

Archives and Special Collections

Dickinson College

Carlisle, PA

COLLECTION REGISTER

Name: **Mohler, Fred Loomis (1893-1974)** **MC 2002.5**

Materials: Papers (1917-1966)

Volume: 0.75 linear feet (Document Boxes 1-2)

Donation: Gift of Fred Loomis Mohler

Usage: These materials have been donated without restrictions on usage.

BIOGRAPHICAL NOTE

Fred Loomis Mohler was born on August 23, 1893 in Wilbraham, Massachusetts, the son of John Frederick and Sarah Loomis Mohler. As a young boy he became interested in science because his father was a mathematician and physicist. The elder Mohler taught in Delaware and Massachusetts prior to joining the Dickinson faculty in 1896. Young Fred followed his father to Dickinson as a member of the class of 1914; his brother Samuel was also a member of this class, and their younger sister Nora belonged to the class of 1917. While at Dickinson, Fred Mohler was a member of the Kappa Sigma fraternity and the Belles Lettres Society. He participated in track, the Athletic Association, the YMCA, and the Mandolin Club.

After receiving his bachelor's degree from Dickinson in 1914, Mohler pursued his Ph.D. from John Hopkins University in 1917. His physics thesis was entitled, "Resonance radiation of sodium vapor excited by the D lines." Through this research he met and worked with R. W. Wood, who encouraged and motivated him to continue in his research. Throughout his educational experience, Mohler participated in many studies and experiments focused on physics. Under Paul Foote, one of his earliest colleagues, he began to develop his own ideas about atomic physics and to publish his findings.

After receiving his doctorate, Mohler accepted a position at the National Bureau of Standards in the Atomic Physics and Mass Spectrometry Division under Dr. John Foote. In the years following World War I, Mohler and Foote worked together on research that focused on atomic physics, photoionization, and the origin of spectra. In 1927, Foote left the bureau and Mohler became section chief. Over the next two decades, he collaborated with a number of scientists, which led to his research on the precision of bombs and their range as an operations analyst with the Ninth Bomber Command during World War II. Mohler was also a member of several academic societies, including the American Physical Society and the Washington Philosophic Society. He retired from the bureau in 1960.

Despite retirement, Mohler continued to research and publish, acting as a consultant to the Atomic Physics Division. Throughout his life, he researched a variety of scientific topics, though the majority of his work focused on the problems of the interactions of electrons and radiation with atoms and molecules. Although his research in the 1930s on cesium plasma did not attract a lot of attention at the time, many scientists later referred to his early findings. For his contributions to the field of atomic physics, Dickinson honored Mohler with an honorary doctorate of science in 1946.

Mohler married Pearl Worthington on August 17, 1920, and the couple had two children, Wilmer and Emily. The longstanding Mohler family connection to Dickinson was continued when Emily graduated from the college with the class of 1951. Fred Loomis Mohler died on December 2, 1974 in Washington, D. C. at the age of 81.

COLLECTION DESCRIPTION

The Fred Loomis Mohler Collection contains articles written by Mohler and his colleagues that reflect their scientific research. The collection has been divided into two series: Writings-Mohler and Writings-Associates. The articles contained in this collection have been published in various scientific journals.

The Writings-Mohler series consists of articles written by Fred Loomis Mohler. These documents focus on his discoveries, specifically in atomic physics, mass spectra of specific elements such as nitrogen, photoionization, recombination of ions, and cesium vapor. These articles were written from the time he was a graduate student until his retirement in 1960. The articles in this series are arranged alphabetically by the publication in which the article appeared, and thereafter chronologically. At the end of this series are two miscellaneous folders. One of these contains lists of his publications on specific topics he studied in the 1920s, such as atomic physics, as well as an abstract of a speech Mohler gave at a Sigma Chi meeting, and autobiographical notes. The other folder contains a bound volume of his journal articles.

The Writings-Associates series contains scientific journal articles published by Mohler's colleagues and mentors. Many of these articles pertain to studies Mohler himself was performing, such as Boeckner's experimentation with cesium. Paul Foote, Mohler's graduate professor at John Hopkins University, wrote many of these articles, many of which were published at the time when Mohler was working with and learning from him. This series is arranged alphabetically by author, then alphabetically by the publication in which the article appeared, and thereafter chronologically.

