GOVERNMENT OF THE DISTRICT OF COLUMBIA
HISTORIC PRESERVATION OFFICE

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HISTORIC PRESERVATION REVIEW BOARD
APPLICATION FOR HISTORIC LANDMARK OR HISTORIC DISTRICT DESIGNATION

New Designation _X_
Amendment of a previous designation ___
Please summarize any amendment(s) ______

Property name Carnegie Institution of Washington, Atomic Physics Observatory
If any part of the interior is being nominated, it must be specifically identified and described in the narrative statements.

Address 5241 Broad Branch Road, NW

Square and lot number(s) Square 2288/ Lot 0813

Affected Advisory Neighborhood Commission 3G

Date of construction 1937 Date of major alteration(s) ______

Architect(s) Edward Burton Corning

Architectural style(s) MODERN MOVEMENT/Art Deco, Art Moderne

Original use Education: Research Facility

Property owner Carnegie Institution of Washington

Legal address of property owner 1530 P Street, NW, WDC 20005

NAME OF APPLICANT(S) DC Preservation League

If the applicant is an organization, it must submit evidence that among its purposes is the promotion of historic preservation in the District of Columbia. A copy of its charter, articles of incorporation, or by-laws, setting forth such purpose, will satisfy this requirement.

Address/Telephone of applicant(s) 1221 Connecticut Avenue, NW, Washington, DC 20036

Name and title of authorized representative Rebecca Miller, Executive Director

Signature of representative Rebecca Miller Date ~~6~~ October 2016

Name and telephone of author of application John DeFerrari, 202.783.5144

Date received 10/7/16
H.P.O. staff TD

#17-01

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 National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* 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.

1. Name of Property

Historic name: Carnegie Institution of Washington, Atomic Physics Observatory
Other names/site number: ____
Name of related multiple property listing:
N/A
(Enter "N/A" if property is not part of a multiple property listing

2. Location

Street & number: 5241 Broad Branch Road, NW
City or town: Washington State: D.C. County: ____
Not For Publication: ☐ Vicinity: ☐

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, 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. I recommend that this property be considered significant at the following level(s) of significance:

___national **___statewide** **___local**

Applicable National Register Criteria:

___A **___B** **___C** **___D**

____

Signature of certifying official/Title: **Date**

____

State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

____

Signature of commenting official: **Date**

____

Title : **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) ______________________

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private: [x]

Public – Local [ ]

Public – State [ ]

Public – Federal [ ]

Category of Property

(Check only **one** box.)

Building(s) [x]

District [ ]

Site [ ]

Structure [ ]

Object [ ]

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
1		buildings
		sites
		structures
		objects
1		Total

Number of contributing resources previously listed in the National Register ________

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6. Function or Use
Historic Functions
(Enter categories from instructions.)
_EDUCATION: research facility__

Current Functions
(Enter categories from instructions.)
_VACANT/NOT IN USE__

7. Description

Architectural Classification
(Enter categories from instructions.)
MODERN MOVEMENT: Art Deco, Art Moderne

Materials: (enter categories from instructions.)
Principal exterior materials of the property: _BRICK, METAL/Steel, GLASS/Glass block, CONCRETE, ________________.

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The Carnegie Institution's Atomic Physics Observatory rises prominently on a central hillside within the Institution's Broad Branch Road campus. It is a beige brick and glass-block cylindrical tower, crowned by a spherical steel dome, that was designed to house a "Van de Graaff" accelerator for studying nuclear physics. The structure stands 55 feet tall and measures 37.5 feet in diameter. The building's Art Moderne style, craftsmanship, and decorative detailing are rare for the city's industrial building stock and represent a concerted and successful attempt by the Carnegie Institution to construct a scientific research facility that would not appear to be ungainly or industrial and that would stand as an attractive contribution to the surrounding residential neighborhood of Chevy Chase, D.C. The observatory was designed by prolific Washington architect Edward Burton Corning (1889-1957), who also designed many private residences, commercial structures, and civic buildings in Chevy Chase and the metropolitan D.C. area at large.

Narrative Description

The Atomic Physics Observatory is situated in a prominent central location within the Broad Branch Road campus of the combined Department of Terrestrial Magnetism and Geophysical Laboratory, on lot 0813 in square 2288 (Illustration 1). The observatory stands in a small cluster of buildings approximately 200 feet north of the original Department of Terrestrial Magnetism laboratory building, to which it was originally connected via a zigzagged, underground concrete tunnel, designed to minimize the spread of radiation from the observatory. Immediately to the west stands the Greenewalt Building, completed in 2006, while the 1940 Cyclotron Building stands a short distance to the northeast (Map 2).

The observatory is a cylindrical structure of beige brick crowned by a spherical steel dome designed to house a "Van de Graaff" machine for studying nuclear physics. The structure stands 55 feet tall and measures 37.5 feet in diameter (Illustration 2). The façade of the cylinder is evenly divided into six bays. The bays are separated by trios of angled-brick piers topped by trapezoidal terracotta caps. The sharply angled lines of the piers are typical of Art Moderne styling.

Two of the bays feature pairs of doors at ground level. The simple, undecorated doors have three rectangular window panes each and may be original to the building (Illustrations 3 and 5). At the center of the base level of each of the other bays is a small four-pane window. Above the base level, the bays are slightly inset and feature tall glass-block panels providing natural illumination for the scientific apparatus housed inside the structure. Each panel is composed of 23 rows of five glass blocks each. At the top of the two glass-block panels that surmount the two doorways are small decorative grilles covering ventilation ducts. The grilles feature an angular, modernistic pattern in keeping with the Art Moderne style (Illustration 4).

The steel dome is currently white but was originally coated with a heat-reflective aluminum paint. Steel railings and other fittings provide service access on top of the dome. While the dome appears to be perfectly spherical, it is actually the round end of a large pear-shaped enclosure which is aimed downward, inside the brick and glass block structure, toward a reinforced concrete underground chamber where nuclear interactions were observed. The enclosure provided a pressurized container for the Van de Graaff particle accelerator. At a pressure of 50 pounds per square inch, the container greatly enhanced the voltage that could be applied by the accelerator to conduct "atom-smashing" experiments, increasing it to as much as 5 million volts.

The Atomic Physics Observatory, although vacant, remains in good condition and retains its overall integrity.

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 or 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 grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
ARCHITECTURE
SCIENCE
ENGINEERING

Period of Significance
1937-1975

Significant Dates
1937, 1939

Significant Person
(Complete only if Criterion B is marked above.)

Cultural Affiliation

Architect/Builder
Edward Burton Corning, architect
Chicago Bridge & Iron Works, builder

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Atomic Physics Observatory meets National Register Criterion A (DC Criteria A and B) because it is highly significant to the development of scientific research, not only in the District of Columbia but for the United States as a whole and the world community at large. The observatory was one of a select few scientific research facilities in the United States and Europe that were on the cutting edge of nuclear research in the late 1930s. Carnegie scientists Merle Tuve, Lawrence Hafstad, Odd Dahl, and others had conducted groundbreaking experiments in nuclear physics at the Carnegie Institution's Broad Branch Road campus in the 1930s prior to construction of the observatory. Then, the Carnegie Institution co-sponsored a seminal meeting of world leaders in nuclear physics in January 1939, including Nobel laureates Niels Bohr and Enrico Fermi, who were on hand at the Observatory on January 28, 1939, to witness the splitting of a uranium atom, a crucial breakthrough that would lead within six years to the development of the first atomic bomb and subsequently the harnessing of nuclear fission for peaceful purposes. While the Observatory's demonstration was not the very first, it was one of four experiments that were considered to collectively demonstrate the tremendous power of nuclear energy and its potential for use in an atomic bomb. The role of the Observatory in the history of nuclear physics is thus highly significant.

The Observatory meets National Register Criterion C (DC Criteria D, E, and F) because it represents a unique engineering accomplishment in design, based on the use of a pressurized steel shell to enhance the power of the Van de Graaff accelerator inside. Constructed in 1937, the observatory's unique design was replicated at two other laboratories in the U.S. The observatory's handsome Art Moderne exterior is the work of master architect Edward Burton Corning, who transformed an otherwise ungainly piece of steel machinery into an attractive and streamlined structure that projects the futuristic aesthetics of its era and the cutting edge research that was conducted inside.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

The Carnegie Institution Department of Terrestrial Magnetism's Atomic Physics Observatory is first and foremost a unique icon of a fast-moving era in which breakthroughs in nuclear physics were literally occurring on a daily basis. Although the Carnegie physicists likely didn't realize it, their intense efforts in the late 1930s were a crucial lead-up to the frenzied World War II competition between the U.S. and Germany to harness nuclear energy and develop an atomic bomb. The Observatory's unique design, devised by Carnegie physicist Merle Tuve and his associates, represented a major advance in increasing the power of a Van de Graaff particle accelerator and thus enabling more advanced particle research. That advanced design, in turn was incorporated into an architecturally elegant and futuristic structure by Washington architect Edward Burton Corning, making for a structure that is notable both for its architectural distinction as well as its historical significance.

