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NPS Form 10-900 OMB No. 1024-0018
(Rev. 10-90)

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INTERAGENCY RESOURCES DIVISION
NATIONAL PARK SERVICE

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 for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Carnegie Institution of Washington, Geophysical Laboratory

other names/site number ______

2. Location

street & number 2801 Upton Street, N.W. not for publication N/A
city or town Washington vicinity N/A
state District of Columbia code DC county N/A code N/A
zip code 20008

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this X 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 X meets ____ does not meet the National Register Criteria. I recommend that this property be considered significant ___ nationally X statewide ___ locally. (___ See continuation sheet for additional comments.)

Robert L. Mallett 11/14/94
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 for additional comments.)

______
Signature of commenting or other official Date

______
State or Federal agency and bureau

4. National Park Service Certification

I, hereby certify that this property is:

✓	entered in the National Register (See continuation sheet).	Edson H. Beall	12·29·94
___	determined eligible for the National Register (See continuation sheet).		
___	determined not eligible for the National Register		
___	removed from the National Register		
___	other (explain): ______________	Entered in the National Register	

for Signature of Keeper — Date of Action

5. Classification

Ownership of Property (Check as many boxes as apply)

- X private
- ___ public-local
- ___ public-State
- ___ public-Federal

Category of Property (Check only one box)

- X building(s)
- ___ district
- ___ site
- ___ structure
- ___ object

Number of Resources within Property

Contributing	Noncontributing	
3		buildings
		sites
		structures
		objects
3	0	Total

Number of contributing resources previously listed in the National Register N/A

Name of related multiple property listing (Enter "N/A" if property is not part of a multiple property listing.) N/A

6. Function or Use

Historic Functions (Enter categories from instructions)

Cat: EDUCATION Sub: research facility

Current Functions (Enter categories from instructions)

Cat: VACANT/NOT IN USE Sub:

7. Description

Architectural Classification (Enter categories from instructions)

EARLY 20TH CENTURY REVIVAL:
Italian Renaissance Revival

Materials (Enter categories from instructions)

foundation CONCRETE
roof TERRA COTTA
walls STUCCO

other

Narrative Description (Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria (Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

X A Property is associated with events that have made a significant contribution to the broad patterns of our history.

___ B Property is associated with the lives of persons significant in our past.

X C Property embodies the distinctive characteristics of a type, period, or method of construction represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

___ D Property has yielded, or is likely to yield information important in prehistory or history.

Criteria Considerations (Mark "X" in all the boxes that apply.)

___ A owned by a religious institution or used for religious purposes.

___ B removed from its original location.

___ C a birthplace or a grave.

___ D a cemetery.

___ E a reconstructed building, object,or structure.

___ F a commemorative property.

___ G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance (Enter categories from instructions)
SCIENCE
ARCHITECTURE

Period of Significance 1906 - 1931

Significant Dates 1906-07
1931

Significant Person (Complete if Criterion B is marked above)

____

Cultural Affiliation ______________________________
____

Architect/Builder Wood, Donn and Deming

Narrative Statement of Significance (Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

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
X State Historic Preservation Office
___ Other State agency
___ Federal agency
___ Local government
___ University
___ Other
Name of repository: ______________________________

10. Geographical Data

Acreage of Property 4.45 acres

UTM References (Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing		Zone	Easting	Northing
1	18	321760	4312260	3	__	______	______
2	__	______	______	4	__	______	______

__ See continuation sheet.

Verbal Boundary Description (Describe the boundaries of the property on a continuation sheet.)

Boundary Justification (Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Stephen Callcott, Architectural Historian

organization D.C. SHPO date August 19, 1994

street & number 614 H Street, N.W. Suite 305 telephone (202) 727-7360

city or town Washington state DC zip code 20001

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps
A USGS map (7.5 or 15 minute series) indicating the property's location.
A sketch map for historic districts and properties having large acreage or numerous resources.

Photographs
Representative black and white photographs of the property.

Additional items (Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)
name Carnegie Institution of Washington, Geophysical Laboratory

street & number 2801 Upton Street, N.W. telephone

city or town Washington state DC zip code 20008

The Site

The Carnegie Institution of Washington Geophysical Laboratory is set high on a hill on the northern side of Upton Street, N.W. The landscape surrounding the structure is handsomely laid out with informal plantings and specimen trees. A driveway beginning on Upton Street at the western end of the site winds to the east before curving north to the building. The driveway forks, with one branch veering to the east, passing in front of the building and returning to Upton Street. The other branch leads to two small parking areas on the west and north sides of the laboratory.

It is unclear from historical photographs and research whether the grounds were laid out according to a specific landscape plan. The only area of the site which is obviously planned is the front lawn, which is enclosed on the south by an arc of mature azaleas. As the site was used for agricultural purposes until the end of the 19th century, and as evidenced by historic photographs, the site was considerably less densely planted when first constructed than it appears today.

