THE
WARNER AND SWASEY
COLLECTION

Incorporating Certain Papers of

Worcester R. Warner
Ambrose Swasey
The Warner & Swasey Co.

Special Collections
University Libraries
Case Western Reserve University
In August 1974, The Warner & Swasey Co. deposited in the Special Collections of Case Western Reserve University Libraries the papers described in the following pages. The Warner and Swasey Collection includes correspondence of both Worcester R. Warner and Ambrose Swasey as well as early corporate and engineering records of the company they founded. The greatest part of the Collection deals with the instruments, especially telescopes and observatories, engineered and built by The Warner & Swasey Co.

It is particularly fitting that this Collection should come to Case Western Reserve University. Both Mr. Warner and Mr. Swasey were keenly interested in and supported the forerunners of the present University. Also, Mr. Swasey' s personal correspondences were donated to the University Libraries by Mr. and Mrs. Warren G. Henderson and is now housed with The Warner and Swasey Collection.

The Warner & Swasey Co., in addition to transferring this Collection to the Case Western Reserve University Libraries, generously underwrote the processing and cataloging of the material. Without that support, the Collection would have remained minimally useful to future scholars. It can now be consulted with ease by any qualified researcher. The University Libraries are grateful to Mr. C. William Bliss, Vice Chairman, Mr. Joseph T. Bailey, Chairman and President, and the Warner & Swasey Co. for their assistance and support in this important project. Steven W. Gelston ably carried out the processing of this Collection.
WORCESTER REED WARNER  b. May 16, 1846, Cummington, Massachusetts
d. June 25, 1929, Eisenach, Saxe-Weimar, Germany

In school, young WARNER showed keen delight in the study of physics and mathematics. At the age of 19, he completed his schooling with a three-month term under G. Stanley Hall, who was then a student at Williams College, and later president of Clark University. WARNER secured his first employment in the drafting room of the American Safety Steam and Engine Company, Boston, in 1865. When the company moved to Exeter, New Hampshire, in 1866, WARNER moved with it. It was at this time that he met his future partner, AMBROSE SWASEY. In 1869, WARNER and SWASEY decided to start out together, securing positions at the Pratt and Whitney Company in Hartford, Connecticut. Within two years both had been placed in charge of departments; WARNER was the foreman of the machine-tool-building department. In 1873, at a Boston exhibit, and in 1876, at the Centennial Exposition in Philadelphia, WARNER was in charge of the Pratt and Whitney Company display. In 1878, WARNER made his first trip to Europe on which he first demonstrated his uncanny ability to “get into places”.

In 1880, WARNER and SWASEY decided to leave Pratt and Whitney to establish a business of their own in the mid-west. Initially, they settled in Chicago but in 1881 moved to Cleveland. In 1890, WARNER married Cornelia F. Blakemore of Philadelphia. In 1911, he retired from active business, settling in Tarrytown, New York.

In addition to his outstanding success as an engineer and manufacturer, WARNER in his 30 years in Cleveland, became one of the leading men in the city in civic and financial affairs. He was Director of the Guardian Trust Company, and the Society for Savings; Trustee of Western Reserve University, and Case School of Applied Science; and one of the early presidents of the Cleveland Chamber of Commerce. WARNER was a charter member of the American Society of Mechanical Engineers, and its president in 1897, and a member of various astronomical and engineering societies, both in the United States and abroad. Warner contributed liberally to various universities, churches, and other institutions, including the Cleveland Museum of Art; and the towns of Cummington, Massachusetts, and Tarrytown, New York.

AMBROSE SWASEY b. December 19, 1846, Exeter, New Hampshire

SWASEY’S formal education was limited to that offered by the elementary school at Exeter. Leaving his father’s farm at the age of 19, SWASEY became an apprentice in the Exeter Machine Works. Here, two years later, he met, worked with and for several years lived with, his future partner, WORCESTER R. WARNER. Together in 1869 the friends went, as master machinists, to work for the Pratt and Whitney Company in Hartford, Connecticut. SWASEY was soon placed in charge of the gear-cutting department. SWASEY devised improved methods of manufacturing machine gears, including the first method of generating and cutting teeth of spur gears entirely by mechanical processes. In the spring of 1880, SWASEY and WARNER went west to start a business of their own in Chicago. A year later the company of WARNER & SWASEY was relocated in Cleveland. SWASEY had an
intense interest in the advancement of the engineering sciences. He was a charter member of the American Society of Mechanical Engineers and its president in 1904, and a member of numerous other engineering societies. Through his generous financial support, the Engineering Foundation was established. He received many honorary degrees, numerous awards and honors including: Chevalier of the Legion of Honor (France), 1901; Officer of the Legion of Honor (France), 1921; The John Fritz Gold Medal, 1924; The City of Cleveland Medal for Public Service, 1930; Gold Medal of the Franklin Institute, 1932; Gold Medal of the American Society of Mechanical Engineers, 1933; and the Hoover Gold Medal, 1935.

SWASEY was a generous benefactor of several universities, including Denison, Case School of Applied Science, and Nanking University, China; as well as to various churches and other institutions.

In 1871, SWASEY married Livonia D, Cummings. She died in 1912.