The Carnegie Institution of Washington

Wealthy industrialist Andrew Carnegie retired from business in 1901 to devote his time to a wide array of philanthropic endeavors, including founding libraries and other institutions dedicated to the advance of education and human knowledge. Carnegie considered founding a national university in Washington, D.C., but ultimately decided against the idea. Instead, in 1902 Carnegie provided a generous initial endowment of $10 million to found the Carnegie Institution of Washington, incorporated with the goal of establishing "in the city of Washington, in the spirit of Washington, an institution for promoting original research in science, literature and art."[1] Director Charles D. Walcott explained shortly after the institution's incorporation that its goal, rather than to become a traditional university, was to be a place "where 'the exceptional man' and those who want to follow up some particular branch of scientific research may find ample opportunity and provision for following up such research."[2] Officially the goals were to "encourage in the broadest and most liberal manner investigation, research and discovery, and the application of knowledge to the improvement of mankind." Accordingly, the institution would undertake "projects of broad scope that may lead to discovery and utilization of new forces for the benefit of man."[3] The focus on pure research, unconnected with teaching requirements or the need to develop commercial products, was unique at the time.

It took time for the institution to decide where and how to invest in its research. Initially, most of the budget went to support projects by individual scientists of note (the "exceptional men") working on a wide variety of subjects ranging from astronomy and anthropology to Mayan studies. However, beginning in 1905 under director Robert Woodward, the institution gradually

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[1] "First Step Taken," *Star*, Jan. 4, 1902.
[2] "Carnegie Institute," *Star*, Jan. 10, 1902.
[3] Hatten S. Yoder, Jr., *Centennial History of the Carnegie Institution of Washington, Vol. III: The Geophysical Laboratory* (Cambridge, United Kingdom: Cambridge University Press, 2004), ix.

shifted its focus to several specific areas of scientific research rather than scattered, independent projects by individual researchers.[4] Three broad fields of concentration emerged: (1) the form, contents, and dynamics of the universe; (2) the structure and evolution of the earth; and (3) the frontiers of biology.

The Carnegie Institution developed a number of laboratories, observatories, and research vessels to support the work of its scientists. Through the years, much of the research has taken place at five research centers across the United States and at various observatories and ships working around the globe. Results of this research are published in the institution's annual *Year Book* as well as other departmental publications and are in the public domain for commercial development by others. Locations of Carnegie facilities outside of Washington, D.C., have included astronomical research at Mount Wilson and Palomar Observatories in California, and biological research at the Department of Plant Biology in California, the Department of Embryology in Maryland, and the Genetics Research Unit in New York.[5]

When it was initially founded, the institution was administered from a suite of offices in the Bond Building at 14th Street and New York Avenue NW. However, within a few years, a need emerged to establish both scientific laboratories and administrative facilities dedicated to the work of the institution.[6] These were constructed at three locations in the District of Columbia. First, in 1907 the institution constructed a Geophysical Laboratory at 2801 Upton Street, NW, a location carefully selected to minimize magnetic and electrical disturbances as well as vibrations from street traffic. Nearby the first laboratory buildings of the National Bureau of Standards had recently been completed, providing valuable scientific synergy for the new Carnegie facility. The Geophysical Laboratory's main building was designed by prominent Washington architect Waddy B. Wood (1869-1944) and was added to the *National Register of Historic Places* in 1994.

Planning began in 1906 for the institution's second facility, a new headquarters and administration building on a site the institution had acquired at 16th and P Streets NW.[7] The grand and costly Beaux-Arts structure was constructed according to designs by the prestigious architectural firm of Carrère & Hastings. It was completed in 1910 and was listed in the *National Register of Historic Places* in 1978.

The Department of Terrestrial Magnetism

The third D.C. site was for the Department of Terrestrial Magnetism (DTM), which the Carnegie Institution established in 1904. DTM's original objective, under the direction of Louis A. Bauer (1865-1932), was to complete a large-scale map of all the variations in the earth's geomagnetic field. Under Bauer's leadership, numerous land- and sea-based expeditions were undertaken to collect data literally from the ends of the earth. Among the department's most adventuresome

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[4] "Funds for Giant Tasks," *Post*, Nov. 7, 1905.
[5] *National Register of Historic Places* nomination for the Carnegie Institution of Washington, Geophysical Laboratory, Nov. 23, 1994.
[6] Ibid.
[7] "Carnegie Institution to Erect Costly Home," *Post*, Sept. 5, 1906.

early projects were geomagnetic mapping missions undertaken by two research ships, the *Galilee* and the *Carnegie*. The *Carnegie* was a specially-designed, non-magnetic vessel that would not interfere with delicate geomagnetic measurements, as had been a problem with the *Galilee*. Launched in 1909, the wooden *Carnegie* cruised over 340,000 miles before burning during a refueling stop in Samoa in 1929.[8]

The department had its original headquarters in the Ontario Apartments on Ontario Road in Adams Morgan. Starting with a few rooms, by 1913 the department filled 16 rooms at the Ontario. In addition to administrative offices, the rooms held machine shops and laboratories where new instruments for measuring geomagnetic forces were developed. DTM scientists would conduct experiments to test and calibrate their new instruments under "more or less unfavorable conditions" from inside "two non-magnetic huts on a small piece of ground overlooking the Zoological Park, about 300 feet west of the Ontario Apartment House."[9] By 1910, encroaching local area development threatened this observational and experimental work, and the increasingly crowded conditions inside the Ontario building became more and more problematic.

After an extensive search, DTM acquired in 1913 a 7.4-acre hillside tract at 5241 Broad Branch Road NW adjacent to Rock Creek Park. The secluded, rural setting was deemed "sufficiently removed from industrial disturbing influences" to allow for useful scientific observations.[10] That year construction began on DTM's main laboratory building after two existing single-family dwellings were removed. Designed by Waddy Wood, the main building is in the Italian Renaissance Revival style and is similar in appearance to the Geophysical Laboratory building on Upton Street. A separate, much smaller Standardizing Magnetic Observatory building was also completed in 1914 on the same campus, and a few other small frame buildings were later constructed for special investigative purposes.

By the late 1920s, DTM had essentially completed its original mission of mapping the earth's geomagnetic field, and the department was threatened with closing. Accordingly, its younger scientists began branching out into other areas of electricity and magnetism that were on the cutting edge of scientific research, including an in-depth investigation of the basic forces that control the universe. In the early twentieth century only two such basic forces had been known—gravity and electromagnetism. The next frontier would be the subject that eventually came to be known as nuclear physics.

At the urging of DTM Director John Fleming, geophysicist Merle Anthony Tuve (1901-1982) joined DTM in 1926 fresh out of graduate school and quickly engaged in several groundbreaking projects. His initial work, started previously in conjunction with his friend and fellow physicist

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[8] James Trefil and Margaret Hindle Hazen, *Good Seeing: A Century of Science at the Carnegie Institution of Washington, 1902-2002*, (Washington, D.C.: Joseph Henry Press, 2002), 129ff.
[9] L.A. Bauer and J.A. Fleming, "Research Buildings of Department of Terrestrial Magnetism" in *Land Magnetic Observations 1911-1913 and Reports on Special Researches* (Washington, D.C.: Carnegie Institution of Washington, 1915), 185.
[10] Ibid., 186.

Gregory Breit (1899-1981), was to conduct experiments to prove the existence of the ionosphere. This work was an important step in the future development of radar.

On arriving at DTM, Tuve started conducting experiments to study atomic structure in an effort to better understand the forces that held them together. Working with physicists Lawrence R. Hafstad (1904-1993) and Odd Dahl (1898-1994), Tuve assembled DTM's first atomic particle accelerator using a large Tesla coil. The Tesla coil, invented by Nicola Tesla in the early 1890s, could produce high voltages but used alternating current, which proved to be a poor choice for a particle accelerator. Tuve's team spent several years trying to get the Tesla coil to work, with ultimately limited success. However, their efforts were nevertheless important in developing scientific equipment, such as vacuum accelerator tubes and measuring devices, which would be essential to the success of later particle accelerators (Illustration 6).[11] One milestone, for example, was the announcement by Tuve and his associates in January 1932 of their development of a camera that had been able to record individual protons being released from an atom that had been "smashed" by their Tesla coil accelerator. The *Associated Press* noted at the time that this was "one more step toward 'unlocking the energy of the atom,' that is, discovering whether man can get any useful power out of smashing atoms."[12]

A turning point came with the invention of the Van de Graaff generator by physicist Robert J. Van de Graaff in 1929.[13] The device proved to be a much better choice for an atomic particle accelerator. Van de Graaff generators involve the use of a fast-moving belt in a tube that rubs against a comb-like electrode in spherical shell mounted over one end of the moving belt. In very simple terms, the motion of the belt over the comb causes electrons (electric charge) to accumulate in large voltages in the shell. In large-scale implementations, Van de Graaff generators can be used as particle accelerators. The large accumulated voltages (electrons) in the shell at the top of the generator can be aimed through a vacuum tube at very high energy levels to bombard atoms in a special container, called a Wilson cloud chamber, where the effect of the bombardment can be recorded and studied (Illustration 10).