The Laboratory

The Carnegie Geophysical Laboratory is a two-and-one-half story structure, with a raised basement, measuring 119' wide x 59'6" deep. The front of the building is oriented south, and commands impressive views of downtown Washington. The building's walls are finished in pebbledash stucco, and contain decorative trim in limestone, textured brick, tile and smooth stucco. The hipped roof, clad with red terra cotta tile, has wide overhanging eaves supported by decorative wood brackets. The building is decidedly horizontal in emphasis, which is reinforced by the hipped roof and decorative stringcourses. The building, designed by Washington architects Wood, Donn & Deming in 1906, is a good example of the Mediterranean Revival style popular in the first decade of the twentieth century.

The mass of the building is broken into three sections, with a main center block, flanked by slightly recessed wings on either side. Each of the facades is symmetrical. The front and rear facades each have five window bays in the central block. All of the windows on the building are one-over-one wood sash; originally each opening had paired multi-pane wood storm casements, since removed.[2] On the first floor, each bay consists of a pair of windows with round-headed transoms set within a recessed stucco arch. Below each window is an inset stucco panel. On the second floor, the ten windows, also topped with rounded-headed transoms, are evenly spaced across the facade. Each wing contains a pair of windows on the first floor, and two windows on the second. The side facades have three bays;

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[2] The original drawings and photographs of the building from the Carnegie Institution's 1907 Year Book and from a 1948 photo in the Wymer Collection of the Washington Historical Society archives show the original multi-light casement windows. Each first floor casement had eight lights, each second floor casement had four lights.

three paired windows on the first floor set within arches, six windows on the second. All transom windows are original and retain their multi-light configuration. The basement windows, two-over-two sash, are paired to align with the first floor windows.[3] Limestone string courses separate each of the floors.

The entrance to the building is reached via a double stair joined at a central landing. The central bay of the main floor holds a set of double doors set within a slightly recessed arched stucco niche. The doors are not original, and replaced metal frame glass doors with decorative wrought iron grilles. The door has an elaborately carved low-relief limestone surround, with pilasters on each side and topped by a rounded, broken pediment. At the break in the pediment is a small circular opening trimmed in limestone and protected by a wrought iron grille. Originally, this opening contained a window; it is currently sealed, with a vent.

The building exhibits decorative brick work around the windows and in the cornice. Within each window arch on the first floor are medallions of multi-colored textured brick in a diapered pattern. The polychromatic cornice, one of the most distinctive features of the building, also illustrates a continuous band of panels with brick and tile. Separating each panel is a pair of painted wood brackets. Above the brackets, smaller rafter ends protrude through the roofline below the gutter. The fascia is decorated in an alternating pattern of square and rectangular insets placed into the stucco. The variously-shaped insets contain the same pattern of a central diamond-shaped green tile surrounded by a herringbone pattern of brown brick. The soffit is also decorative, with lattice panels between the brackets and drops at each of the building's eight corners. There are two internal end chimneys finished in both smooth stucco and pebbledash. The chimneys are capped with sheet iron canopies. There are two vents on the flat section of the hipped roof.

While the exterior styling of the building was undoubtedly executed for aesthetic reasons, the Carnegie Institution's Year Book of 1902 details explicit functional requirements for the Geophysical Laboratory's design. Among these were that the exterior walls should be protected against sun and rain by wide eaves; that corridors be planned not only for communication, but to serve as insulators for the laboratories; and that work rooms be well lit with natural light.[4] In addition, the structure had to be fireproof, and impervious to vibration.

The floor plan consists of a double loaded central corridor on each floor. As was specifically requested by the Carnegie scientists, the plan is a modular one, which allowed for the expansion or contraction of individual laboratories as

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[3] The original drawings prepared by Wood Donn & Deming show three-over-three sash windows in the basement.

[4] Carnegie Institution Year Book, No. 1, 1902, p. 36.

needed.[5] Thus, outside and inside walls were built to contain vertical flues of vitrified sewer pipe through which water, gas, compressed air and electrical transmission could pass from floor to floor, while walls between rooms were purposely light in construction, in the event of future enlargement or reduction of laboratories. All interior walls and ceilings are finished in plaster. The floors are of Portland cement throughout the building; in the labs they are finished in linoleum. Each floor has approximately 6,400 square feet.

The basement was originally undivided by party walls. The original building permit describes a vault, also identified on the original site plan to the west of the building. The vault led to a boiler room, also underground and slightly to the southwest of the laboratory. It was above this boiler room that the 1931 power plant was constructed (see below).

According to the 1907 Year Book, the most innovative structural features of the building resulted from two efforts: 1) to provide thermal insulation during Washington's unbearably hot and humid summers, and 2) to prevent unnecessary vibration of the structure due to the heavy machinery it housed. To properly insulate the structure, "it was therefore thought wise to try a plan which, so far as we are aware, has not been tried before, namely, to place an insulating layer on the outside of the building."[6] The result was an exposed inner wall of ordinary brick protected from heat by a six inch insulating layer of hollow terra-cotta, with horizontal air spaces closed at the ends. The solution to the vibration problem was accomplished with an 18' thick layer of Portland cement, poured as the basement floor for each room which contained machinery. This cement block was separated, both at the bottom and sides, from the foundation walls of the building by a six inch layer of dry sand. The use of sand, a technique used successfully in Europe, prevented the vibration within the block from passing into the building. Judging from the original drawing of the longitudinal section of the building, this technique was combined with the more standard structural formula of steel beam construction with a layer of flat terra cotta arches spanning the beams.