COLLECTION INVENTORY

BOX 1 - MC 2002.5

WRITINGS-MOHLER

- Folder 01) *Analytical Chemistry*
“Analysis of Fluorinated Polyphenyls by Mass Spectrometer”
- June 1955
The Astrophysical Journal
“The Excitation of the Enhanced Spectra of Sodium and Potassium
in a Low Voltage ARC” - Apr. 1922
“The Number of Lines in a Series as a Function of Electron
Pressure” - Oct. 1939
- Folder 02) *Fortschritte der Chemie, Physik und physikalischen Chemie*
“Ionisierungs- und Anregungsspannungen” - 1925
- Folder 03) *The Journal of Chemical Physics*
“Mass Spectra of *cis*- and *trans*-Decahydronaphthalene” - Dec. 1949
“Mass Spectra of N₂¹⁴, N¹⁴N¹⁵ and N₂¹⁵” - Jan. 1950
“The Ionization Potential of the CF₃ Radical and Some
Fluorocarbon Bond Energies Obtained by Electron Impact”
- Apr. 1952
“Ionization and Dissociation of Methyl Siloxanes by Electron
Impact” - Jan. 1953
“Some Ions of High Kinetic Energy in Mass Spectra of Polyatomic
Molecules” - Mar. 1954
“Ionization and Dissociation of Hexafluorobenzene by Electron
Impact” - Feb. 1957
- Folder 04) *Journal of the American Chemical Society*
“The Ionization Potential of Hydrochloric Acid and the Electron
Affinity of Chlorine” - July 1920
“The Dissociation of Diborane by Electron Impact” - Mar. 1948
“Mass Spectra of Some Cyclic and Straight Chain Fluorocarbons”
- Jan. 1949
“Dimethylphosphinoborane Trimer. Mass Spectra and Thermal
Decomposition” - Feb. 1954
- Folder 05) *Journal of the Optical Society of America*
“Determination of Planck’s Constant ‘h’ by Electronic Atomic
Impact in Metallic Vapors” - May-Nov. 1919
“The Significance of the ½ Terms in Spectral Series Formulae”
- Jan. 1922
“The D₂ Zeeman Pattern For Resonance Radiation” - June 1923
“Stages in the Excitation of the Spectra of Thallium” - Oct. 1923
“Inner Quantum Numbers for the Neutral Helium Atom” - Jan. 1924

BOX 1 - MC 2002.5 (cont.)

WRITINGS-MOHLER (cont.)

- Folder 06) *Journal of the Washington Academy of Sciences*
“The Thermo chemistry of Ionization of Vapors of Certain Compounds” - Sep. 1920
“Soft Characteristic X-rays from Arcs in Gases and Vapors” - Jun. 1921
“Mass Spectra of Hydrocarbons” - Jan. 1948
National Geographic Society
“National Geographic Society- U.S. Navy Solar Eclipse Expedition of 1937 to Canton Island” - 1929
- Folder 07) *National Research Council*
“Bulletin of the National Research Council: Critical Potentials” - Sep. 1924
- Folder 08) *Philosophical Magazine*
“Ionization and Resonance Potentials for Electrons in Vapours of Magnesium and Thallium” - Jan. 1919
“Ionization and Resonance Potentials for Electrons in Vapours of Lead and Calcium” - Jul. 1920
“A Significant Exception to the Principle of Selection” - Apr. 1922
- Folder 09) *Physical Review*
“Resonance Radiation of Sodium Vapor Excited by One of the D Lines” - 1918
“Ionization and Resonance Potentials for Electrons in Vapors of Arsenic, Rubidium, and Caesium” - Jan. 1919
“Photo-Electronic Ionization of Caesium Vapor” - Aug. 1925
“Relative Production of Negative and Positive Ions by Electron Collisions” - Nov. 1925
- Folder 10) “Photo-Ionization and Relative Absorption Probabilities of Caesium Vapor” - Jan. 1926
“Photo-Ionization of a Gas by a Discharge in the Same Gas” - July 1926
“Electron Collisions in Carbon Monoxide” - Jan. 1927
“Excitation by Atomic Hydrogen” - Mar. 1927
“Recombination and Photo-Ionization” - Oct. 1929
“Metastable Ion Transitions in the Mass Spectra of The Monochloropropenes” - Mar. 1947
“Mass-Spectrometer Study of the Rare Gases” - June 1947
“Mass Spectrometer Analysis of Mercury Made by Neutron Attachment to Gold” - Apr. 1948
- Folder 11) *Science*
“Critical Potentials of Thallium Vapor” - Apr 1923
“Excitation Potentials of the Spectra Argon II and Neon II” - Apr. 1926
“The Absorption Spectrum of Mercury at High Pressure Admixed with Nitrogen” - Dec. 1927
“Photo ionization of Caesium Vapor” - May 1929

BOX 1 - MC 2002.5 (cont.)

WRITINGS-MOHLER (cont.)