THE WARNER & SWASEY COMPANY

In 1880, WORCESTER R. WARNER and AMBROSE SWASEY, two New England machinists, decided to establish a machine business of their own in the mid-west. From boyhood days, both WARNER and SWASEY showed a consuming interest in things mechanical. WARNER early developed an interest in astronomy and built a small telescope, and SWASEY was interested in fine mechanisms, later becoming an expert on the subject of gearing. The founding of their own machine tool plant gave them an opportunity to demonstrate these interests in a very practical way. Machine tools are precision instruments. The equipment, which made machine tools, could therefore make telescopes. Initially the partners settled in Chicago, but in 1881 they relocated the company in Cleveland. Though the company was founded in 1880, it was not incorporated until 1900 and these incorporation papers actually constitute the first written agreement between the founders.

The partnership of these two men was an unusual one in the annals of American business. Each one supplemented the other. It used to be said that WARNER could sell anything that SWASEY could make, and that SWASEY could build anything that WARNER believed he could sell. WARNER had an instinct for business development and skill in dealing with people. SWASEY had a passion for precision, skill, and accuracy. This combination built the WARNER & SWASEY COMPANY.

From the beginning, the WARNER & SWASEY COMPANY has been known in two seemingly unrelated fields, turret lathes and astronomical telescopes. Their principle work was the designing and manufacturing of machine tools of the highest quality: turret lathes, planers, grinding machines, etc., at which they achieved great success; but always they were interested, as a decidedly minor activity, in the designing and constructing the mountings of astronomical instruments. They achieved distinction for their efforts in three separate occasions of designing and building the world’s largest telescope: the Lick telescope for the University of California, a 36” object-glass, in 1887; the Yerkes telescope for the University
of Chicago, a 40" object-glass, in 1897; and the 72" reflecting telescope for the Dominion Astrophysical Observatory in Vancouver, Canada, in 1916.

The WARNER & SWASEY COLLECTION is divided into two segments, Personal and Company. The Personal section is divided into material dealing with WORCESTER R. WARNER, and AMBROSE SWASEY. There is little material collected pertaining to WARNER. The overwhelming majority of material collected here is related to SWASEY. Of special note are SWASEY’S diaries and his collection of personal clippings, mounted and bound. There is some correspondence between the two men. This is arranged between the two sections chronologically.

The section entitled Company is also divided into two groups, company and article file. The company section is divided into categories, arranged alphabetically. The dates of this collection range from 1880 to 1967. Most of the material, however, is of the late 19th and early 20th centuries. The bulk of the material deals with the instruments manufactured by the WARNER & SWASEY COMPANY, especially Telescopes and Observatories. The material on Telescopes and Observatories is arranged by the name of the institution for which the instruments were contracted, not by the Observatory’s name. (i.e. University of Chicago, not Yerkes Observatory). Instruments for foreign institutions are arranged by country (i.e. Canada for Dominion Astrophysical Observatory). Of special note is the material concerning Case School of Applied Sciences (Warner & Swasey Observatory); University of California (Lick Observatory); University of Chicago (Yerkes Observatory); University of Texas (McDonald Observatory); Argentina (Observatorio Nacional de Cordoba); and Canada (Dominion Astrophysical Observatory). The ledgers of the Company are also of special interest.

The article file has been maintained in its original numerical order. This is not solely a grouping of articles written by or about the WARNER & SWASEY COMPANY. Included in this order are periodical articles, talks by Company personnel, and correspondence relating to various articles and/or topics. A list has been made describing the contents of the files, numbered A-1A to A-507. An index has been compiled of the authors of the articles, memos, and correspondences that appear in the files. Following each name is a list of the files in which these documents can be located.
Worcester Reed Warner and Ambrose Swasey
(personal)

Box 1
Worcester R. Warner: Biographical.
Worcester R. Warner: Correspondence. (see Appendix A)
Worcester R. Warner: Obituaries and Tributes. (2)
Worcester R. Warner: Recollections and Miscellaneous.
Worcester R. Warner: Cornelia Blakemore Warner (wife).

Box 2
Messrs Warner and Swasey: Correspondence between them 1902-29.
Messrs Warner and Swasey: Articles mentioning them.
Messrs Warner and Swasey: Photographs.
Messrs Warner and Swasey: Photographs, homes.
Ambrose Swasey: Addresses.
Ambrose Swasey: Biographical, Book 1, Part 2.
Ambrose Swasey: Biographical, Book 1, Part 3.
Ambrose Swasey: Biographical, Book 1, Part 4.

Box 3
Ambrose Swasey: Biographical, miscellaneous.
Ambrose Swasey: Biographies.
Ambrose Swasey: Clippings, 1901-1937.
Ambrose Swasey: Clippings, AS and The Engineering Foundation, 1915.
Ambrose Swasey: Personal Clippings, 1900-1904.*
Ambrose Swasey: Personal Clippings, 1908-1909.*

Box 4
Ambrose Swasey: Personal Clippings, 1910-1911.*
Ambrose Swasey: Personal Clippings, 1912-1913.*

Box 5
Ambrose Swasey: Personal Clippings, 1914-1915.*
Ambrose Swasey: Personal Clippings, 1916-1917.*

Box 6
Ambrose Swasey: Personal Clippings, 1918.*
Ambrose Swasey: Personal Clippings, 1919-1920.*
Ambrose Swasey: Personal Clippings, 1921.*

Box 7
Ambrose Swasey: Personal Clippings, 1922-1923.*
Ambrose Swasey: Personal Clippings, 1924.*
Ambrose Swasey: Personal Clippings, 1927-1928.*
Box 8  Ambrose Swasey: Personal Clippings, 1929.*
Ambrose Swasey: Personal Clippings, 1930.*
Ambrose Swasey: Personal Clippings, 1931.*

Box 9  Ambrose Swasey: Personal Clippings, 1932.*
Ambrose Swasey: Clippings, 1934+
Ambrose Swasey: Clippings, 1935+
Ambrose Swasey: Clippings, 1936+

Box 10  Ambrose Swasey: Clippings, Birthday 1936.+
Ambrose Swasey: Clippings, Hoover Medal Presentation, 1937.+
Ambrose Swasey: Correspondence (see Appendix A).
Ambrose Swasey: Correspondence – Herbert Hoover.
Ambrose Swasey: Diaries – 1877; 1879; 1887; 1888; 1889; (2) 1890; 1892; 1893, in two parts.
Ambrose Swasey: Diaries – (2) 1894; 1895; 1896; 1897; (2) 1898; 1899.

