

**Ionospheric Section Records, 1927-[1959] (Bulk 1942-1946)**



**Carnegie Institution of Washington  
Department of Terrestrial Magnetism Archives  
Washington, DC**

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August 2005

# Ionospheric Section Records, 1927-[1959] (Bulk 1942-1946)

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**DTM-2005-10**

**Introduction**

*Abstract:* This collection documents the work conducted by the ionospheric program at the Carnegie Institution's Department of Terrestrial Magnetism.

*Extent:* 17 linear feet: 12 records center cartons, 1 oversize records center carton, 2 flat storage boxes

*Acquisition:* The records have been in the possession of Department of Terrestrial Magnetism (DTM) since their creation.

*Access Restrictions:* There are no access restrictions. Authorization for declassification is noted in a memorandum of the Acting Secretary of Defense, 2 August 1960.

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*Preferred Citation:* Ionospheric Section Records, 1927-[1959], Department of Terrestrial Magnetism, Carnegie Institution of Washington, Washington, D.C.

*Processing:* Processing was completed by Jennifer Snyder in August 2005.

This collection was processed through the generous support of the National Historical Publications and Records Commission.

**Historical Note**

\*Dr. Louis Brown wrote an excellent history of the Ionospheric Section which is found in *Centennial History of the Carnegie Institution of Washington, Volume II: The Department of Terrestrial Magnetism*. Much of the below information has been cribbed from this chapter.

Ionospheric research began at the Department of Terrestrial Magnetism (DTM) in 1924 when Gregory Breit joined the staff. The initial goal of the program was to establish the existence of a conducting layer (then called the "Kennelly-Heaviside Layer") in the upper atmosphere which allowed radio transmissions to travel great distances. Merle Tuve was brought on board shortly after Breit. Together they developed a technique for transmitting modulated radio signals up into the atmosphere and observing the resulting radio echoes. The echo observations proved the existence of ionosphere and permitted measurement of its height.

In the early 1930s, Odd Dahl and Lawrence Hafstad joined the program to continue the ionospheric studies until work was transferred to the National Bureau of Standards (NBS). However, NBS programs were curtailed due to the Depression, and with the arrival of Lloyd V. Berkner at DTM in 1933 the Department's ionosphere program resumed an active phase. Under Berkner, new automatic ionospheric recorders were developed and a field station for experiments

established at Kensington, Maryland. Berkner brought a national and international scope to the work because of his involvement in many organizations. Harry W. Wells was acting chief of DTM's ionospheric work during the War years.

During World War II, DTM established ionosphere stations around the globe to facilitate communication among the armed forces. Carnegie was an integral member of the Wave Propagation Committee (WPC), organized under the Joint Communications Board, Joint Chiefs of Staff. According to the National Institute of Standards and Technology's museum website,

In 1942, the Combined Communications Board of the Combined Chiefs of Staff in Washington, DC created the Interservice Radio Propagation Laboratory (IRPL) and placed its headquarters at NBS. The duties of this new lab were:

- to centralize and disseminate all ionospheric and radio propagation data for the U.S.
- to operate and sponsor operation of such ionospheric stations as were necessary to obtain the data
- to cooperate and collaborate with the radio propagation organizations of other countries of the United Nations
- to issue radio propagation information and predictions for the use of the armed forces and other cooperating agencies of the United Nations
- to train personnel of the armed forces in the use of ionospheric and propagation data
- to make special propagation studies and solve specific problems upon request

IRPL later became the Central Radio Propagation Laboratory (CRPL). Indeed, these were much the same duties of the Carnegie program.

After the War, DTM's ionospheric activities moved to its new experimental laboratory at Derwood, Maryland. In the 1950s the focus of research there gradually shifted to radio astronomy. "Upper atmosphere research" was mentioned prominently in the Carnegie *Year Book* for the last time in 1957. With Wells' departure in 1960, ionospheric research at DTM effectively came to an end. [An excellent summary of DTM's ionosphere activities during the War is given in *Year Book 45*, pp. 54-56, 1946.]

### **Scope and Contents**

This collection documents the work conducted by the ionospheric program at the Carnegie Institution's Department of Terrestrial Magnetism. It includes committees meeting minutes and transcripts, data collected at Carnegie's observation stations, and research notebooks documenting various experiment conducted to establish the existence of a conducting layer for radio waves in the upper atmosphere.

### **Arrangement**

This collection is arranged in three series as follows:

Series 1: Files, 1934-1948, n.d.

Series 1, Subseries 1: Equipment files, 1936-1946, n.d.

Series 1, Subseries 2: Federal Communication Commission (FCC) files, 1934, 1938-1946, n.d.