In 1931 Robert Van de Graaff visited DTM to advise Tuve on building a particle accelerator based on his invention. Tuve's team designed a large Van de Graaff machine capable of about 1.2 million volts. A new annex was built on to the 1919 Experiment Building (demolished in 2005) to house the machine, which was completed in 1933. Using the new machine, Tuve's team performed critical experiments in 1935 to examine how protons scatter in proton-proton collisions, a seemingly arcane subject that "one of the most important discoveries of the decade—that the nuclear force between proton and proton was the same as between neutron and

[11] Louis Brown, *Centennial History of the Carnegie Institution of Washington, Vol. II: The Department of Terrestrial Magnetism*, (Cambridge, United Kingdom: Cambridge University Press, 2004), 73-80.
[12] "Mystery of Atoms is Nearer Solution" *Post*, Jan. 27, 1932.
[13] R. J. Van de Graaf, K. T. Compton and L. C. Van Atta, "The Electrostatic Production of High Voltage for Nuclear Investigations" in *Physical Review*, Vol. 43 (American Physical Society, Feb. 1933), 149–157.

proton," a discovery that opened new experimental and theoretical methods of studying atoms.[14] Scientists were beginning to hone in on the nature of the "strong force" that had been theorized to hold atomic nuclei together.

Work by physicists in Germany had postulated that the particles in an atomic nucleus—protons and neutrons—were bound together by an extremely strong nuclear force, a force that might be millions of times stronger than gravity. Understanding and learning how to harness that force would ultimately form the basis of the wartime effort to create an atomic bomb as well as the later development of the nuclear energy industry. However, much more experimentation was necessary to better understand this force and to learn its specific properties.[15]

Competition in the burgeoning field of nuclear physics research was strong, with important work underway in Germany, Denmark, and several locations in the United States. According to Constance McLaughlin Green, Washington, D.C., had lost its dominant position as a center of research in the natural sciences in the 1930s, due largely to retrenchment by the federal government during the Depression. Budgets for the National Bureau of Standards, the Census Bureau, and other federal research centers had been slashed[16]. Under such conditions, the work of the Carnegie Institution became all the more critical as a sponsor for pure scientific research. The importance of maintaining the country's pre-eminence in scientific research would later become clear to lawmakers as the threat of German scientific advances during World War II emerged.

In May 1936, the Carnegie DTM scientists announced at the annual meeting of the American Physical Society that they had obtained experimental evidence of the strong nuclear force from their proton-proton collision research. However, they needed a much more powerful machine to take the next step—to actually break apart an atom—and they announced plans to build such a machine, capable of producing as much as 5 million volts, at the May 1936 meeting.[17] This new machine would be the Atomic Physics Observatory, a Van de Graaff accelerator encased in a pressurized container that allowed for much higher voltages to be attained than the older machine.

As *The Evening Star* explained it at the time:

> *The new atom-smashing machine designed for Dr. Tuve's laboratory here will be the most powerful ever conceived by man.*
> *The nucleus of every atom is surrounded by an armor plate of electric force corresponding to millions of volts. Vast energy must be used to get a projectile through this armor plate.*

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[14] Brown, 89-93.
[15] "Force Million Times Greater Than Gravitation Is Described," *Post*, Sep. 9, 1936.
[16] Constance McLaughlin Green, *Washington: A History of the Capital, 1800-1950* (Princeton, NJ: Princeton University Press, 1962), 410-11.
[17] Stephen J. McDonogh, "New Carnegie Institution Gun to Blast Protons and Neutrons," *Post*, Aug. 22, 1937.

Thus for investigation of the general nature of the structure of atoms the development of apparatus for impelling particles at extremely high voltages is essential....

It is planned to have the huge spherical high-pressure tank and vacuum tube half buried in the side of a hill, the tube pointing at targets buried in deep underground vaults. It is also expected that the target vault will be flooded with water, which is more effective at stopping neutrons than rocks or lead. The scientists will be located in another vault to observe, by means of extremely sensitive instruments, what happens when the projectiles strike atoms.[18]

Building the Atomic Physics Observatory

With high hopes for more breakthrough scientific discoveries, DTM began construction of the new Atomic Physics Observatory in 1937. In May, the Carnegie scientists gave a progress report on their investigations at that year's annual meeting of the American Physical Society. They had made further direct observations of the strong nuclear force, but did "not know whether the force with which they are dealing is 'a kink in gravity itself' when it enters the protonic field of force, or something entirely without parallel in the microscopic world." In any event, the *Star* reported, "Before the experiments reported today it was largely a mathematical abstraction, but it now becomes a simply describable reality. It is, beyond all comparison, the most titanic force with which human experience ever has come in contact."[19]

In June DTM filed plans for the new observatory with the D.C. government. A newspaper notice at the time described a "great steel pear" that was to be constructed and its role in studying "the behavior of the newly discovered force—36,000,000,000,000,000,000,000 times greater than gravity—which binds the nuclei of atoms together and hence is the basic binding force of creation." Additional details of the building were also provided:

The pear-shaped structure will be placed over a circular chamber of reinforced concrete entirely underground in which will be placed the target to be bombarded. Thus the electric beam will be directed straight downward toward its mark. Beside it will be a control room reinforced by earth and concrete in which will be set up the instruments for control of the processes.

All observations will be made through reinforced windows. The only entrance to the observatory will be by means of a zig-zag tunnel reinforced by earth and concrete leading from the main laboratory building. The zig-zag arrangement is to prevent damaging rays from the atom-smashing and other processes affecting the other machinery of the laboratory or any of the personnel.

Below the circular chamber for the target will be an 8-foot-deep tank filled with water when the apparatus is in action. The water is for the absorption of neutrons thrown off in the bombardments.[20]

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[18] "Force That Holds Protons Is Told," *Star*, May 1, 1936.
[19] Thomas R. Henry, "New Super-Force Experiments Described by Carnegie Scientists," *Star*, May 2, 1937.
[20] "Steel 'Pear' Observatory To Delve Secrets of Atom," *Star*, Jun. 4, 1937.

The residential neighborhood of Chevy Chase had developed around DTM's Broad Branch Road campus in the decades after the DTM laboratory was built, filling in much of the formerly open, rural landscape. DTM officials responded to concerns that construction of the massive new observatory would create an industrial eyesore in the midst of the quiet suburban-style homes by hiring local Chevy Chase architect E. Burton Corning to design a brick enclosure for the scientific device that would make it aesthetically pleasing. The *Evening Star* article noted that "The whole structure, according to Dr. John A. Fleming, director of the Terrestrial Magnetism Laboratory, has been designed to present a pleasing architectural effect in a residential neighborhood. There will be a pilastered wall with casement windows around it."[21] According to a much later newspaper article, local residents "approved" the observatory's contemporary Art Moderne design as being "architecturally suitable for the area."[22]

"Architecturally, the observatory will be a definite asset to Broad Branch road," *The Washington Post* observed. "A brick wall, matching the other two buildings on the grounds, will encircle the lower half of [the accelerator]. Pilasters and glass block windows will break up the monotony of the sphere."[23] The completed building would have an appearance similar to an astronomical observatory, hence the chosen name. According to DTM scientist Louis Brown, "it was widely believed that the Naval Observatory on Massachusetts Avenue had improved real estate values," thus residents raised few objections to the new "observatory" coming to their own neighborhood.[24]

The attractive design of DTM's Atomic Physics Observatory made it a unique scientific research facility. It was also the first of its kind to be built, based on designs developed by Dr. Tuve and his team. Two similar accelerators were also constructed beginning in 1937 following the Carnegie design, one at the Westinghouse Company's research laboratories outside of Pittsburgh, Pennsylvania and another at the University of Minnesota in Minneapolis[25] (Illustration 12). However, neither of the other two structures were designed to be aesthetically attractive. The Westinghouse machine was perched on top of a laboratory building and lacked a brick enclosure, giving it a much rougher, industrial appearance. Reported incorrectly to be "the nation's first Van de Graaff nuclear generator," the Westinghouse device was dismantled in January 2015, angering Pittsburgh-area preservationists.[26] The University of Minnesota device did not enter service until 1940. It too was a purely steel structure tucked out of public view behind the university's physics building. The machines at the Carnegie Institution and the

[21] Ibid.
[22] Susan Crowley and Martha Beshers, "The 'Atom Smasher' That's Down the Street," *Post*, April 1, 1976.
[23] "5-Million-Volt Atom Cracker Nears Completion Here; Scientists to Look Into Basic Force of the Universe," *Post*, Sep. 14, 1937.
[24] Brown, 88.
[25] John A. Fleming and O.H. Gish, "Department of Terrestrial Magnetism: Magnetism and Atomic Physics" in *Carnegie Institution of Washington Year Book No. 37* (Washington, D.C.: The Carnegie Institution of Washington, 1938), 269.
[26] Jill Harkins, "Atom smasher in Forest Hills torn down; restoration promised," *Pittsburgh Post-Gazette*, Jan. 21, 2015.

University of Minnesota are the only known examples of this type of accelerator still in place as originally constructed.