Box 11  Ambrose Swasey: Diaries – 1899; 1900; 1901; 1903; 1908; 1909; (2) 1910.
Ambrose Swasey: Diaries – 1902; 1903; 1904; 1905; 1906; 1907.
Ambrose Swasey: Diaries – 1908; 1909; 1910; 1911; 1912; 1913.
Ambrose Swasey: Diaries – 1914; 1915; 1916; 1917; 1918; 1919.

Box 12  Ambrose Swasey: Diaries – 1920; 1921; 1922; 1923; 1924; 1925.
Ambrose Swasey: Diaries – 1926; 1927; 1928; 1929; 1930; 1931.
Ambrose Swasey: Diaries – 1932; 1933; 1934; 1935; 1936; 1937; extracts from diaries, 1868-1921.
Ambrose Swasey: Genealogy of The Swasey Family.

Box 13  Ambrose Swasey: Honors and Tributes, 1899-1922. (see also oversize)
Ambrose Swasey: Honors and Tributes, 1924.
Ambrose Swasey: Honors and Tributes, John Fritz Award Booklet, 1924.
Ambrose Swasey: Honors and Tributes, 1929-1936.
Ambrose Swasey: Honors and Tributes, 1936-1937.
Ambrose Swasey: Obituaries (2).+

Box 14  Ambrose Swasey: Publications.
Ambrose Swasey: Scrapbook.
Ambrose Swasey: Scrapbook – Astronomy.
Ambrose Swasey: Societies – American Society of Mechanical Engineers.
Ambrose Swasey: Societies – Engineering Foundation, Correspondence.

* mounted

Box 15  
Ambrose Swasey: Travel Logs – 1887; 1887-1888; 1889.
Ambrose Swasey: Travel Logs – 1894; 1897; 1898.
Ambrose Swasey: Travel Logs – 1900; 1902-1903.
Ambrose Swasey: Photographs. (see also oversize)
Ambrose Swasey: Photographs – Birthdays.
Ambrose Swasey: Photographs, with others; negatives.
Ambrose Swasey: Miscellaneous.

Box 16  
Ambrose Swasey: Clippings Relative to Friends, 1893-1910.*
Ambrose Swasey: Clippings Relative to Friends, 1911-1915.*
Ambrose Swasey: Clippings Relative to Friends, 1920-1924.* (wrapped)

Warner & Swasey Company

Box 17  
Anniversaries: Twenty-fifth, 1906; Thirtieth, 1910.
Anniversaries: Fortieth, Anniversary Book (3).
Anniversaries: Fiftieth, 1930.
Anniversaries: Fiftieth, Anniversary Book (3).
Anniversaries: Sixtieth, 1940; Seventy-fifth, 1955.

Box 18  
Apprenticeship Papers – (see also oversize: work indentures, diploma).
Articles
Correspondence: A. – Blinn. (see Appendix B).
Correspondence: Brashear.
Correspondence: Braymer – G.
Correspondence: H – L.
Correspondence: M – R.
Correspondence: S.
Correspondence: T – Y.
Correspondence: Instrument Inquiries.
Correspondence: Telescope Inquiries.

Box 19  
Correspondence: Letter Book, 1882 – 1883.
Notebook, 1886 – 1888.

Box 20  
Employee Relations
Engineering Reports; 1923 – 1938.
Engineering Reports; 1939; 1940.
Exhibitions – awards, visitor booklet.
Expense Accounts, 1890’s.
Shipping Expenses.
History, (see also Box 20); Archives.
Instruments: General. (see also Box 20 and Photographs)
Instruments: Altazimuth; Azimuth.
Instruments: Binoculars, BOFORS gun; Construction Equipment;
Chronograph;

Box 21
Instruments: Dividing Engine; Fire Control.
Instruments: Micrometer, Position Finder; Prism.
Instruments: Range Finder; Spectroscopes.
Instruments: Telescopes and Observatories, General.
Instruments: Telescopes and Observatories, Data on Telescopes, Domes and
& Astronomical Instruments (2).
Instruments: Telescopes and Observatories, list of company made telescopes.
Instruments: Telescopes and Observatories, miscellaneous.

Box 22
Instruments: Telescopes and Observatories, Alabama Polytechnic Institute –
Brigham Young University. (see index of Universities and
Observatories – Appendix C).
Instruments: Telescopes and Observatories, Brooklyn College – Carleton
College.
Instruments: Telescopes and Observatories, Case Institute of Technology
(CWRU); 1950 - 1971.
Instruments: Telescopes and Observatories, Case Institute of Technology
(CWRU); 1936 - 1947.
Instruments: Telescopes and Observatories, Case School of Applied Science
(CIT) (CWRU); 1930, 1920.
Instruments: Telescopes and Observatories, Chamberlain Observatory –
Denison University.
Instruments: Telescopes and Observatories, DePauw University – Gallandet
College.