- Folder 12) *Scientific Papers of the Bureau of Standards, Dept. of Commerce*
- “Resonance and Ionization Potentials for Electrons in Cadmium Vapor” - Feb. 1918
 - “Ionization and Resonance Potentials for Electrons in Vapors of Lead and Calcium” - Feb. 1920
 - “Ionization and Resonance Potentials of Some Nonmetallic Elements” - Oct. 1920
 - “Resonance Potentials and Low- Voltage Arcs from Metals of the Second Group of the Periodic Table” - Nov. 1920
 - “Characteristic Soft X-Rays From Arcs in Gases and Vapors” - Dec. 1921
 - “Spectra and Critical Potentials of Fifth Group Elements” - June 1924
 - “Critical Potentials Associated With Excitation of Alkali Spark Spectra.” - Apr 1925
 - “A Photo ionization Experiment with Hydrogen” - June 1926
 - “Recombination Spectra of Ions and Electrons in Caesium and Helium” - Mar. 1929
- Folder 13)
- “Photo ionization of Some Alkali Vapors”-Aug. 1929
 - “Photo-Ionization of Caesium by Line Absorption” - July 1930
 - “Effects of Gases on Photo-Ionization of Caesium by Line Absorption” - Aug. 1930
 - “Photo-Ionization of Caesium Vapor by Absorption Between the Series Lines” - Oct. 1930
 - “Radiation From Metals Bombarded by Low-Speed Electrons” - Apr. 1931
 - “Radiation From Probe Surfaces Bombarded by Electrons” - Oct. 1931
 - “Experiments on the Emission and Absorption of Radiation by Metallic Silver” - Mar. 1932
 - “Power Input and Dissipation in the Positive Column of a Caesium Discharge” - July 1932
 - “Collisions of the First and Second Kind in the Positive Column of a Caesium Discharge” - Oct. 1932
 - “The Variation with Angle of Emission of the Radiation From Metals Bombarded by Slow Electrons” - Nov. 1932
 - “Scattering of Electrons by Ions and the Mobility of Electrons in Caesium Discharge” - Mar. 1933
- Folder 14)
- “Recombination Radiation in the Cesium Positive Column” - 1933
 - “A Note on Bacterial Effects of X-rays” - Nov. 1934
 - “Ionization of Liquid Carbon Disulphide By X-rays.” - Nov. 1934
 - “Reversal Temperature and Population of Excited States in the Cesium Discharge” - Mar. 1936
 - “Intensity Distribution in the Line Emission Spectrum of Cesium” - June 1936
 - “Electron Concentration and Spectral Intensity Distribution in a Cesium Discharge” - Dec. 1936

BOX 1 - MC 2002.5 (cont.)

WRITINGS-MOHLER (cont.)

- Folder 14) *Scientific Papers of the Bureau of Standards, Dept. of Commerce*
“Recombination of Ions in the Afterglow of a Cesium Discharge”
- Oct. 1937
“Recombination in the Afterglow of a Mercury Discharge”
- Nov. 1937
“Cesium Discharge Under Conditions of Nearly Complete Ionization” - Nov. 1938
“Resistivity and Power input in the Cesium Discharge at High Current Density” - Dec. 1938
- Folder 15)
“Calculation of the Luminous Efficiency of Ionized Cesium Vapor”
- Jan. 1939
“Recombination and Electron Attachment in the *F* Layers of the Ionosphere” - Nov. 1940
“Dissociation of SF₆, CF₄, SiF₄ by Electron Impact” - Jan. 1948
“Mass Spectra of Octanes” - Aug. 1948
“Doubly Charged Ion Spectra in Mass Spectra of Hydrocarbons”
- Apr. 1949
“Metastable Transitions in Mass Spectra of Hydrocarbons”
- July 1949
“Mass Spectrum of Pentaborane (B₅H₉)” - Aug. 1949
“Mass Spectra of Nonanes” - Mar. 1950
“Mass Spectra of the Deuteromethanes” - Dec. 1950
“Temperature Variation of Mass Spectra of Hydrocarbons”
- Feb. 1951
“Mass Spectra of Some Organo-Lead and Organo-Mercury Compounds” - Nov. 1951
- Folder 16)
“Mass Spectra of Deuteracetylenes, Monodeuterobenzene, and Deuteronaphthalenes” - Mar. 1952
“Mass Spectra of Fluorocarbons” - Nov. 1952
“A new Technique for the Mass Spectrometric Study of the Pyrolysis Products of Polystyrene” - Apr. 1953
“Mass Spectra of the Deuteroethylenes.” - Aug. 1954
“Mass Spectra of Thermal Degradation Products of Polymers”
- Dec. 1955
“Mass Spectra of Some Lead Alkyls” - July 1956
“Ionization and Dissociation of the Trifluoromethyl Halides by Electron Impact” - Aug. 1956
“Mass Spectrum of Sulfur Vapor” - Oct. 1956
“A Survey of Negative Ions in Mass Spectra of Polyatomic Molecules” - Dec. 1956
“Mass Spectra and Relative Sensitivities of Some Polyphenyls”
- Feb. 1958
“Mass Spectra of Aromatic Hydrocarbons Filtered from Smoky Air” - June 1958

BOX 1 - MC 2002.5 (cont.)