A report by George F. Becker titled "Construction of Geophysical Laboratory" included in the 1903 Year Book contains a discussion of recommendations for the lab's construction based on the author's observations of European geophysical laboratories. Becker advocated that the most delicate laboratory work be conducted on piers in the basement or on the first floor of the building. According to Becker, masonry arches could support a second floor usage which included a "large class of experiments." According to the original Wood, Donn & Deming drawings, all floors, including the basement floor, are supported by a

[5] Year Book, No. 1, 1902, p. 36.

[6] Year Book, No. 6, 1907, p. 87.

The Power Plant

To the west of the 1906 Laboratory is the power plant, constructed in 1931, designed by William Deming, previously of Wood, Donn & Deming. The power plant was built as an above-ground addition atop the original subterranean boiler room.[7] The building is built into the hillside, with only its western end exposed; the remainder of the structure is located in and under the hill and a parking lot next to the Laboratory.

The L-shaped building is a one-story concrete clad structure in a simple industrial version of the Renaissance Revival style, with smooth concrete surfaces and large rounded-headed windows which echo those originally found on the Laboratory. An exterior stair leads to the below-grade areaway and entrance on the south elevation. The large windows are designed as an arch within an arch, with a central awning casement section and multiple fixed panes. The glass is reinforced with wire mesh. The roof of the power plant serves as the surface of the parking lot above. A smoke stack, rising from within the interior courtyard of the L-shaped building, rises approximately 80 feet.

Outbuildings

The site also contains a small, 26' x 16', one-story stucco outbuilding, located north of the power plant, and northwest of the laboratory. Constructed between 1924-1931, the specific purpose of the building is unclear. While the building's design is purely functional, consisting of an end-gable orientation, a pitched roof with small monitor at the ridge, and simple fenestration, some attempt was made by its builder in cladding it in pebbledash to have it complement the Laboratory building.

Additional outbuildings, including several corrugated metal sheds, two cinder block sheds, and a metal paneled shed, were constructed on the property at different periods. These sheds have all been demolished.

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[7] D.C. Building Permit #147456 was issued on October 16, 1931 to the Carnegie Institution for the construction of the plant.

The Carnegie Institution of Washington Geophysical Laboratory at 2801 Upton Street, N.W. is among the oldest of five world-famous scientific research centers of the Carnegie Institution of Washington. Constructed between 1906-1907, four years after the founding and endowment of the Institution by Andrew Carnegie, the Laboratory was built to the design of the skilled Washington, D.C. architectural firm of Wood, Donn & Deming. The building, which was built at this location for very specific scientific reasons, is sited on 4.45 acres of its original 5 acre parcel, and was continuously occupied by the Geophysical Laboratory until 1990. The Laboratory is the site of numerous scientific experiments which have received national and international attention.

The Carnegie Institution of Washington

The Carnegie Institution of Washington, a world-renowned scientific organization, was founded and endowed by millionaire philanthropist Andrew Carnegie in 1902.[8] The goals of the Institution are "to encourage in the broadest and most liberal manner investigation, research and discovery, and the application of knowledge to the improvement of mankind." The interests of the Institution are primarily in three broad fields: 1) the form, contents, and dynamics of the universe; 2) the structure and evolution of the earth; and 3) the frontiers of biology. Work in these fields takes place at five research centers across the United States, one of which is the Geophysical Laboratory. Other laboratories include the Mount Wilson and Palomar Observatories in California; the Department of Terrestrial Magnetism in Washington, D.C.; the Department of Plant Biology in California; the Department of Embryology in Maryland; and the Genetics Research Unit in New York.

At the time of its founding, the Carnegie Institution was the only organization of its kind in the United States devoted solely to fundamental research. Research was of a nature not normally undertaken by other institutions or government agencies. The Carnegie Institution, which does not provide grants to other institutions or individuals, developed its own network of laboratories where scientists could, and still do, carry on research without any outside pressure to teach or develop commercial products. In addition, the Institution established an agency solely devoted to the publication and dissemination of the results of the research undertaken in its various departments.

The results of experiments conducted by Carnegie Institution scientists are presented and published promptly each year through a series of meetings, lectures, exhibitions, journals, the Institution's own Year Book, as well as other publications distributed through each of the organization's departments. As early as 1939, the Institution had published over 900 volumes of research and had distributed these volumes to libraries and organizations around the world. Experiment results are not patented by Institution; rather, patents and the

[8] Carnegie established the Institution with an initial endowment of $2 million. He added to this in subsequent years, donating over $22 million to its operation by 1911.

development of commercial products based on research results are left to others. Important discoveries of the Carnegie Institution which have led to commercially successful products include the development of temperature-resilient quartz glass, improved mining methods, hybrid vegetables, and improvements in radar technology.

Early History of the Institution

The Carnegie Institution was originally organized under the laws of the District of Columbia and incorporated as the Carnegie Institution. It was reincorporated by an act of Congress (approved April 28, 1904) under the title Carnegie Institution of Washington. Under the Articles of Incorporation, the control of the Institution was placed into the hands of a 24-member Board of Trustees. Members of the board have included some of the most illustrious figures in American philanthropic, scientific and political history, including Alexander Agassiz, Cleveland Dodge, Charles D. Wolcott, Samuel P. Langley, Charles Lindbergh, Seeley G. Mudd, John J. Pershing, Frederic Delano, and Elihu Root.