Box 23
Instruments: Telescopes and Observatories, Hartford Public Schools –
Lowell Observatory.
Instruments: Telescopes and Observatories, Miami University – Ohio State
University.
Instruments: Telescopes and Observatories, Ohio Wesleyan University.
Instruments: Telescopes and Observatories, Smith College Observatory –
Trinity College.
Instruments: Telescopes and Observatories, United States Naval
Observatory; 1900-1966.
Instruments: Telescopes and Observatories, United States Naval
Observatory; 1886-1895.
Instruments: Telescopes and Observatories. University of Alabama – University of California (Berkeley).
Instruments: Telescopes and Observatories, University of California; 1938 – 1953.
Instruments: Telescopes and Observatories, University of California; 1887 – 1947.
Instruments: Telescopes and Observatories, University of California; 1885 – 1887.
Instruments: Telescopes and Observatories, University of California; 1881 – 1884.
Instruments: Telescopes and Observatories, University of California; photographs & pamphlets.
Instruments: Telescopes and Observatories, University of Chicago.
Instruments: Telescopes and Observatories, University of Chicago; pamphlets; 1905 – 1951.

Instruments: Telescopes and Observatories, University of Chicago; pamphlets, 1892 – 1897.
Instruments: Telescopes and Observatories, University of the City of Toledo - University of Michigan.
Instruments: Telescopes and Observatories, University of Minnesota – University of Pennsylvania.
Instruments: Telescopes and Observatories, University of Texas; 1938 – 1955.
Instruments: Telescopes and Observatories, University of Texas, 1932 – 1937.
Instruments: Telescopes and Observatories, University of Texas, pamphlets & clippings.
Instruments: Telescopes and Observatories, University of Texas; dedication; 5/5/39.
Instruments: Telescopes and Observatories, University of Texas; dedication book.

Instruments: Telescopes and Observatories, University of Texas; dedication book (2).
Instruments: Telescopes and Observatories, University of Texas; Correspondence re: model; 1936 – 1959.
Instruments: Telescopes and Observatories, University of Toledo – Virginia Polytechnic Institute.
Instruments: Telescopes and Observatories, Warner Observatory – Yankton College.
Instruments: Telescopes and Observatories, Argentina – Observatorio Nacional de Cordoba.
Instruments: Telescopes and Observatories, Canada – Dominion Astrophysical Observatory.
Box 27  
Instruments: Telescopes and Observatories, Canada – Dominion Astrophysical Observatory; articles, visitor guide.
Instruments: Telescopes and Observatories, Canada – Dominion Astrophysical Observatory; pamphlets (2).
Instruments: Telescopes and Observatories, Foreign; Africa – Poland.
Instruments: Telescopes and Observatories, Foreign; Russia – General.
Instruments: Battery Commander’s Telescope; Telescopic Sight.
Instruments: Panoramic Sight.
Instruments: Turret Lathe.

Box 28  
Instruments: Turret Lathe.
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Invitations and Celebrations.
Letterheads.
Michelson and Morley Experiment.
Personnel: John A. Brashear.

Box 29  
Personnel: James C. Hodge
Personnel: S. Lawson; C.A.R. Lundin; L.D. McDonald; D.M. Pattison.

Box 30  
Personnel: F.A. Scott; W. Seely; O.J. Stilwell.
Personnel: Warner Seely – Astronomical Articles by famous astronomers saved by WS.
Personnel: Charles J. Stilwell – Where Precision Reigns, 1944; C.S. Stilwell; talk by unknown W&S official, 12/30/41.
Promotional Material.
Publications – Company Newspaper. (see also flat box).

Box 31  
Publications: Catalogues; 1884, 1887, 1889.
Publications: Catalogues; 1893, 1896, 1897.
Publications: Catalogues; 1898, 1899, 1900.
Publications: Catalogues; 1901.
Publications: Catalogues; 1903. (2)
Publications: Catalogues; 1904.
Box 32  Publications: Catalogues; 1907.
Publications: Catalogues; 1911. (2)
Publications: Catalogues; 1913. (3)

Box 33  Publications: Catalogues; 1914, 1919, 1925.

Box 34  Publications: Machine Catalogue; 1920 – 1935.

Box 35  Sales Manual (Obsolete): “A” Type Turret Lathe, 1928.
Sales Manual (Obsolete): “RAM” and “A” Type Turret Lathe, 1936.
Sales Manual: Turret Lathes and Tools, 12/15/43. (2)
Secretary’s Report, 1911; Stockholder’s Report, 1966; 1967.
Photographs of Company Building. (see also oversize).
Pratt & Whitney – Company History; (mentions W and S).

Box 36  John A. Brashear Co., 1894 – 1896.
History: Data Pertaining to founding, and growth to 1/1/1900.
History: Data on move to Cleveland, 1880.
Instruments: Chronograph (Prof. Creshore and Lt. Squier) 1896.
Instruments: Meridian Circle – U.S. Government Observatory
Instruments: Ranger Finder, U.S. Government Board of Ordinance and
    Fortification, 1898 – 1899.
Instruments: Wood Screw Machinery, 1892-1894.
Instruments: Telescopes and Observatories; Case School of Applied
    Science, 1899; Western Reserve University, 1899.
Instruments: Telescopes and Observatories; CSAS; Warner & Swasey
    Observatory; contract specification, 1919-1920.
Instruments: Telescopes and Observatories; CSAS; Observatory, 1920.
Instruments: Telescopes and Observatories; Central Manual Training
    School, 1894-1896.
Instruments: Telescopes and Observatories; Ohio Wesleyan University;
    60” Telescope & Dome, 1923-1924.
Instruments: Telescopes and Observatories; U.S. Government; 26”
    Equatorial telescope; remounting, 1890-1897.
Instruments: Telescopes and Observatories; U.S. Naval Observatory; 15”
    Photographic Telescope, contract dated 11/10/32.
Instruments: Telescopes and Observatories; University of California; 20”

