 feet--the same lot size as today, suggesting the plantings and design could be original. There is an outbuilding at the northeast corner of the lot. The long asphalt central driveway terminates at a large open motor court just beyond the metal gates in the plastered masonry wall across the width of the property from north to south. The driveway is located on the east-west axis of the observatory portion of the building.

The exterior of the basement is surrounded by a light moat. Stairs with an iron railing lead from the northern facade to the moat, which surrounds all of the building except that portion which is part of the telescope tower. An arched window is in the northern facade. The east and west walls of the structure are mirror images, except for the chimney on the eastern wall.

The telescope tower has 45° clipped corners and the tower portion has overflows for roof drainage.

The Hale Solar Laboratory has not been altered since its construction in 1924. The building is in excellent condition and retains much of the original equipment and personal books and journals used by George Ellery Hale.

History

George Ellery Hale was born in Chicago, Illinois, on June 29, 1868. Hale graduated from the Massachusetts Institute of Technology in 1890 and after some work in Europe, organized the Kenwood Observatory in Chicago. There in 1889 he invented the spectroheliograph, a device that made it possible to photograph the light of a single spectral line of the sun. Thus he was able to photograph the sun by the light of glowing calcium, and the result was a clear indication of the distribution of calcium in the solar atmosphere. Hale detected calcium clouds in the Sun that he called flocculi.[2]

To continue his research Hale felt the need for larger and more sophisticated telescopes. This led to Hale's greatest accomplishments--organizing and carrying out projects involving the construction of astronomical observatories. During the course of his career, Hale was responsible for the founding of three major observatories: Yerkes in Wisconsin, and Mount Wilson and Palomar in California. He built the world's largest telescopes many times over.

Hale began work on his first large observatory in 1892 when he persuaded Chicago street-car magnate Charles Tyson Yerkes to support the establishment of a large astronomical observatory for the University of Chicago. Hale had Alvan G. Clark begin the process of grinding and polishing the glass disks for the proposed 40-inch refractor. Yerkes Observatory was completed in 1897, and its 40-inch refractor remains the largest refractor in the world today. Generations of astronomers have been trained or worked at Yerkes, in the past century making use of the fortunate combination of Yerkes' money and Hale's vision.

Hale was not satisfied and soon left Yerkes to travel to California in pursuit of newer and more powerful telescopes. In 1904 he founded the Mount Wilson Observatory, obtaining the funding from steel magnate Andrew Carnegie. A 60-inch reflecting telescope was placed in operation there in 1908 and a 100-inch reflecting telescope was placed in operation in 1917, the latter paid for by the Los Angeles hardware tycoon, John D. Hooker.[3]

The 100-inch was to remain the largest telescope in the world for a generation. By using this telescope, astronomers at Mount Wilson in 1930 first observed velocities of galaxies increase progressively with ever-increasing distances from the earth. This observation, combined with an earlier observation made on this telescope in 1924 that galaxies are stellar systems, clarified one of the most basic questions of cosmology--the nature of the large scale structure of the universe.[4]

It was at the Mount Wilson Observatory in 1908 that George Ellery Hale made his most famous scientific discovery when he detected the existence of strong magnetic fields inside sunspots. This was the first association of magnetic fields with any extraterrestrial body.[5]

Hale's activities reached into many fields during this time. With colleagues Alfred Noyes and Robert Millikan, he transformed the Throop Polytechnic Institute into the California Institute of Technology. He persuaded Henry E. Huntington to endow the Huntington Library and Art Gallery. As a member of the Pasadena Planning Commission he was influential in obtaining for Pasadena the coordinated civic center buildings--City Hall, Civic Auditorium, and Central Library. For this work he received the Noble medal from the City of Pasadena, an award set aside for outstanding local citizens.

Some of his other contributions are less well known. He co-founded the International Astronomical Union (IAU) and the Astrophysical Journal. He persuaded President Woodrow Wilson to form the National Research Council, through which scientific minds could be best used to help the country during World War I. Hale worked with Bertram Goodhue on the plans of the building designed in 1924 for the Research Council in Washington, DC.