During the early years, the activities of the Institution were directed toward the support of a wide range of projects, with money commonly granted for specific purposes and limited periods. In later years, the philosophy of the Institution changed, with funding directed toward a few major projects which required large staff and long periods of time to accomplish. This movement quickly led to the development of specialized departments and divisions, each headed by its own investigator.

For several years after it was founded, the Carnegie Institution rented a suite of downtown offices in the Bond Building on New York Avenue, N.W. Having outgrown these quarters, and unable to find suitable space for experimentation, the Institution began an extensive building campaign which resulted in the construction of three buildings in the city by the eve of World War I.

The Geophysical Laboratory was the first of the three buildings, constructed in 1906-1907. Planning also began in 1906 for the construction of an administration building, against the wishes of Mr. Carnegie. The Trustees purchased a site for its construction at the southeast corner of 16th & P Streets, N.W.; it was completed in 1909.[9] In 1914, the Department of Terrestrial Magnetism was completed at 5451 Broad Branch Road in upper Northwest Washington.[10]

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[9] The Administration Building was designated a National Historic Landmark in 1965, and listed on the National Register of Historic Places in 1966. The structure was designed by the New York firm of Carrere and Hastings.

[10] The structure, designed by Waddy Wood, is stylistically quite similar to the Geophysical Laboratory, despite having undergone alterations.

Early Planning for the Geophysical Laboratory

Plans for the Geophysical Laboratory building were first discussed in 1902, the year the Institution was chartered. The need for a geophysical laboratory was clearly and concisely stated in the first Year Book, published in 1902. In this publication, an unnamed committee of six scientists, including the future Smithsonian Institution Secretary Charles D. Walcott, made an impassioned plea to the Board of Trustees to construct a lab for the study of geophysics. The text describes the recent evolution of the science of geophysics, the need for a laboratory in which to study it, a list of profound scientific questions to be addressed, and the ideal specifications for such a building.

The scientists write:

> Until recently the natural sciences and physical sciences have been handled as if almost independent of each other. The ground between has been largely neglected. The occupancy of this ground is certain to lead to important results. The order of results to be expected is illustrated by the great advances which have recently come from occupying the middle ground between astronomy and physics, and between physics and chemistry.
>
> No individual university, or State has attempted to study in a comprehensive way the great territory between geology, physics and chemistry. Nor, so far as we know, does an individual, university or State contemplate the attempt. This great, almost untouched territory, can only be occupied by geophysical laboratories properly equipped and manned.
>
> Your committees have therefore given prolonged consideration to the following propositions:
>
> 1) That a central laboratory of geophysics be established in Washington;
>
> 2) That from this central laboratory the co-operation be sought of all independent laboratories engaged in geophysical studies, without reference to country;
>
> 3) That, where necessary, branch laboratories be constructed in various parts of the world.

The committee of scientists went on to elaborate that:

> The only hope of adequate solution of these profound problems lies in special experimentation. Neither the application of existing science, with its limitations, nor of pure theory, with its present narrow basis, covers, in any competent way, the ground of these problems... It is therefore necessary that special experiments shall be devised to determine with the

utmost precision the laws of variation, with varying conditions, under as great a range of mass, pressure, temperature, and time as possible, and then to apply these determinations with the most critical circumspection to the phenomena which the earth itself presents, and to check them by cross investigation based upon independent sources....

Areas and problems to be investigated by the geophysical laboratory were outlined as follows:

1) The envelopes of the earth doubtless in large measure had a common origin, and they are still most intimately related in action and function... Among its salient questions are those of its origin, its mass, its mass-limitations, its mass-distribution, the potential atmosphere absorbed in the ocean and in the body of the earth... The solution of nearly all of these problems rests ultimately upon grounds that need the searching tests of the laboratory.

2) The crust of the lithosphere has thus far been the chief field of geology in the narrower sense, since it contains the rock record of the earth's past, and geological studies have been directed chiefly to reading and mapping this record. But the record needs to be interpreted on broader and deeper lines....

3) The relation of the earth to neighboring bodies, its motions and the modifications of its form imposed by these, also constitute a record of the earth's history, and a forecast of its future.

The committee concluded:

In view of the special nature of the geophysical and geochemical experimentation which the elucidation of the profounder problems of the earth requires, and of the absence of many of the requisite appliances in the laboratories now established, we recommend that a central laboratory of geophysics be established by the Carnegie Institution at Washington, and that its scope be broad enough to embrace geochemistry and any other science essentially involved in the problems of the earth. We designate this a central laboratory because we recognize the need of special branch laboratories in various parts of the world for the determination of certain questions which require special localization.... The central and branch laboratories should be constructed for the special investigations for which they are designed, and should be manned with reference to the problems to be investigated.[11]

[11] Year Book, No. 1, 1902; pp. 27-35.

In addition to the justification for the construction of a geophysical laboratory, the committee also provided specifications for siting, exterior design, and possible floor plans. These include suggestions such as protection of exterior walls from sun and rain through the use of wide cornices and balconies; uniform temperature in the building for experiments; and construction of rock-bottomed laboratories to provide structurally stable work spaces for pressurized experiments. Guided by these premises, two proposed sketches for the layout of the laboratory were also published in the 1902 Year Book.