Box 37  Instruments: Telescopes and Observatories; University of Chicago,
    1890-1897.
Instruments: Telescopes and Observatories; Wesleyan University,
18 1/2” Equatorial Telescope, 1914.
Instruments: Telescopes and Observatories; Argentina – Observatorio Nacional de Cordoba; 60” Telescope, 1912-1936.
Instruments: Telescopic Sights.
Instruments: Telescopes – expenses incurred setting up.
Inventory, 1883; Orders, by departments, 1896.
Data taken aboard, 1897-1898.
Miscellaneous: contract for knitting machines; selling AS’s right and title in Epicycloridal Milling Machine; Sale of Patent shares to WRW; Patent license to Hancock Inspiration Co.; AS notes, 1900.

Box 38
Daily Journals: 1894.
Daily Journals: 1895.
Daily Journals: 1900.

Box 39
Invoice Book: 6/1880-12/1885.
Sales Book: 8/2/1880-12/1887.
Sales Book: 12/1887-7/1892.

Box 40
Scrapbook, 1886-1914.
Scrapbook, 1895-1899.

Box 41
Photographs: Instruments; Altazimuth-Dividing Engine.
Photographs: Instruments; Domes, by institution, ABC.
Photographs: Instruments; Photographic Doublet – Position Finder.
Photographs: Instruments; Radar Antennas, 1943-1945, (Sales Order #798367-J; 9718B-Z; 9759A-FF).
Photographs: Instruments; Radar Antennas
Photographs: Instruments; Range Finder – Spectrometer
Photographs: Instruments; Telescopes and Observatories; by size: 2”-15”.
Photographs: Instruments; Telescopes and Observatories, by size: 181/2”-24”.

Box 42
Photographs: Instruments; Telescopes and Observatories, by size: 26”, University of California – 40” University of Chicago.
Photographs: Instruments; Telescopes and Observatories, by size: 60” Reflective, Argentina.
Photographs: Instruments; Telescopes and Observatories, by size: 60” Mt. Wilson Solar Observatory.
Photographs: Instruments; Telescopes and Observatories, by size: 69"
Ohio Wesleyan University.

Photographs: Instruments; Telescopes and Observatories, by size: 72"
Reflecting – Canada.

Photographs: Instruments; Telescopes and Observatories, by size: 82"
University of Texas. (2)

Box 43

Photographs: Instruments; Telescopes and Observatories, by size: 82"
University of Texas. (2)

Photographs: Instruments; Telescopes and Observatories, by size: 200"
Reflecting, model.

Photographs: Instruments; Telescopes, Field – Miscellaneous.
Photographs: Instruments; A Few Astronomical Instruments. (3)

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Photograph Book: #1, pictures #1A-190A.
Photograph Book: #2.
Photograph Book: #3, pictures #400-1584.
Photograph Book: #4, pictures #1585-1866.
Photograph Book: #5.

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Photograph Book: #6, 72" Reflecting Telescope, Canada-Dominion Astrophysical Observatory.
Photograph Book: #7, pictures #1867-3537.
Photograph Book: #8, 60" Reflecting Telescope, Argentina, Observatorio Nacional de Cordoba.
Photograph Book: #9, 60" Reflecting Telescope, Argentina, Observatorio Nacional De Cordoba.
Photograph Book: #10, pictures #3538-6597.

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Photographs: pictures #5126-5131.
Photograph Book: #12, 60" Reflecting, Ohio Wesleyan University.
Photograph Book: #13, Ohio Wesleyan University.
Photograph Book: #14.
Photograph Book: #15, University of Texas.
Photograph Book: #17, University of Texas.

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Photograph Book: #18, University of Texas.
Photograph Book: #19, University of Texas.
Photograph Book: University of Texas. (2)
Photograph Book: #21, University of Minnesota, University of California, CSAS, Brooklyn College.

*List of Photographs in books, by number of the negative.
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Photographs: University of Chicago.
Photographs: Scrapbook. (2)
Warner & Swasey Company – Article File

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Articles 1A-1B. (see attached author index, Appendix D; and title/subject list, Appendix E).
    Articles: 1C-2A.
    Articles: 3.
    Articles: 5-21.
    Articles: 22-43.
    Articles: 44-61.
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Box 4
Articles: 265-279.
    Articles: 280-289.
    Articles: 290-304.
    Articles: 305-330.
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Articles: 365-379.
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    Articles: 420-431.

Box 6
Articles: 432-441.
    Articles: 442-447.
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    Articles: 461-466.
Articles: 467–477.
Articles: 478–485.