After retiring from the active directorship of the Mount Wilson Observatory in 1923 Hale searched for a site for a new observatory--one where he could work undisturbed. Hale investigated observing conditions around Pasadena and found that the "seeing" was actually better in the valley than on Mount Wilson during the middle part of the day. A 95 x 300 foot lot was purchased from the Henry E. Huntington Library and Art Gallery near the southern border of Pasadena.

Construction began in 1924. The building permit application, dated April 18, 1924, lists the architect as Johnson, Kaufman, & Coate, one of the more prominent firms in Pasadena. The reinforced concrete structure was built under the supervision of George Jones of the Mount Wilson Observatory staff. The 21 x 49 foot building included a dome housing equipment for viewing the sun (with a 78 foot pit below ground), a library, and a basement with shop and lab.

The project was financed largely by George Ellery Hale personally, although construction and some of the equipment were provided by Carnegie Institution. Upon completion in 1925 Hale made a gift of the buildings, grounds, and equipment to the Carnegie Institution of Washington. The Solar Lab was to become a permanent branch of the Mount Wilson Observatory.

Hale spent his retirement years at his lab studying the sun with instruments of his design. He installed a spectroheliograph at the lab, a device to photograph the sun using the light of a single wavelength. Hale had won the Janssen Gold Medal of the Paris Academy of Science in 1894 for this invention. While at the lab, Hale redesigned the spectroheliograph, to allow the sun to be seen by hydrogen light. Hale's new instrument, called the spectrohelioscope, showed up the prominences of the sun in greater detail than ever before observed. In his spare time he wrote several books, while also completing plans for the 200-inch telescope at Palomar Mountain.

After Hale's death in 1938 the Hale Solar Laboratory continued to be used as a solar observatory for many years. It was at the Hale Solar Laboratory in 1952 that Mount Wilson astronomers Harold and Horace Babcock (father and son) constructed the first solar magnetograph. This instrument finally enabled astronomers to measure the general magnetic field of the sun, a goal which had long been sought after by Hale. In 1985 the Hale Solar Laboratory was sold to William and Christine Shirley, who built a private residence on the grounds. The laboratory currently houses the offices of the Mount Wilson Institute, a non-profit organization, formed in 1986 to operate the Mount Wilson Observatory when the Carnegie Institution of Washington announced plans to withdraw from the Observatory.

Footnotes

1. Most of the material in this form was adapted from the following sources.

   Lorraine Melton, "National Register of Historic Places Inventory-Nomination Form-Hale Solar Laboratory." (Pasadena, California: Pasadena Heritage, 1984).

   Christine Shirley, "The Hale Solar Laboratory-740 Holladay Road-Pasadena, California-A Guided Tour..." (Pasadena, California: Christine Shirley, 1985).

2. Isaac Asimov, Asimov's Biographical Encyclopedia of Science and Technology (New York: Doubleday & Company, Inc. 1982), pp. 622-623.

3. Ibid.

4. The American Society of Mechanical Engineers, "The 100-Inch Telescope of the Mount Wilson Observatory" (Northrop Corporation, 1981).

5. Asimov, op. cit., 622.

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Abell, George O. Exploration of the Universe. 4th ed., Philadelphia: Saunders College Publishing, 1982.

American Society of Mechanical Engineers. The 100-Inch Telescope of the Mount Wilson Observatory. Northrop Corporation, 1981.

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Asimov, Isaac. Asimov's Biographical Encyclopedia of Science & Technology. New York: Doubleday & Company, 1982.

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Learner, Richard. Astronomy Through the Telescope. New York: Van Nostrand Reinhold Company, 1981.