The Committee concluded "that if the facilities herein recommended are granted, it will assure to America the foremost place in the special fields..."[12]

Scientific Specifications for the Geophysical Laboratory

The success of the Institution's proposed scientific endeavors depended on the structure of the laboratory itself. Accordingly, the scientists associated with the Institution studied the issue carefully and developed specific recommendations for the building's construction and form. Based on the plea put forth in the 1902 Year Book, the Board of Trustees approved the plan, and scientists from the Institution travelled to Europe where they visited famous laboratories in order to study the effectiveness of their construction and siting. In 1903, the year after the construction of the geophysical lab was first recommended, an entire chapter of the Year Book was devoted to its design and construction. The recommendations conclude that extreme measures be taken to insure that the laboratory be properly constructed.

> The most important features of laboratories are the means adopted to secure stability of piers and the methods of obtaining constant temperatures. Laboratory construction must determine in what measure stability of instruments and constancy of temperature can be attained. Laboratory construction is a matter of extreme importance and one which has been, relatively speaking, neglected. Vast ingenuity has been applied to the perfection of apparatus, while little pains has [sic] been taken to provide for that freedom from mechanical and thermal disturbance without which many instruments of precision cannot give the best results of which they are capable. Hence also the work done in an ill constructed laboratory, other things being equal, will be inferior in quantity and quality as compared with that achieved in a suitable building.[13]

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[12] Year Book, No. 1, 1902, p. 43.

[13] Year Book, No. 2, 1903, pp. 185-186.

The recommendations take specific form in the report and are important to the eventual siting of the Geophysical Laboratory. Among the recommendations discussed are conditions necessary for both the siting and the building, including:

1. Freedom from magnetic disturbances. Magnetic observations can only be made in buildings free from iron and as remote as possible from industrial establishments.

2. Freedom from electrical disturbances. The laboratory had to be at least one mile from trolley lines using an earth current, or several hundred feet from trolley lines which use double overhead or underground metallic circuit lines. In addition, carriages deriving power from storage batteries also cause disturbances, thus making it necessary that the laboratory be siting away from major thoroughfares.

3. Freedom from vibration of the piers. The laboratory needed to be siting such that piers could be constructed to very specialized specifications so as to avoid vibrations caused by traffic even at some distance, as had been experienced by laboratories in Europe.

4. Freedom from steel construction. Buildings constructed from steel were believed to not be as stable as those of masonry. In steel buildings, it was believed that the oscillation due to wind would be more considerable than in arched masonry construction.

Construction of the Geophysical Laboratory

Discussion and planning for construction continued until 1905, when in December, the Institution's Board of Trustees allotted $150,000 for the acquisition of five acres of land, the construction of the laboratory and the purchase of equipment.[14] A site in the Azadia subdivision was purchased in the spring of 1906.[15]

[14] The five acres was later reduced to 4.5 acres when the Institution gave land to the District of Columbia for the construction of Upton Street to the south of the Laboratory.

[15] The name Azadia, which is indicated as the subdivision name on the building permit for the Laboratory and in Institution reports, is never indicated on maps as a subdivision, but is a name historically associated with the land since at least the middle of the 19th century.

The site was deliberately chosen away from densely populated areas:

> upon a somewhat isolated hill in the northwest section of the city of Washington, only a short distance from the Bureau of Standards. The site itself includes 5 acres of land and is protected on three sides by the steep contour of the hill from the disturbing encroachments of future building operations. The land on the forth side is permanently occupied by the Sisters of the Holy Cross, who expect to erect upon it several buildings for educational purposes. The tract is situated about 1,500 feet away from the nearest street-car line, and the geological formation is such that mechanical disturbances from without need not be feared. Reasonably convenient access to the site in now obtained by a temporary road through the adjacent property of the Sisters of the Holy Cross, but this must be abandoned in the near future on account of the extensive building operations contemplated by them. A permanent entrance-way would naturally be provided by the proposed continuation of Upton Street described in the street-plan adopted for the District of Columbia, which forms the southern boundary of the laboratory grounds. All the land required for continuing this street past our property, a distance of about 1,200 feet, has been dedicated to the District of Columbia without cost, and a formal request for the extension has been made. Its construction is now dependent upon favorable action by Congress.[16]

The 1907 Baist Atlas shows that the land between Connecticut Avenue and old Pierce Mill Road (directly west of the Laboratory site) on the north side of Upton Street had been subdivided. This subdivision was called Fernwood Heights. The only structures indicated in this area in 1907 were the Army and Navy Preparatory school buildings at the northeast corner of Connecticut Avenue and Upton Street. East of Fernwood Heights was the Academy of the Holy Cross. The Academy site was originally part of Dumbarton, the 18.96 acre estate of W.K. Ryan. Although the 1907 atlas indicates that the Carnegie Institution owned the land east of the Holy Cross site, the Geophysical Laboratory building itself does not appear until the publication of the 1911 Baist map.