Box 7

Articles: 503–507.
Glass Slides
Glass Slides & Negatives
Glass Slide Index

Flat Box 1: Ledger, 10/80–12/31/87 (1st Ledger of Company).
2: Company Newspaper, 1/46–7/61 (not complete).
   Work Indenture: F.E. Bender, 4/3/1882; Joseph Leatham, 7/13/1880;
   Charles F. Gross, 7/28/1890. (copy)
   Diploma – apprenticeship to the machinist trade – Charles F. Gross,
   9/25/1895. (copy)
3: Scrapbook.
4: Scrapbook.
   Scientific American, 3/17/1888, University of California.
   Scientific American, 12/20/1909, University of Chicago.
5: Scrapbooks. (2)

Oversize Photographs – Warner and Swasey. (2)
Photographs – Ambrose Swasey. (9)
Photographs – Warner & Swasey Plant.
Scrapbook.
Department of State Certificate – AS, Delegate for U.S. to International
   Congress on Commercial Instruction at Vienna 9/12–16/10.
Poster for 40th Anniversary Celebration.
Diagram of Taper Spindles used by Pratt & Whitney, drawn by AS
Poster – “Hudson Entertainment Lecture Course presented by Hudson
   Men’s Club… benefit of High School Library… Mr. W.R. Warner
   November 19 (1908) lecture on Egypt & Pyramids.”
Hartford Courant 10/5/30 Pratt & Whitney Spread, (W and S pictured).
Cleveland Plain Dealer – Art Gravure Section 7/4/1939 AS Spread.
AS – birthday greeting from friends at Pratt & Whitney 1936.
Appendix A
Index of Correspondents of Worcester R. Warner (WRW); and Ambrose Swasey (AS).

| AS   | Bacon, Henry  |
| WRW  | Baker, Elbert A. |
| AS, WRW | Baker, Newton D. |
| WRW  | Baker, Motor Vehicle Co. |
| AS   | Barnard, E.E. |
| WRW  | Belt Line |
| AS, WRW | Brashear, John A. |
| WRW  | Brayton, George B. |
| WRW  | Burlingame, Wm. |
| WRW  | Burton, Senator Theodore E. |
| WRW  | Carter, Mrs. Robert |
| AS   | Case, Eckstein (see Case School of Applied Science) |
| AS   | Case School of Applied Science |
| AS   | Chappell, Joe Mitchell |
| WRW  | Chisholm – Phillips Automobluim Co. |
| AS   | Cleveland Police Department |
| WRW  | Cobb, John N. |
| WRW  | Coolidge, Calvin |
| AS   | Crane, Charles R. |
| AS   | Crane, R.T., Jr. |
| AS   | Cumming, Hugh S. |
| AS   | Cushing, Harvey |
| AS   | Cutler, James G. |
| AS   | Denison University |
| AS   | Dickens, Edith P. |
| WRW  | Duke, George L. |
| WRW  | Elliot, Henry W. |
| WRW  | Euclid Ave. Property Owners, Committee of |
| WRW  | Floyd, R.G. |
| AS   | French, Daniel Chester |
| WRW  | Garfield, James R. |
| WRW  | Giering, Robert Xavier |
| WRW  | Gobeille, J. Leon |
| AS   | Goethals, George W. |
| AS   | Grassle, W.W. |
| AS   | Griebly, AW |
| AS   | Hammond, John Hays |
| WRW  | Herrick, Myron |
| AS   | Hoover, Herbert |
| AS   | Howe, Charles H. (see Case School of Applied Science) |
Hughes, Charles Evans
Hunt, Charles Wallace
Johnson, Tom L.
Kelly, S.J.
Kline, H.M.
Leland, Henry M.
Lincoln, Robert
National Daylight Association of Cincinnati
Newcomb, Simon
Nichols, C.A.
Ohio – Secretary of State – Automobile Dept.
Panama Canal
Pray, Thomas Jr.
Pupin, Michael I.
Quail, Frank (see School of Applied Science)
Rockefeller, John D.
Rockefeller, John D., Jr.
Ryder, James F.
Smithsonian Institution
Staffard, O.M.
Struve, Otto
Thmy, E.S.
Trouvelot, George H.E.
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<td>Chandler &amp; Company</td>
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<td>Davis, Robert</td>
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<td>Elson</td>
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Engineering: an illustrated weekly journal

Riley

Ewell

Ritchey

Fauth & Company

Roberts

Rockwell

Rocky Mountain Mining Review

Rogersen

Shankland (CWRU professor of physics)

Smith

Smithsonian Institution

Stendicke

Tatlock

Thurston and Kuris

Tydeman

United States Air Force

United States Army

United States Coast & Geodetic Survey Office

United States District Judge

United States Government: panoramic sights

West

White

Woodside

Yerkes

Young
Appendix C

Instruments: Telescopes and Observatories
(W & S Company, Box 5-11)

Alabama Polytechnic Institute
Albion College
Alegheny Observatory
Amherst College Observatory – Lawrence Observatory
Balwin – Wallace College
Beloit College
Brigham Young
Brooklyn College
Buchtel College
Buchnell University
Burr & Burton Seminary
Butler University
California Institute of Technology
Carleton College
Case Institute of Technology (Case School of Applied Science) (CWRU) – (W&S Observatory)
Central Manual Training School (Box 20)
Chabot Observatory (see Oakland School System)
Chamberlain Observatory
Cincinnati Observatory
College of Puget Sound
Columbia College
Cornell University
Davidson Observatory
Dearborn Observatory
Denison University – (Swasey Observatory)
DePauw University – (McKim Observatory)
Doane College
Dudley Observatory
BUC Durfee High School
Fisk University
Flint Junior College
Gallandet College
Hartford Public Schools
Harvard College
Haverford College
Hiram College
Houston High School
Indiana University
State University of Iowa
Johns Hopkins University
Lafayette College
Lake Erie Seminary
Lehigh University
Leland Stanford Junior University
Lowell Observatory
Miami University
Millsaps College
Mississippi State College
Montana State University
Mount Wilson Solar Observatory
National Astronomical Observatory
New River State College
New Windsor Observatory
Northwestern University
Oakland Public Schools – (Chabot Observatory)
Ohio State University
Ohio Wesleyan University – (Perkins Observatory)
State University of Oregon
Packer Collegiate Institute
Pan American College
Park College
Pennsylvania State College
Princeton University
Racine College
Red House Observatory
Rose Polytechnic Institute
St. Horus University
St. Mary's School
San Diego State College
Shefield Scientific School (see Yale College)
Smith Observatory
Smith College Observatory
Swarthmore College – (Sproul Observatory)
Trinity College
United States Naval Observatory
University of Alabama
University of Arizona
University of California (Berkley)
University of California – Lick Observatory
University of Chicago – Yerkes Observatory
University of City of Toledo
University of Illinois
University of Kansas
University of Michigan
University of Minnesota
University of North Carolina
University of Notre Dame
University of Oregon
University of Pennsylvania — (Flower & Cook Observatory)
University of Texas — (McDonald Observatory)
University of Toledo — (Ritter Observatory)
University of Virginia — (Leander McCormick Observatory)
University of Wisconsin — (Washburn Observatory)
Vanderbilt University
Vassar College
Virginia Polytechnic Institute
Warner Observatory
Washington University
Wellesley College — (Whitin Observatory)
Williams College
Yale University (Yale College; Sheffield Scientific School of Yale College)
Yankton College
Argentina — (Observatorio Nacional de Cordoba)
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Appendix E