The Chicago Bridge & Iron Works built the Atomic Physics Observatory in the latter half of 1937 (Illustrations 7 and 10). DTM scientists reportedly had trouble finding a contractor to do the work, having approached one steel company that turned down the job, claiming it would be impossible to complete. Dr. Tuve then contacted associates at the Navy Yard, who gave him leads that eventually took him to the Chicago Bridge & Iron Works. The Chicago company had extensive experience building pressurized spherical oil tanks, which turned out to be similar in construction to the planned atomic observatory.[27]

The 70-ton steel pear-shaped structure was built from a series of steel plates that were welded together under the support of four upright steel girders. The brick enclosure was constructed around the completed steel structure. The Van de Graaff accelerator consisted "chiefly of a 12,000-pound steel ball (19 feet in dimeter) supported 26 feet above the grounded base (inside the steel tank) on four porcelain pillars, six feet on centers." The "porcelain pillars" were actually stacks of short porcelain supports separated by steel plates inserted at intervals to stabilize the columns. In between them stretched two fabric charging belts that spun at high speeds to generate the electrostatic energy that accumulated in the steel ball at the top. The nearby National Bureau of Standards tested the steel tank to ensure it wouldn't be knocked over by high winds and also lent surplus porcelain insulators[28] (Illustration 11).

The new facility was considered an engineering marvel at the time of its completion. The Works Progress Administration's guide to Washington, D.C., published that same year, noted that DTM's "high voltage and vacuum-tube equipment for studying atomic physics and magnetism is probably unrivaled anywhere in the world."[29]

Operating the Atomic Physics Observatory

Much of 1938 was spent installing and testing the Van de Graaff accelerator and other associated equipment inside the observatory. The observatory did not come into service until late November 1938. By that time, other scientists were also close to confirming the existence of what Tuve was calling "supergravitation"—the strong nuclear force.[30] In December 1938, German chemists Otto Hahn and Fritz Strassmann detected the element barium after bombarding uranium with neutrons in their Berlin laboratory. They communicated these results to their colleague, Austrian physicist Lise Meitner, who was living in exile in Stockholm because she was a Jew. Meitner, working with her nephew Otto Frisch, concluded that the barium was the result of nuclear fission. Frisch confirmed this hypothesis with an experiment he conducted at Niels Bohr's University Institute of Theoretical Physics in Copenhagen on January 13, 1939.

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[27] "5-Million-Volt Atom Cracker...," op. cit.
[28] Fleming and Gish, op. cit.
[29] Federal Writers' Project, *Washington: City and Capital* (Washington, D.C.: U.S. Government Printing Office, 1937), 530.
[30] "Dr. Tuve Outlines System He Uses in Atom Smashing," *Post*, Mar. 3, 1938.

Though not unexpected, the breakthrough discovery was nevertheless startling and would have enormous implications for the future of nuclear physics. Because it was based on fleeting measurements of tiny amounts of energy released in the slightest fraction of a second, scientists wanted above all else to be sure their results were accurate. The Carnegie Institution and the Atomic Physics Observatory would play key roles in the process of confirming the results.

By late January, the results of the Copenhagen experiment had not yet been made public. In anticipation of the 5th Washington Conference on Theoretical Physics scheduled to take place on January 26, 1939, Niels Bohr and his colleague, Belgian physicist Léon Rosenfeld, traveled to the U.S. to take part in the symposium. On the way to Washington, Rosenfeld apparently discussed the still-secret experimental results with colleagues at Princeton University, who in turn relayed the information to Italian physicist Enrico Fermi. Fermi was working at Columbia University at the time, and he quickly devised an experiment to confirm the results and his colleagues ran it successfully using Columbia University's cyclotron on Wednesday, January 25, the day before the conference opened in Washington.[31]

Sponsored by the Carnegie Institution and the George Washington University, the 5th Washington Conference on Theoretical Physics was an important forum for scientists to exchange their latest news. On hearing about Fermi's successful experiment, Niels Bohr apparently decided to make an informal announcement about the nuclear fission breakthrough to the other physicists present. As recorded on a plaque at George Washington University, on January 26, Bohr "made the first public announcement of the successful disintegration of uranium into barium with the attendant release of approximately two hundred million electron volts of energy per disintegration." American scientists, including Merle Tuve of the Carnegie Institution, were eager to verify the new discovery as soon as possible. In fact, Tuve's colleagues at the time, Lawrence Hafstad and Richard B. Roberts (1910-1980), immediately left the conference to go back to Broad Branch Road to work on confirming the discovery.[32]

As reported in *The Evening Star*, the "race" to confirm the reported results ended in a four-way tie. Tuve's group at the Carnegie Institution was at a disadvantage because its atomic physics observatory was temporarily out of order on January 26. Spurred on by Bohr's announcement, the DTM scientists spent all day and all night on Friday, January 27, getting the machine back in operating condition.[33]

By Saturday, January 28, the Carnegie observatory was up and running. Tuve invited Bohr, Fermi, Rosenfeld, Edward Teller, and other noted physicists who had been at the conference to come to the Broad Branch Road complex to observe DTM's confirmation of nuclear fission using the Atomic Physics Observatory (Illustration 8). A series of experiments were run that

[31] "No Terrestrial Catastrophe Likely to Occur As Result of Atom-Smashing Experiments," *Post*, Feb. 19, 1939.
[32] Brown, 97.
[33] Thomas R. Henry, "Race on Cracking of Atoms Results in Four-Way Tie," *Star*, Jan. 30, 1939.

lasted late into the night as the Van de Graaff accelerator trained its beam of highly charge atomic particles on a sample of uranium in the observatory's ionization chamber. "So intrigued was Fermi," according to Louis Brown, another DTM scientist, "he kept the scientists up until the small hours of the morning checking the Van de Graaff."[34] Fermi and the other scientists all understood that the verification being conducted at the Atomic Physics Observatory was crucial in confirming the validity of the recent experiments in Copenhagen and at Columbia University.

As *The Evening Star* reported, "a stream of the heavy neutrons was turned on the uranium in the ionization chamber with an energy of 2,000,000 volts behind it. Immediately the thing happened. A series of 'kicks' occurred far beyond any capacity to measure them. They ran in the neighborhood, it was reported, of 50,000,000 volts, so far as they could be measured. Since it was possible to measure only one half the reaction the probability is that the energy release was very close to 200,000,000 volts, if not a little more." Over the weekend, a fourth team, led by physicist Robert D. Fowler of the Johns Hopkins University, also separately confirmed nuclear fission, using a different method.

The four groups of scientists working on the problem agreed that their collective results proved that the power of the strong nuclear force could be unleashed by splitting a uranium atom. On the morning of January 30, 1939, the four entities—Tuve's team at the Carnegie Institution, Enrico Fermi's group at Columbia University, the Danish researchers at Niels Bohr's University Institute of Theoretical Physics in Copenhagen, and Fowler at Johns Hopkins University—independently announced their results.[35] "The story is one of the most dramatic in the annals of science," *The Evening Star* proclaimed. "[A] whispered secret, an exiled old lady, a suggestion dropped at a Washington meeting of the keenest minds in the scientific world, feverish night and day work, and the setting loose of such titanic forces as man has not hitherto dreamed of producing."[36]

The full implications of what had been proven through the Atomic Physics Observatory were not immediately understood by the general public, but everyone knew that a page in scientific history had been turned. On February 20, 1939, *The Evening Star* summarized the momentous role that the Atomic Physics Observatory had played:

> *"At the Terrestrial Magnetism laboratory of the Carnegie Institution of Washington there occurred recently an event which, by implication, might be the most significant happening in the history of the human race.... Two young physicists, just out of graduate school, stood outside a galvanometer at the Carnegie laboratory a few days ago, however, and witnessed, for the first time so far as they knew, release of the binding energy of atoms, of the fabulous atomic energy, of the energy which created all things. An uranium atom split in two. Actually, it now appears, a few men in the United States and Europe had witnessed the same thing a few hours before them. There has been no more dramatic story in the history of*

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34 Crowley and Beshers, op. cit.
35 Report of the 5th Washington Conference on Theoretical Physics (Washington, D.C.: Feb. 1, 1939).
36 Henry, op. cit.

science.... Now the way has been opened. Nobody knows what roads will be followed henceforth, but it has been the lesson of history that once man gets a toehold on a force of nature sooner or later he will make it his slave."[37]

The news energized physicists around the world and soon led to competing efforts to develop an atomic bomb. If a chain reaction of uranium atoms splitting apart and releasing their stored energy could be initiated, the cumulative energy output would make for a bomb of such tremendous force as had never been known before. In August 1939, Albert Einstein wrote to President Roosevelt urging him to take action to beat Germany in developing such a weapon, resulting in the start of the secret Manhattan Project to build an atom bomb.

Nuclear research from this point forward was kept secret. Accelerator-equipped laboratories were soon under construction at numerous sites across the United States. DTM used the path breaking APO to conduct numerous additional tests, and the results were sent to Fermi at Columbia for use in the secret new bomb project. A government Advisory Committee on Uranium was formed in October 1939, and Tuve was named to the committee. However, he didn't stay with the project very long, not wanting to work directly on an atomic bomb. He would later remark that he "got out of nuclear physics when it changed from a sport to a business."[38]

Tuve instead began working with the Navy on an effort to develop a "proximity fuze" that would enable explosives on missiles and rockets to explode when they were close to but not necessarily in contact with their targets. A massive research effort initially located at the Broad Branch Road campus took over the Standardizing Magnetic Observatory Building as well as the new Cyclotron Building, which was completed in 1940. As it grew too big for the campus, it eventually moved to the new Applied Physics Laboratory at Johns Hopkins University in Baltimore as well as the nearby campus of the National Bureau of Standards. Perfection of the proximity fuze would be a major accomplishment of the war effort.[39]

After the war, it became common for physics departments in universities and other laboratories around the country to operate Van de Graaff accelerators, many using improved designs made by a company co-founded by Robert Van de Graaff. The Carnegie Institution's dedication to pure research meant that it avoided competing with these institutions in applied areas of nuclear research. However, the APO still had unique characteristics that kept it useful for research for decades after World War II. In particular, a long-running project conducted in conjunction with the University of Basel, Switzerland, and several other Swiss collaborators used the APO to investigate nuclear reactions induced by polarized protons. Led by Carnegie scientist Louis Brown, the project ran from 1961 to 1974. Along the way, a number of enhancements were made to the scientific equipment installed in the APO.[40]

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[37] "Science Marches On," *Star*, Feb. 20, 1939.
[38] Brown, 119.
[39] Ibid., 109-115.
[40] Ibid., 125-132.