In 1906, a year after the land was purchased, the design of the Geophysical Laboratory building was contracted to Wood, Donn & Deming, a young, but already well-known Washington, D.C. architecture firm. Specialized plans for the building had already been developed by the Institution and approved by its Board. Its execution was left to the architects and Richardson & Burgess, the builders. On August 7, 1906, District of Columbia Building Permit #419 was issued for the construction of a two-story-and-basement brick laboratory for scientific research. The cost of the building was estimated at $75,940.

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[16] Year Book, No 6, 1907, p. 85.

The design and need for the building was heralded with a lengthy headline and article in the Evening Star (July 8, 1906):

> PLANS FOR NEW PLANT, CARNEGIE INSTITUTION TO HAVE GEOPHYSICAL LABORATORY, OUTLINE OF THE DESIGN, BUILDING TO BE 150 FEET LONG AND SIXTY FEET WIDE, OBJECT--SCIENTIFIC RESEARCH, STRUCTURE ELABORATELY DESIGNED AND TO BE COMPLETED BY JULY 1, 1907.
>
> The Carnegie Institute [sic] of Washington has awarded the contract for the construction of a geophysical laboratory, which it is claimed, is to be the most remarkable scientific mechanical plant in the world. The building will be erected on a commanding elevation about 1,500 feet east of Connecticut avenue and nearly opposite the bureau of standards, and will offer unequaled opportunity for scientific research in the field of geophysics.....

The article continues to describe the architectural features of the building, to define the new science of geophysics, and to present the scientific problems which the Laboratory will endeavor to answer. A rendering of the building's design is included in the article. A few months later, a second rendering is presented with an article reporting current scientific findings of the Institution (Evening Star, September 22, 1906). The building was occupied less than one year later by the Carnegie scientists, who had previously occupied leased space at the U.S. Geological Survey.

As designed and constructed, the building has several special features: 1) It was entirely fireproof, except for the roof. Even the tables and chemical hoods were of stone, iron or glass. 2) The walls were constructed to provide an extra layer of insulation to assist in keeping the structure cool in summer. 3) Heavy machinery was placed in the basement on thick concrete slabs which were completely separated from foundation walls. This prevented the vibrations of the machinery to be carried through the structure, thus effecting the precision of the experimentation instruments. The building was fitted with a number of independent laboratories, each with an accompanying office or study, and each adapted for a single research purpose. While there were no large research laboratories constructed initially, the walls were built in such a way as to be easily removed to enlarge rooms or rearrange the entire floor plan of the Laboratory.

Soon after construction of the building was completed, $4,000 was appropriated to fence, grade and landscape the grounds, as well as to build a road, and bring in utility connections from Upton Street up to the Laboratory.

The structural design of the building was apparently successful. In a 1911 issue of Brickbuilder (Volume 20, pp. 257-260), the Laboratory is cited for its excellent stable construction. The article, "The Design of a Physical Laboratory," lists the Geophysical Laboratory as one of two "fine research laboratories in Washington" and one whose structural detailing is to be emulated to insure stability for precision instruments.

The Carnegie Geophysical Laboratory is a work in the Mediterranean Renaissance Revival style, incorporating influences from both Italian and Spanish 16th century architectural precedents. Typical of revival buildings, the mixture of stylistic elements was probably intended more for their overall romantic effect than for stylistic purity. The building most clearly draws influence from the villas of 16th century architect Andrea Palladio, as translated by American revivalist architects at the turn-of-the-century. The transformation of the Renaissance villa tradition to one of the many American eclectic revival styles was successfully achieved by prominent architects like McKim, Mead & White and Charles Platt. For architects of this period, Renaissance ideals represented the pinnacle of society -- its cultural, philosophical, moral, intellectual and political apotheosis. Beginning in the 1870s, and continuing through the first decades of the 20th century, there was an increasing appreciation of the Italian Renaissance as a high point in Western achievement, and a period to be emulated. Literature of the period has numerous references to an "American Renaissance."

Like the Renaissance villa, the Carnegie Geophysical Laboratory is wedded to its hilltop site, and presents a finished, symmetrical facade on all four sides. The powerful, cubic massing, raised basement, low-hipped red tile roof, stucco wall cladding, projecting eaves with prominent brackets, and central, sculptural entrance all evoke the vocabulary of the Palladian villa.

Details of the building bear the mark of Spanish architecture as well. The most prominent Spanish feature of the Laboratory is the door surround, which appears to have been taken directly from Plates 51 and 52 of Andrew N. Prentice's Renaissance Architecture and Ornament in Spain (1893), depicting the facade and specifically a door detail of the Palma, Majorca Town Hall, built at the end of the 16th century.

To some extent, the specifications placed on the design of these buildings by the Institution and its Board of Trustees for wide eaves and arched windows may have also dictated the appropriateness of a Renaissance Revival style for its early buildings.

Wood, Donn & Deming were certainly well-versed in creating pleasing variations of Mediterranean stylistic derivation during their ten year partnership, and Wood continued using the style after the firm dissolved. The Mission style Alice Barney House (Sheridan Circle, N.W.) of 1902, the Mediterranean Renaissance Revival Fitzhugh Residence (2253 R Street, N.W.), and the remodelling of Providence Hospital (2nd & D Streets, S.E.) in the Mission style, both in 1904, attest to the firm's adeptness in employing the architectural vocabulary of the Mediterranean Renaissance. Other notable buildings include the Mission style Cordova Apartments (1905) and Mission styled residences at 2131 and 2214 Wyoming Avenue, N.W. (1907, 1910). The design of the Carnegie Institution's Geophysical Laboratory fits well into the revivalist architectural vocabulary of the firm, and attests to the firm's skill in adapting the Institution's scientific specifications into a high-style Mediterranean Renaissance Revival building.