Series 1, Subseries 3: Interservice Radio Propagation Laboratory (IRPL) files, 1942-1946

Series 1, Subseries 4: Ionosphere Station Reports, 1941-1946

Series 1, Subseries 5: Wave Propagation Committee (WPC) files, 1942-1946

Series 1, Subseries 6: Miscellaneous files, 1936-1948, n.d.

Series 2: Data, 1933-1956 [bulk 1933-1946]

Series 3: Research Notebooks, 1927-1950s

**Series 1: Files, 1934-1948, n.d.**

This series is arranged into 6 subseries, organized by file type (e.g., committee). The types of materials found in this series include: regulations, handbooks, mimeographs, and correspondence.

**Series 1, Subseries 1: Equipment files, 1936-1946, n.d.**

The equipment files document the types of equipment used at observation stations. Files may include instructions, manuals, or other documentation.

**Series 1, Subseries 2: Federal Communications Commission (FCC) files, 1934, 1938-1946, n.d.**

This subseries contains Carnegie's FCC documentation. Of note is the application file for establishing a radio station in College, Alaska.

**Series 1, Subseries 3: Interservice Radio Propagation Laboratory (IRPL) files, 1942-1946**

This subseries documents the activities of IRPL. Established by the National Bureau of Standards, this organization was responsible for collecting radio-wave propagation data and disseminating them to the armed forces.

**Series 1, Subseries 4: Ionosphere Station Reports, 1941-1946**

This subseries contains reports from Carnegie Institution run stations around the world. They are organized by country.

**Series 1, Subseries 5: Wave Propagation Committee (WPC) files, 1942-1946**

This subseries contains agendas, minutes, notes, and other communications about the meetings of this committee. Abbreviations on the files are as follows:

WP = Wave Propagation

JX = Joint Communications Board

JCB = Joint Communications Board

CX= Combined Communications Board

CCB= Combined Communications Board

**Series 1, Subseries 6: Miscellaneous files, 1936-1948, n.d.**

The files in this subseries are more general than those found in the above subseries. Reprints, reports, and bulletins from Carnegie and external sources are included here. Of particular note is the photograph album which was created by/for H.W. Wells; it illustrates wartime operations and equipment at DTM's ionospheric stations. Also noteworthy are the first motion pictures of

ionospheric activity, produced at DTM in 1946 using panoramic recorders. Other films document field work at DTM's observation stations. The films that are in their original cardboard boxes were made at observation stations and show people working.

**Series 2: Data, 1933-1956 [bulk 1933-1946]**

This series contains observation logs, charts, and traces (ionograms) from observation stations around the world. Of note in this series are auroral materials from College, Alaska. The records are arranged geographically and then by type of material.

**Series 3: Research Notebooks, 1927-1950s**

Several of the notebooks in this series are believed to be associated with Tuve and Breit's ionosphere experiments, though no personal identifiers have been found with the notebooks. Two notebooks belonged to H.W. Wells and are identified as such.

**Folder Listing**

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G: Correlation of D.F. [Direction Finder] Errors with Ionospheric Conditions, 1945		10
H and M: Frequency Guide for Operating Personnel, 1943-1944		11
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“First Motion Picture of the Ionosphere,” 1946 (2 films)		
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“November 17, 1948”		
[2 unlabeled films in small black film cans]		
[Ionosphere station in tropics; people conducting work at station, n.d.]		
(2 films)		
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### **Subject Terms**

#### Topics:

- Auroras
- Ionosphere
- Radio wave propagation
- World War, 1939-1945

#### Corporate Names:

- Carnegie Institution of Washington. Dept. of Terrestrial Magnetism
- Central Radio Propagation Laboratory (U.S.)
- Interservice Radio Propagation Laboratory (U.S.)
- United States. Federal Communications Commission
- United States. Joint Communications Board
- United States. National Bureau of Standards

#### Personal Names:

- Berkner, Lloyd V. (Lloyd Viel), 1905-
- Breit, Gregory, 1899-
- Dahl, Odd, 1898-1994
- Tuve, Merle Antony, 1901-1982
- Wells, Harry Warren, 1907-

#### Forms:

- Agendas (administrative records)
- Blueprints
- Correspondence
- Laboratory notebooks
- Minutes
- Logs (records)
- Photographs
- Photograph albums

### **Bibliography**

Brown, Louis. *Centennial History of the Carnegie Institution of Washington. The Department of Terrestrial Magnetism*. Cambridge: Cambridge University Press, 2004.

“The Ionosphere and Its Relations to Geomagnetism Summary of War Activities, 1942-1946”. *Carnegie Institution of Washington Year Book*, v. 45, (pp. 54-56). Washington, DC: Carnegie Institution of Washington., 1946.

**Related Collections**

Instrument and Equipment Records, 1892-1970, Department of Terrestrial Magnetism, Carnegie Institution of Washington, Washington, D.C.

Drawings and plans for buildings at the ionospheric stations are located in the DTM Archives.