Title/Subject List by File

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A-1a "The Mechanics of the Telescope", paper before the American Association for the Advancement of Science, by E.P. BURRELL, Director of Engineering, December 1930; article in Mechanical Engineering, April vol. 53, no. 4.

1b "Telescopes "61" Reflector for Argentine National Observatory, Cordova, Argentine, By WARNER SEELY, 1922, never released for publication.

1c "A New Sixty-inch Telescope for Perkins Observatory, Ohio Wesleyan University", for Mechanical Engineering, 1924; correspondence between WARNER SEELY and The American Society of Mechanical Engineers relating to article.

1d Article on Development of Turret Lathes, July 15, 1929, author unknown, for American Machinist.

1e "Mechanical Development in Cleveland since 1880", author unknown, 1930.

2 "Tooling Micarta on Turret Lathes" (2 approaches) authors unknown, 1935, mentions both Warner and Swasey Co. and the Cloyes Gear Works.


3 "The 62' Dome of McDonald Observatory" by E.N. JENNISON, prepared for Mechanical Engineering 1935; outline, paper correspondence between WARNER SEELY and The American Society of Mechanical Engineers relating to article and blueprints.

4 "Turret Lathe Aprons Made Without Jigs” by G.L. KLUTER, as “Turret Lathe Aprons Machined Without Use of Jigs” for Iron Age, April 25, 1935; and Photographs.


6 Selecting the Right Machine for the Right Job (empty).

10 "Turret lathes on Unusual Materials" by J.R. LONGSTREET, American Machinist, April 10, 1935.

11 "Is Written Off Machinery an Asset or a Liability?” by L.D. MCDONALD, Assistant Treasurer, Machinery, July 1935, reprint.

13 "Accuracy from the Ground Up – correspondence between WARNER SEELY and American Machinist, 1935, diagram.
14 "Production of High Grade Castings for Machine Tools" by D.M. GURNEY, Metallurgist, for Steel, September 9, 1935, reprint; "Alloys Used in Machine Tools" by D.M. GURNEY, Metal Progress, January 1932.
15 "How New Machines Saved Us Money” by L.M. MERRILL, American Gas Accumulator Co., sent to Machinery, October 9, 1934.
16 “How Much of Our Codes Shall We Keep” by PHILIP E. BLISS, President, nd.
17 “Obsolescence Versus Earnings” by P.E. BLISS, President, nd.
18 “McDonald Telescope and Observatory – “The McDonald Telescope and Observatory” by AMBROSE SWASEY, 1934, (not published); “A New ‘Eye’ for Astronomers” by W. SEELY, Cleveland Trust Magazine, January and February 1936, vol 17, no. 1 and 2.

22 Problems of a Machine Tool Demonstrator – memo to WILLIAM SCOTT from WARNER SEELY.

26 “Profits from Depression Purchases” by J.M. SPENCER, Vice President and General Manager of Hobart Manufacturing Co., American Machinist, February 13, 1935, reprint; memo of W. SEELY regarding article.
28 “Accurate Collets for Turret Lathes” by WILLIAM PELICH, correspondence of W. SEELY relating to article.
31 “Broader Adaptability Features of New Machine Tool Models’ by C.J. STILWELL, Vice President, for Automotive Industries, nd.; “Address of the President” by C.J. STILWELL, Vice President, before convention of the National Machine Tool Builders’ Association, May 22, 1935.
33 Minor Design Refinements – “Improvements of Minor Details is Major Factor in Machine Tool Developments” by G. HUBBARD, consulting engineer, for American Machinist, 1936.

“Cutting Speed Pre-selector” author unknown, n.d.


Training Skilled Men, Learners, Special Learners, Apprentices, - article by W. SEELY, 1936.


Turret Lathes used as Jig Borers – correspondence of L.R. HAWKINS and W. SEELY, 1936; blueprints.

McDonald Telescope – article for *Wellman Magazine*, 1936.


Redesigning the Turret Lathes for Cemented Carbide Tools (empty).


“Welded Vs. Cast Iron Jigs” by L.R. HAWKINS, Manager, West Coast Branch, for *Western Machinery and Steel World*, nd.

High Test Alloy Cast Iron for Machine Tools – correspondence relating to article by F.J. DOST.


“Current Trends in Europe” by C.J. STILWELL, Vice President, *Export Trade and Shipper*; correspondence relating to article.