The Architects: Wood, Donn & Deming

When the Carnegie Institution sought to commission an architectural firm to design their new laboratory, there were several qualified offices in Washington from which to choose. They selected the recently formed firm of Wood, Donn & Deming, whose work was already noted for its high caliber of design.

Wood, Donn & Deming was formed in 1902, four years before construction began on the Geophysical Laboratory. The firm's three principals -- Waddy Butler Wood, Edward W. Donn, Jr., and William I. Deming -- were extremely active in the architectural community, designing for many clients and serving in professional organizations. The office was known for its fine ability to render a variety of building types in innovative, yet traditional revival styles.

According to Edward Donn in his unpublished reminiscences (1948), he was the designer in the firm, while Deming served as the engineer, and Wood acted as the firm's marketing specialist. The firm received a number of substantial Washington commissions which gave it immediate acclaim. Among these were residential structures, schools, hospitals, churches, apartment buildings, libraries, and office buildings. Remaining examples of their work include the Union Trust Bank (1907; now First American Bank), the Masonic Temple (1908; now the Museum of Women in the Arts), the General Charles Fitzhugh residence (Philippine Embassy), St. Patrick's Parochial School and Parish Hall (1904), Providence Hospital, and the Cordova Apartments (1905). These buildings, as well as others, were all constructed during the 10-year partnership. Many today have been recognized by listing on the National Register of Historic Places, including the Bachelor Apartments, St. Patrick's Parochial School and Parish House, the Union Trust, the Masonic Temple, the Woodrow Wilson House, as well as private residences in the Kalorama Triangle, Massachusetts Avenue, and Sheridan-Kalorama historic districts.[18]

The firm was dissolved in 1912 when Wood opened his own practice. Donn and Deming continued in partnership until 1923.

Waddy Butler Wood (1869-1944) was known in Washington for his work designing trolley car barns with the National Capital Traction Company prior to the formation of the Wood, Donn & Deming partnership. In addition, he was an accomplished designer of single-family, detached and row houses, mostly in the Kalorama Triangle area.

Wood studied engineering at the Virginia Polytechnic Institute for two years and continued his education by devoting extensive time to reading architectural books at the Library of Congress. He began his career in Washington, D.C. in 1892 with the construction of car barns. Following the dissolution of the Wood, Donn & Deming office, Wood practiced individually, continuing to design large

[18] The Woodrow Wilson House is also a National Historic Landmark.

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residential, commercial, institutional, and government structures, including the Carnegie Institution's Department of Terrestrial Magnetism on Broad Branch Road (1914). Many of Wood's buildings are listed on the National Register of Historic Places either individually or within historic districts.

Edward W. Donn, Jr. (1869-1953) was a native Washingtonian who went on ~~the~~ to become a noted authority on early American architecture and a pioneer in restoration architecture. Upon completing his education at the Massachusetts Institute of Technology in 1891, and graduate work at Cornell University, Donn returned to Washington where he began a long and distinguished career. Serving briefly as a partner with Washington architect Walter Peter, and as chief designer for the Office of the Architect of the Treasury from 1900-1902, Donn joined Wood and Deming for a ten year partnership in 1902. Upon the dissolution of the firm, Donn and Deming continued to work together until 1923, when they separated into individual practices. It was during this late period of his career than Donn focused on the restoration of nationally significant historic structures in Maryland and Virginia. Among these sites are Woodlawn Plantation, Wakefield, and Kenmore. Donn played an important role in the founding of the Washington Chapter of the American Institute of Architects, serving as its first secretary. He was elected president of the organization three times.

William I. Deming (1871-1939) is the least known of the three partners. Born in Washington, D.C., he was a graduate of George Washington University. As mentioned, Deming served as the firm's engineer. It is therefore not surprising that he was retained to design the power house addition to the Geophysical Laboratory in 1931. Following the dissolution of his partnership with Donn, Deming continued to design schools, hospitals, and commercial buildings.

Accomplishments at the Geophysical Laboratory

Particularly during the first half of the 20th century, the Carnegie Institution's Geophysical Laboratory was well-known for its innovative experiments, all of which dealt with the formation and composition of the Earth and its elements. The results of many of these investigations eventually led to commercially successful products or improved standards of safety in fields such as mining or building construction in seismically unstable areas.

In one of its earliest success stories, the Geophysical Laboratory developed the process by which to produce quartz glass, a glass which does not melt under very high temperatures.[19] The production of quartz glass was quickly picked up by private interests who saw its many commercial uses. Among those who saw the practical applications of quartz glass was the Corning Glass Company, who marketed the product into the now standard household material, Pyrex. The development of quartz glass by the Geophysical Laboratory occurred shortly before the

[19] See Evening Star article, February 17, 1907, p. 1.

construction of the Upton Street lab, when they were located in leased space. Its development and instant success reiterated the need for independent, well-built facilities for the Institution's scientists.