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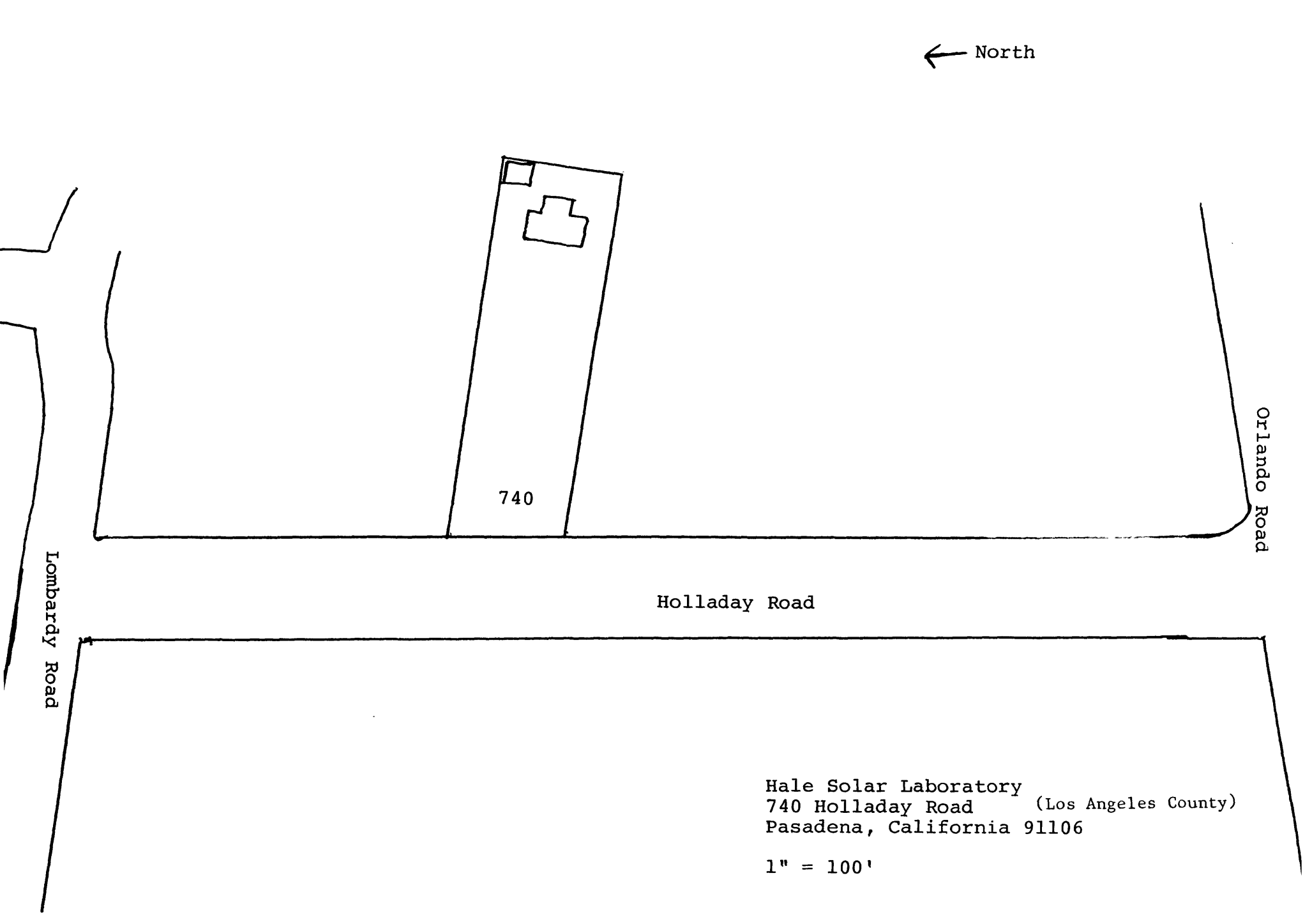
Shirley, Christine. The Hale Solar Laboratory-740 Holladay Road-Pasadena-A Guided Tour... Pasadena, California: Mrs. Christine Shirley, 1985.

Wright, Helen. Explorer of the Universe: A Biography of George Ellery Hale. New York: E. P. Dutton & Co., Inc., 1966.



Hale Solar Laboratory
740 Holladay Road (Los Angeles County)
Pasadena, California 91106

1" = 100'