WRITINGS-MOHLER (cont.)

- Folder 16) *Scientific Papers of the Bureau of Standards, Dept. of Commerce*
“Redetermination of Mass Spectra of Deuteromethanes” - Sep. 1958
“Mass Spectra of Some Deuterostyrenes.” - Jan. 1959
“Phosphinoborine Compounds: Mass Spectra and Pyrolysis”
- Aug. 1959
- Folder 17) “Isotopic Abundance Ratios Reported For Reference Samples”
- May 1960
“Mass Spectra of Some Deuteroethanes” - Mar.-Apr. 1961
“Photoionization of Atoms and Molecules” - Jan. 1962
“Survey of Multiply Charged Ions” - May 1964
- Folder 18) “Analytical Mass Spectrometry Section: Instrumentation and
Procedures for Isotopic Analysis” - July 1966
“Concepts in Temperature in Electric Discharge Phenomena”
undated
- Folder 19) Typescript, “Radiation and Temperature of Condenser Discharger.”
- May 1941
“National Bureau of Standards Organizational Directory” - July 1964
Autobiographical Notes on Scientific Work - List of Publications on Atomic
Physics - Part I and II
List of Publications - 1-107

BOX 2 - MC 2002.5

WRITINGS-MOHLER(cont.)

- Folder 01) Bound volume, “Papers 1918-1930.”

WRITINGS-ASSOCIATES

Boeckner, C.

- Folder 02) *Scientific Papers of the Bureau of Standards, No. 184*
“Resonance and Quenching of the Third Principal Series
Line of Caesium” - July 1930
“Probabilities of Recombination into the 1^2S State of
Caesium” - Feb. 1931
“Radiation from Caesium and other Metals Bombarded by
Slow Electrons” - Sept. 1932

Foote, Paul D.

- Folder 03) *American Institute of Chemical Engineers*
“Atomic Physics and its Relation to Chemical Engineering”
- Dec. 1923
American Institute of Mining and Metallurgical Engineers, Inc.
“The Relation between Metallurgy and Atomic Structure”
- Feb. 1926
Journal of The Franklin Institute
“Spectroscopy and Bohr’s Theory of Atomic Structure” - 1924

BOX 2 - MC 2002.5 (cont.)

WRITINGS-ASSOCIATES

Foote, Paul D. (cont.)

- Folder 03) *Philosophical Magazine*
“Resonance and Ionization Potentials for Electrons in
Metallic Vapours” - July 1918
- Folder 04) *Physical Review*
“The Excitation of Forbidden Spectral Lines” - Aug. 1925
- Scientific Monthly*
“The Alchemist” - Sep. 1924
“Radio Talks on Science: The Atom” - Nov. 1925
- Scientific Papers of the Bureau of Standards, Dep. of Commerce*
“Atomic Theory and Low-Voltage Arcs in Caesium
Vapor” - Jan. 1920
“A New Micro photometer for Photographic Densities”
- Jan. 1920

Langer, R.M.

- Folder 05) *Physical Review*
“Quantum Mechanics of Chemical Reaction” - July 1929

MacNair, Walter

- Folder 06) *Journal of Biological Chemistry*
“Antiricketic Substances: VII Biochemical and Spectroscopic
Studies on Purified Cholesterol” - Jan. 1928
- National Academy of Sciences*
“The Zeeman Effect of the Hyper-Fine Structure
Components of 2537 of Mercury.” - June 1927
“Explanation of the Incomplete Polarization of Mercury
Resonance Radiation” - Aug. 1927
- Philosophical Magazine*
“The Fine Structure of Certain Lines and Energy Levels of
Cadmium” - Sep. 1926

Ruark, Arthur Edward

- Folder 07) *The Astrophysical Journal*
“The Hydrogen Balmer Series and the Impossibility of
Further Corrections to the Quantizing of Hydrogenic
Atoms” - July 1923
- Journal of The Optical Society of America and Review of Scientific
Instruments*
“Stages in the Excitation of the Spectra of Cadmium”
- June 1925
”Multiple Electron Transitions and Primed Spectral Terms”
- Sep. 1925
“Spectra Excited by Active Nitrogen” - Jan. 1927
- Philosophical Magazine*
“A Proposed Test of the Space Quantization of Atoms in a
Magnetic Field” - Feb. 1925