The APO was finally decommissioned in 1975. Writers Susan Crowley and Martha Beshers, reporting for *The Washington Post*, visited the DTM campus the following year and were given a tour of the APO:

> *"Dr. Louis Brown, a DTM staff member, has been conducting research with Van de Graaff for 14 years. He speaks affectionately about it and offers to show it to his visitors. He nimbly climbs a ship's ladder from a basement room up into the circular brick housing of the generator. Facing him is a huge metal cone rising 30 feet until it meets the rim of the dome.*
>
> *After unscrewing bolts the size of a child's fist, he opens a round hatch door and scrambles into the machine. He leans back against the sloping wall, and as he talks, his voice booms, bouncing around the inside of this giant ice cream cone. He knows every inch of its porcelain and metallic coils, its conducting rods, even its vast surfaces, which he personally washed after a fire in 1968 damaged the generator and closed it for two years....*
>
> *Local residents seem to take the Van de Graaff for granted. One neighbor casually called it the "atom smasher," others seemed oblivious of its function. One man said that the machine doesn't seem to be in operation very often but when it is, it sounds like a jet taking off. He added that the noise was not objectionable."*[41]

While the Atomic Physics Observatory has not been in use since the 1970s, DTM's Broad Branch Road campus has remained a focal point for scientific research sponsored by the Carnegie Institution. It is now home to five scientific research buildings, including the Atomic Physics Observatory. In 1990, a large, modern laboratory building was constructed to the east of the observatory, where the much smaller Standardizing Magnetic Observatory had previously been located. The Carnegie Institution's Geophysical Laboratory, previously located in its own facility on Upton Street, moved here and joined DTM's scientists in the new building. The original DTM building now houses administrative offices.

The Architect: Edward Burton Corning

Dating from an era when American industrial buildings were generally constructed in plain, utilitarian styles, the Atomic Physics Observatory is distinctive for the architectural flair given it by its designer, Edward Burton Corning (1889-1957). Corning was a prolific architect who worked in a variety of architectural styles and is credited with designing a wide range of buildings in the Washington, D.C., area throughout his long career. A native Washingtonian, Corning attended Jefferson Elementary School and graduated from the McKinley Technical High School in 1907. After graduating, Corning worked as an architectural draftsman in the office of Arthur B. Heaton (1875-1951), another prolific native-born Washington architect. He also studied architecture at night at George Washington University and in 1920 was practicing architecture from his father's house on Cummings Lane in Chevy Chase Maryland.

Corning eventually rose to become a partner in Heaton's firm. Prominent buildings that Corning worked on while working with Heaton include the National Geographic Society Annex at 3rd Street and Randolph Place NE (1923), the Methodist Home at 4901 Connecticut Avenue NW

[41] Crowley and Beshers, op. cit.

(1926), the Y.W.C.A. Building at 17th and K Streets NW (1927-demoished), and the addition to the Washington Loan and Trust Company building at 9th and F Streets NW (1927).[42]

In the early 1930s, Corning started his own architectural practice, focusing on projects in upper Northwest Washington and Chevy Chase, Maryland. He lived with his wife Margaret in a house on Leland Street in Chevy Chase, Maryland, that had been designed by Arthur Heaton. Corning's projects from this period included the Chevy Chase Building and Loan Association headquarters (1933), an addition to the Hot Shoppes restaurant on Connecticut Avenue at Yuma Street NW (1934), and many private residences. Corning's structures were often Colonial Revival, although some, such as a row of seven townhouses at 410-432 Evarts Street NE, include Art Deco details in the brickwork.[43] In 1934, Corning was named consulting architect to the Chevy Chase Building and Loan Association, filling a unique position wherein he reviewed plans for construction of new homes for prospective loan applicants. Given his prominence in this part of the city, Corning was a natural choice to design the new Atomic Physics Observatory for the Department of Terrestrial Magnetism, which is located near the Chevy Chase community.

One of Corning's most spectacular modernist works is the WJSV (later WTOP) Transmitter Building at 2115 University Boulevard West in Wheaton, Maryland, which he designed in 1939, just two years after the Atomic Physics Observatory project. The futuristic, Bauhaus-style design, modeled on Le Corbusier's Villa Savoye, reflected the power and promise of the new era in radio technology that it helped usher in. The building also featured innovative concrete "Plyform" panels of Douglas fir that were bent to form the curve wall surfaces. Capable of broadcasting up to 50,000 watts, the maximum power that the Federal Communications Commission allowed at the time, the new transmitter was the most powerful in the Washington area.[44] Like the more modest Atomic Physics Observatory, the WJSV Transmitter demonstrates Corning's skill and interest in working in modern, futuristic architectural designs.

In 1942, Corning entered into a partnership with Raymond G. Moore (1889-1963), a former fellow architecture student at George Washington University. The new firm of Corning & Moore had its offices at 1302 18th Street NW and focused on larger projects, such as apartment houses and shopping centers, and presented a significant change in Corning's architectural practice. During the war years of 1943 and 1944, the new firm worked on a number of two- and three-story apartment buildings in Southeast and Southwest Washington and continued with other low-rise dwellings in the late 1940s. By the 1950s, with a housing boom underway, Corning & Moore found itself taking on significantly larger projects, including tall apartment buildings in the residential corridors along Connecticut, Wisconsin, and Massachusetts Avenues. Examples include the Berkshire at 4201 Massachusetts Avenue NW and Greenbrier, 4301 Massachusetts Avenue NW (both 1950), the Brandywine at 4545 Connecticut Avenue NW (1952), Livingston

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42 E. Burton Corning in *D.C. Architects Directory*, updated Oct. 2010.
43 Ibid.
44 Claire Lise Kelly, *Montgomery Modern: Modern Architecture in Montgomery County, Maryland, 1930-1979* (Silver Spring, MD: The Maryland—National Capital Park and Planning Commission, 2015).

Apartments at 5437 Connecticut Avenue NW (1953), the Calvert-Woodley at 2601 Woodley Place NW (1954), and the Wisconsin House at 2712 Wisconsin Avenue NW (1957).[45]

Corning & Moore also worked on a variety of commercial structures, including several prominent retail complexes, such as the Massachusetts Avenue Parking Shops (1936), located at 4841-4861 Massachusetts Avenue NW, which was designated a D.C. historic landmark and added to the *National Register of Historic Places* in 2003. Architectural historian Richard Longstreth has noted that the practice of Corning & Moore became one of the most prolific in Washington after World War II and that "as much as any firm, Corning and Moore helped to define the nature of the new retail development" that was being constructed at the time.[46] While the Massachusetts Avenue Parking Shops were rendered in the Colonial Revival style, Corning continued to occasionally produce Art Deco and Art Moderne designs, such as the Washington & Lee Shopping Center (1945, demolished) and the Lerner Department Store at 3105-09 Wilson Boulevard (1948, demolished), both in Arlington, Virginia.

In the 1950s, Corning developed designs for the Chevy Chase Baptist Church, the B'nai B'rith National Headquarters Building, and office buildings at 1000 Connecticut Avenue NW and 1700 K Street NW, among other projects. He had a lifelong love for music, playing the piano and singing in church choirs from an early age. He was 68 years old when he passed away in 1957.[47]

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[45] Ibid.
[46] Richard Longstreth, "Building for Business: Commercial Architecture in Metropolitan Washington" in C. Ford Peatross, ed., *Capital Drawings: Architectural Designs for Washington, D.C. from the Library of Congress* (Baltimore, MD: Johns Hopkins University Press, 2005), 140.
[47] "Architect Corning Dead at 68," *Post*, Dec. 10, 1957.

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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 # __________
____ recorded by Historic American Landscape Survey # __________

Primary location of additional data:

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

Historic Resources Survey Number (if assigned): ____________

10. Geographical Data

Acreage of Property ____________

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates (decimal degrees)
Datum if other than WGS84: ________
(enter coordinates to 6 decimal places)
1. Latitude: Longitude:

2. Latitude: Longitude:

3. Latitude: Longitude:

4. Latitude: Longitude:

Or
UTM References
Datum (indicated on USGS map):

☐ NAD 1927 or ☐ NAD 1983

1. Zone: Easting: Northing:

2. Zone: Easting: Northing:

3. Zone: Easting: Northing:

4. Zone: Easting : Northing:

Verbal Boundary Description (Describe the boundaries of the property.)