Other early experiments involved the study of lead, specifically its changes of state between liquid and solid; the systematic studies of the radium content of rocks; and the effect of pressure on rock and mineral formations.

During World War I, the Geophysical Laboratory was drafted by the U.S. Government into the development and manufacture of optical glass for range-finders, periscopes, and other instruments of precision through which firearms were controlled. More than 95% of all glass used by the government during the war was made under the direction of the Laboratory.

In the early 1920s, the Geophysical Laboratory became extensively involved in studies in seismology, specifically studies of earth movement in California.

In the 1940s, newspaper articles proclaimed yet another scientific triumph at the Laboratory. In an experiment, Laboratory scientists produced the greatest pressure on earth: 3,000,000 pounds per square inch. This accomplishment led to the ability to hypothesize with greater accuracy conditions below the Earth's core, and to come to a better understanding of its interior.[20]

The Carnegie Institution continued to use the Geophysical Laboratory until 1989, when its functions were consolidated and moved to the Department of Terrestrial Magnetism on Broad Branch Road. At that time, the Geophysical Laboratory site was placed on the market for purchase. While interest has been expressed in the property, it remains vacant in 1994.

[20] Evening Star, March 22, 1940.

BIBLIOGRAPHY

Carnegie Institution of Washington, Year Book, No. 1, 1902; No. 2, 1903; No. 4, 1905; No. 6, 1907; Vol. 13, 1914; 1956; 1986. Washington, DC: Carnegie Institution of Washington.

Carnegie Institution of Washington, Scope and Organization, Third Issue, December 9, 1914; Tenth Anniversary, December 14, 1911; Nineteenth Issue, April 1939.

"Carnegie Institution of Washington": miscellaneous pamphlets published by the Institution, c. 1963 and c. 1986.

Evening Star

"Carnegie Institution, Provisions of the Bill Introduced for its Incorporation," March 18, 1904.

"Work Done Past Year, President of Carnegie Institution Make Report, Large and Small Grants, Ship Chartered for Pacific Ocean Expedition, Aggregate of Allotments, Plans for Future Outlined by President Woodward -- Duties of Executive Department," February 19, 1906.

"Plans for New Plant, Carnegie Institution to Have Geophysical Laboratory, Outline of the Design, Building to be 150 Feet Long and Sixty Feed Wide, Object -- Scientific Research, Structure Elaborately Designed and to be Completed by July 1, 1907," July 8, 1906.

"New Office Building, Carnegie Institution to Build One in Northwest," September 5, 1906.

"Making Quartz Glass, Discovery at the Carnegie Geophysical Laboratory, Important to the Arts, Commercial Possibilities Not Yet Considered, Demand for Product, Feat Achieved by Arthur L. Day and E.S. Shepherd After Many Fruitless Attempts," February 17, 1907.

"Ceremony of Dedication, Carnegie Institution Opens New Building, Founder and Vice President Sherman Present -- Lecture by Prof. G.E. Hale," December 14, 1909.

"Unique Building for Terrestrial Magnetism Work," May 24, 1914.

"Carnegie Exhibit to Open Saturday, Outstanding Discoveries of Year to be Displayed for First Time," December 5, 1937.

"Greatest Pressure on Earth Produced in Experiment Here; 3,000,000 Pounds Per Square Inch Achieved; A Major Help in Study of Earth's Interior," March 22, 1940.

Washington Times

"Giant Atom Smasher Tested, Electric 'Egg" May Hatch Wonders," April 4, 1935.

Washington Post

"New Home for Scientific Research," January 8, 1911.

"5-Million Volt Atom Cracker Nears Completion Here; Scientists To Look Inton Basic Force Of The Universe," September 14, 1937.

"Carnegie Building In District to Get $300,00 Addition," October 26, 1937.

"The 'Atom Smasher' That's Down the Street," April 1, 1976.

Maps

A Complete Set of Surveys and Plats of Properties in the City of Washington Compiled and Drawn from offical Records and Actual Surveys Published by the Author and Proprietor G.M. Hopkins, C.E., Philadelphia, 1887. Plate 43.

Hopkins Map, Vol. 3, 194, Plate 17.

Map of the Subdivision "Fernwood Heights," 188?.

Baist's Real Estate Atlas, Vol. 3, 1903, Plate 21.

Baist's Real Estate Atlas, Vol. 3, 1907, Plate 27 and 28.

Baist's Real Estate Atlas, Vol. 3: 1911, 1913, 1916, 1919, 1924, 1931, 1937, 1945, 1954, 1968, Plate 27.

Sanborn Fire Insurance Map, 1916, Plate 311.

Maps of Washington, District of Columbia, Vol. 8, Published by the Sanborn Map Company, New York, 1981, Plate 814.

Photographic Files

Historical Society of Washington, D.C.
Martin Luther King Public Library, Washingtoniana Division

The property is located atop a hill at 2801 Upton Street, N.W., in lot 809 of Square 2049 (old Squares 2240-2242, old Parcel 57/7) in Washington, D.C.[1] The 4.45 acre site is bounded by Upton Street on the south and east, the Howard Law School campus on the west, and residential development on the north.

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[1] The current Square and Lot numbers were designated in 1976.