The Carnegie Atomic Physics Observatory stands on lot 0813 in square 2288. Lot 0813 is bounded by Broad Branch Road NW to the south, Jocelyn Street NW to the north, and Thirty-Second Street NW to the west. Its eastern boundary is Thirty-First Street, and a driveway which continues along the axis of Thirty-First Street to Broad Branch Road. The observatory stands near the east-west mid-point of the lot, approximately 150 feet south of Jocelyn Street. The boundaries of the designated area are the footprint of the observatory.

Boundary Justification (Explain why the boundaries were selected.)

The Carnegie Atomic Physics Observatory occupies a small portion of an unsubdivided tract that is treated for tax map purposes as a very large lot. Its footprint is less than .3 % of the lot's total area.

11. Form Prepared By

name/title: John DeFerrari, Trustee
organization: D.C. Preservation League
street & number: 1221 Connecticut Ave., NW, Suite 5A
city or town: Washington state: D.C. zip code: 20036
e-mail info@dcpreservation.org
telephone: (202) 783-5144
date:

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.
- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.
- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: Carnegie Institution Atomic Physics Observatory

City or Vicinity: Washington, D.C.

County: State:

Photographer: See list below

Date Photographed: See list below

Description of Photograph(s) and number, include description of view indicating direction of camera:

1 of 12.
View from southeast. (Photographer: John De Ferrari, September 2, 2016).

2 of 12.
View from east. (Photographer: John De Ferrari, September 2, 2016).

3 of 12.
View from southwest. (Photographer: John De Ferrari, September 2, 2016).

4 of 12.
Detail of glass block window and door on west side. (Photographer: D.C. Historic Preservation Office, undated).

5 of 12.
Detail of north entrance. (Photographer: John De Ferrari, September 2, 2016).

6 of 12.
Physicists Merle Tuve, Lawrence Hafsted, and Odd Dahl observe a high-voltage experiment at the Department of Terrestrial Magnetism. (Photographer: Carnegie Institution of Washington, 1931).

7 of 12.
The newly completed Atomic Physics Observatory seen from the southwest. (Photographer: Carnegie Institution of Washington, October 20, 1938).

8 of 12.
Nuclear physicists gather at the Atomic Physics Observatory to witness the demonstration of nuclear fission on January 28, 1939. (Photographer: Carnegie Institution of Washington, January 28, 1939).

9 of 12.
Aerial view of the Broad Branch Road Campus. (Photographer: Carnegie Institution of Washington, Fall, 1991).

10 of 12.
View from the west of the Atomic Physics Observatory and the Experiment Building, constructed in 1919. (Photographer: Carnegie Institution of Washington, October 20, 1938).

11 of 12.
Schematic Diagram of the Atomic Physics Observatory. (Source: Carnegie Institution of Washington, undated).

12 of 12.
Cutaway diagram of the Westinghouse Van de Graaff accelerator. (Source: *Popular Science*, July 1937).

PropertyQuest report for 5241 BROAD BRANCH created 7-10-2016

Map of Carnegie Institution Broad Branch Campus. Orange dot identifies location of Atomic Physics Observatory (nominated structure). Propertyquest.dc.gov (10/7/2016)

Map 1: Carnegie Institution Broad Branch Road Campus. Broad Branch Road NW runs along the southern edge of the map; Jocelyn Street NW is along the northern edge. The Atomic Physics Observatory is the round structure at the center of the complex.

Map 2: Aerial photograph of the Carnegie Institution Broach Branch Road Complex. The Atomic Physics Observatory is the round white structure at the center of the complex.

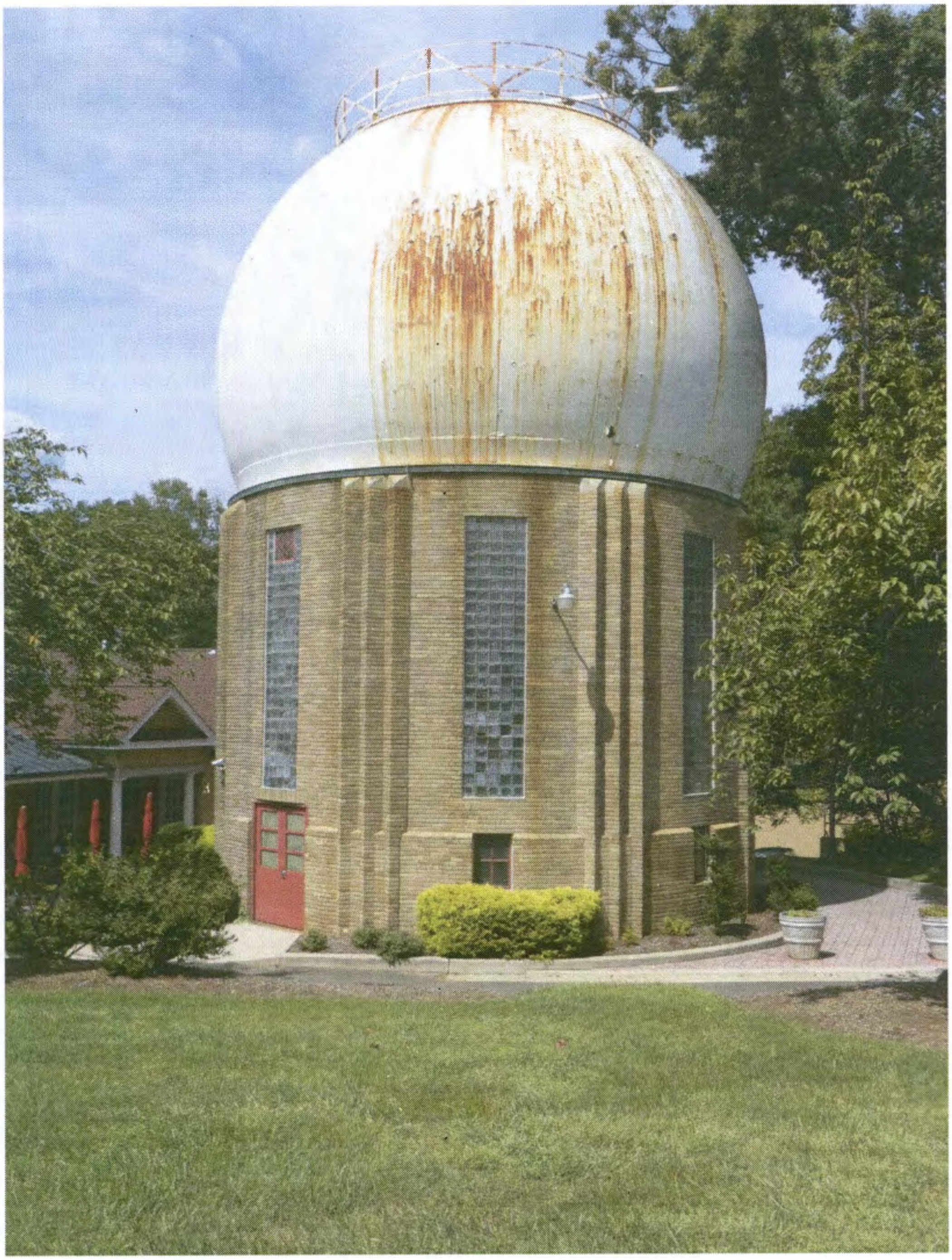

Illustration 1: View from southeast. (John DeFerrari).

Illustration 2: View from east (John DeFerrari).

Illustration 3: View from southwest (John DeFerrari).

Illustration 4: Detail of glass block window and door on west side (DC Historic Preservation Office).

Illustration 5: Detail of north entrance (John DeFerrari).

Illustration 6: Physicists Merle Tuve, Lawrence Hafsted, and Odd Dahl observe a high-voltage experiment at the Department of Terrestrial Magnetism in 1931 (Carnegie Institution).

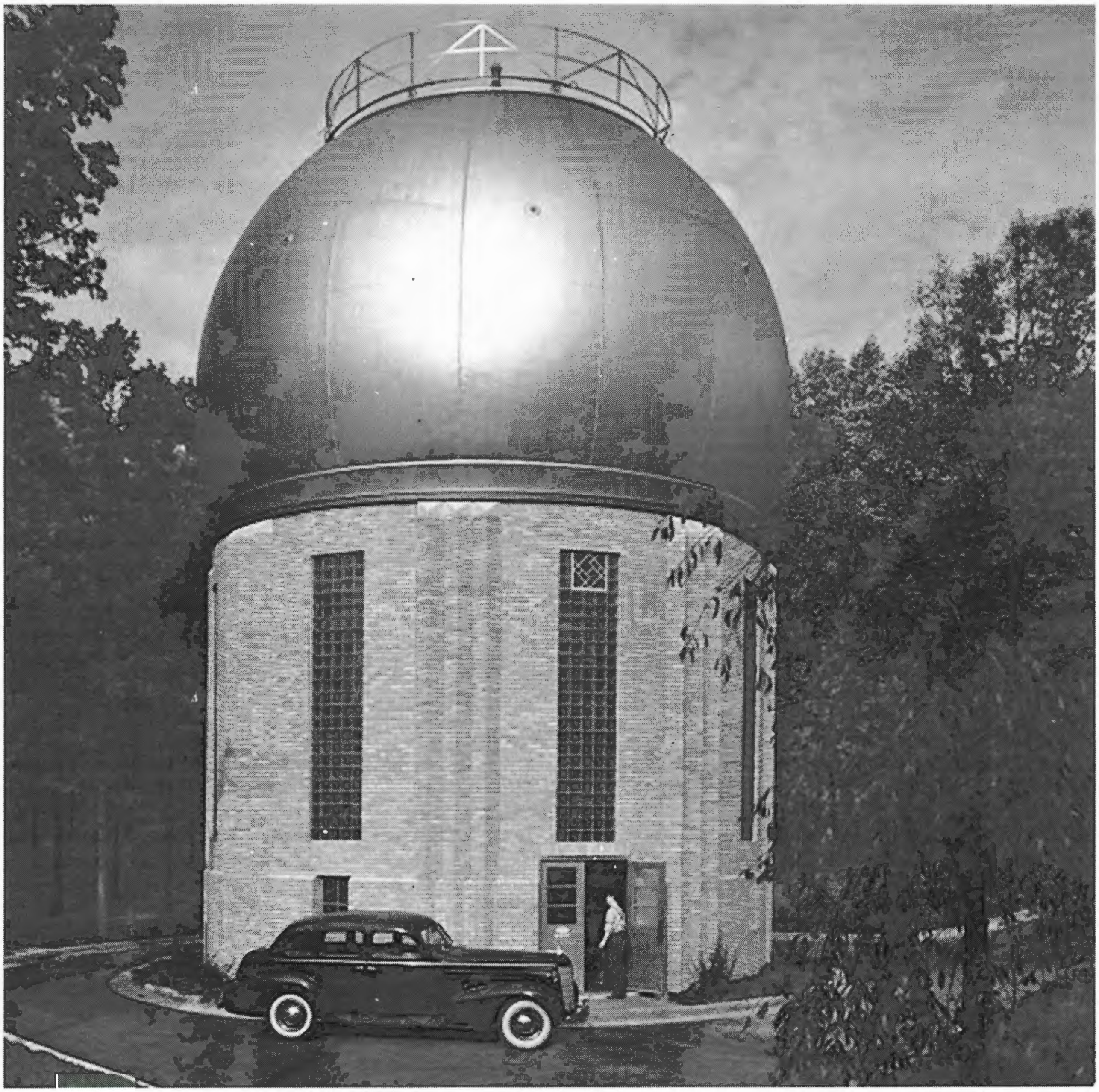

Illustration 7: The newly-completed Atomic Physics Observatory seen from the southwest, October 20, 1938 (Carnegie Institution).

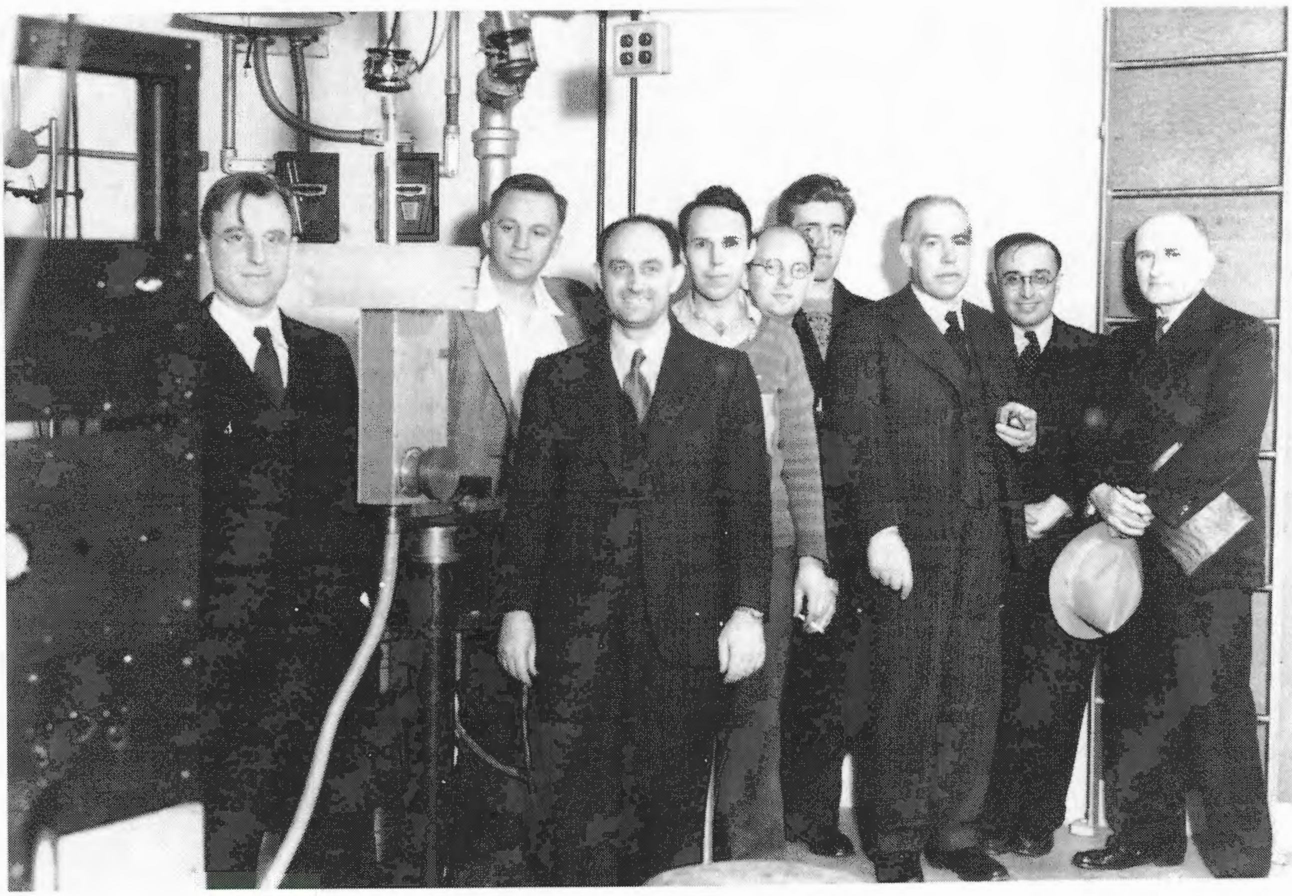

Illustration 8: Nuclear physicists gather at the Atomic Physics Observatory to witness the demonstration of nuclear fission on January 28, 1939. From left to right: Robert Meyer, Merle Tuve, Enrico Fermi, Richard Roberts, Leon Rosenfeld, Erik Bohr, Niels Bohr, Gregory Briet, and John Fleming. Edward Teller was also at the observatory but was not in the photograph. (Carnegie Institution).

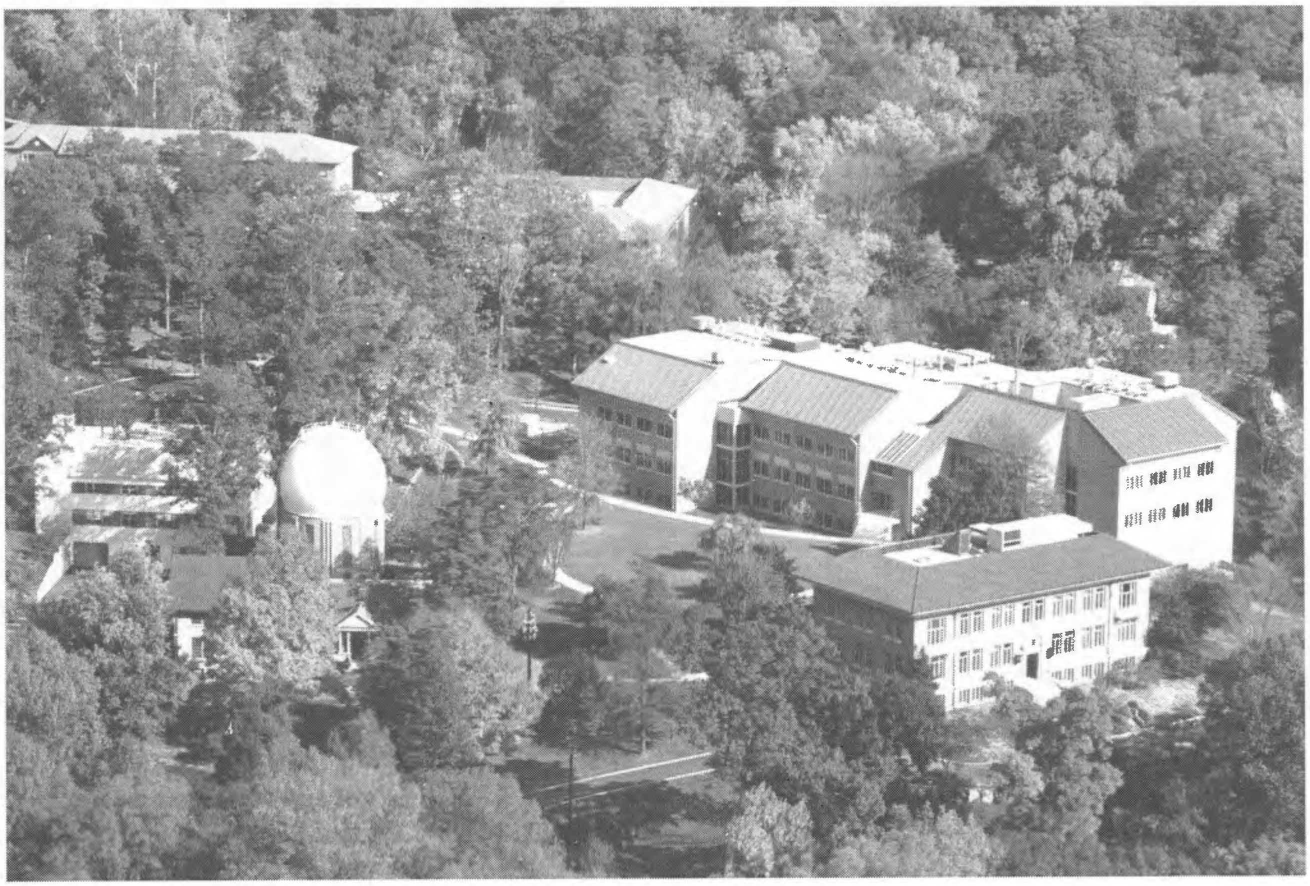

Illustration 9: Aerial view of the Broad Branch Road Campus in 1991 (Carnegie Institution).

Illustration 10: 1938 view from the west of the Atomic Physics Observatory and the Experiment Building (constructed in 1919). The original Department of Terrestrial Magnetism building is partially visible on the far right. (Carnegie Institution).

Carnegie Atomic Physics Observatory
Name of Property
Washington, D.C.
County and State
Name of multiple listing (if applicable)

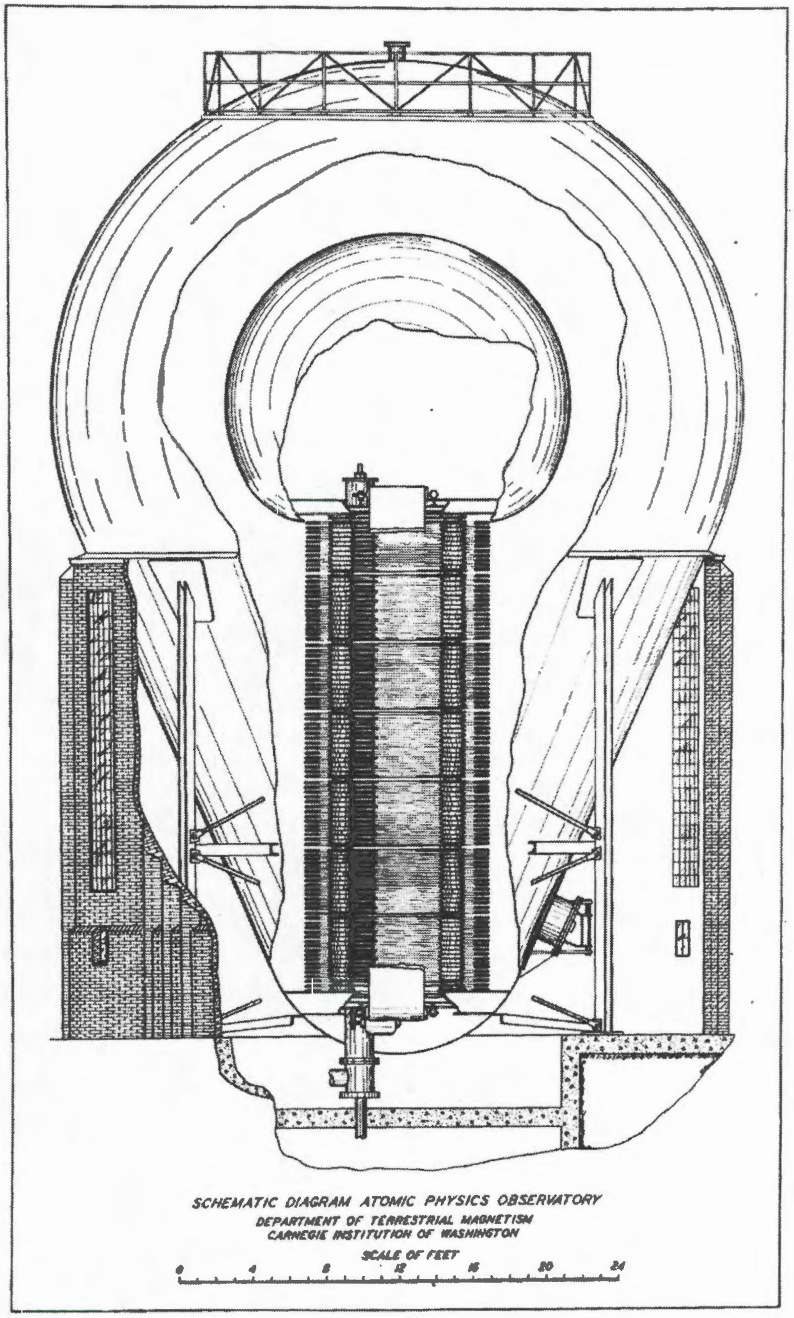

Illustration 11: Schematic Diagram of the Atomic Physics Observatory (Carnegie Institution).

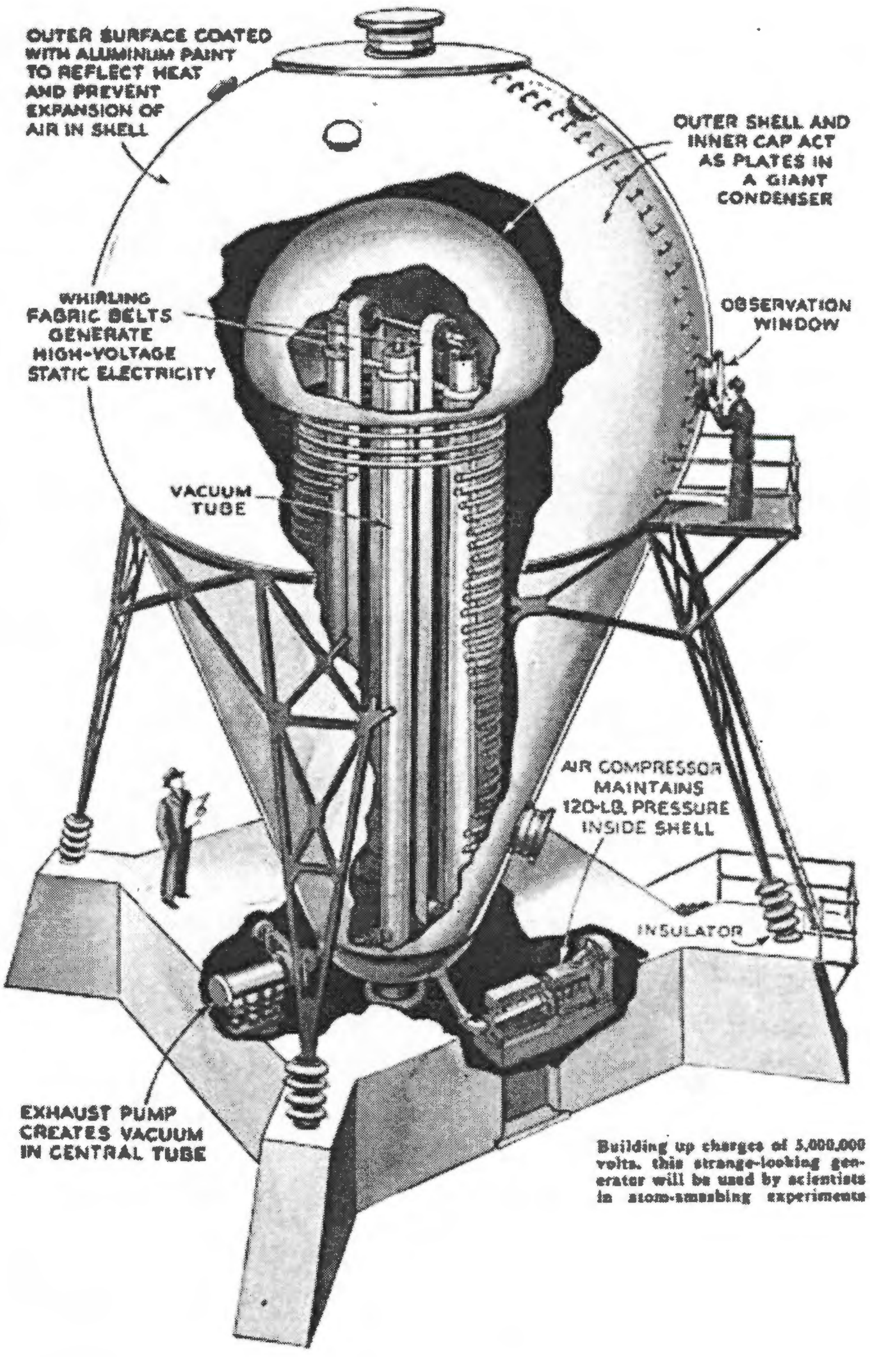

Illustration 12: Cutaway diagram of the Westinghouse Van de Graaff accelerator, which was based on the design of the Carnegie Atomic Physics Observatory (*Popular Science*, July 1937).