“Keeping Costs Down In 1937” by E.S. STILWELL, Vice President and Sales Sales Manager, 1936.

“Labor Supply and Apprenticeship” by W. SEELY, Secretary, speech before the Labor Relations Group, National Industrial Council, December 7, 1936.

“The Export Outlook for Machine Tools” by C.J. STILWELL, Vice President, for American Machinist, 1936.

“Modern Lighting – Worker Efficiency” by W. SEELY, Secretary, several Industrial Magazines, June 1937; “Good Lighting Betters Worker Efficiency” By W. SEELY, Secretary, nd.

“When is a Machine too Old?” by M.E. LANGE, Engineer, nd.; notes for address “When is a Machine too Old?” before Management Group of the Chamber of Commerce of Rochester, New York., December 7, 1936.

“When is a Machine too Old?” by C.S. STILWELL, Vice President, La Machine Moderne, Paris, January 1, 1937.


“Learner” Training System Produces Machine Operatives in Sixty Days – correspondence regarding interview of C.J. STILWELL, Vice President and E.C. KREUTZBERG, Development Manager of Steel, 1937.

“Building Accuracy into Turret Lathes”, author unknown, Machinery, July, 1937.

Better Appearance Inspires Better Machine Production, article by G.B. CARSO, nd.; photograph.

Self-Aligining Coupling, article for Warner & Swasey Co., for several industrial magazines, 1937, blueprints.


Depreciation Reserves, - “Depreciation Reserve Policies”, author unknown, nd.

“A Special Equipment Features Materials Handling in Machine Tool Plant”, author unknown, Steel, March 1937; correspondence between W. SEELY, Secretary, and Steel, relating to article.

Nathan Manufacturing Co. – article for American Machinist, nd.; blueprint.

“New Attachment Revolutionizes Turret Lathe Operation” (pre-selector) by M.E. LANGE, Engineer, nd.

Apprentice Article – correspondence between W. SEELY, Secretary, and Western Machinery and Steel World, relating to apprentice article, 1937.

Article for Advertising and Selling – outline for article for Advertising and Selling, 1937.


Coordinating Sales with Production – Letter relating to C.S. STILWELL’s article for Steel “Are Sales Managers Getting What They Need in Product and Production?”, 1937.

“Design to Fit Operator” by W. SEELY, Secretary, Machine Design, November 1937.
"Wanted - Trained Men" by W. SEELY, Secretary, for several industrial Magazines, February 1937.

"Training Learners for Production Operations" by W. SEELY, Secretary, Machinery, December 1937; "Putting Learners into Production" by W. SEELY, Secretary, nd.

"Industry Needs Skilled Help" - correspondence regarding article.

Survey of Employment – April and May 1937.

"Centralized Tool room Eliminates Tool Crib Troubles" by FRED L. PRENTIS, Editor of Iron Age, September 9, 1937.

"Fitting Men for Industry" by C.J. STILWELL, Vice President, Executive Services Bulletin, March 1938, vol. xvi, no.3.

"Large Chips – letters relating to production of big chips, 1937.


"Machining Turret Lathe Beds" by GEORGE L. KLUTER, Production Engineer, American Machinist, 1938.

"Sight Saving Light is Installed as Essential Part of Lathe Manufacture" by S.W. WATKINS, Electrical Engineer, Electrical Production, December 1937.

Machine Shop Lighting – letter from Iron Age regarding article.

Power Distribution – correspondence relating to article.

Decentralization – correspondence relating to article.

The Place of Advertising in the Machine Tool Industry – correspondence relating to article.


W&S Advertising Campaign, 1937 – letter relating to.

"To Buy or Not to Buy” by C.S. STILWELL, Vice President and Sales Manager, Steel, January 31, 1938, reprint.

Machining and Finishing Jigs and Tools – letter relating to proposed article.

"Leading – on Attachment for Hexagon Turret Announced by Warner & Swasey”, for various industrial magazines, March 1938.

"New Tools Increase Turret Lathe Productivity” by W.K. BAILEY, Manager Tool Division, nd.; memo and questionnaire on publicity and sales.

"New Tools Make Carbide Cutters Available to Small Shops” by JAMES P. LONGSTREET, Development Engineer; letters regarding article in Machinery, 1938.

"Calculator Short-Cuts Figuring of New Equipment Savings” author unknown, nd.


“Planning and Employees’ Hobby Show” by JOHN C. KLINE, Supervisor of Purchases, *Factory Management and Maintenance*, nd.


Wanted – Steady Work – correspondence relating to proposed article for *Steel*, December 1938.

“The Place of the Turret Lathe in the Tool Room” by C.S. STILWELL, Vice President, April 28, 1938.


“Getting More From Your Turning Equipment” by W.C. DeGRAFF, nd.

“Making Better Machine Tool Catings” by F.J. DOST, Superintendent, Sterling Foundry Co., *Mechanical Engineering*, May 19, 1940; Correspondence relating to article.


“Carbides Work on Small Lots” by W.J. BURGER, Works Manager, nd.; correspondence relating to article.

“What of the Future?” by C.S. STILWELL, Executive Vice President, nd.

“Standard Tool are Breaking Production Bottlenecks” by W.J. BURGER, Works Manager, *Machinery*, February 1940; letters relating to article.


“Manufacturing and National Defense” by C.J. STILWELL, President,
address before the American Society of Mechanical Engineers, April 25, 1940; letters relating to address.

A-130 "Typical Bar Stock Set-ups" by J.R. LONGSTREET and W.K. BAILEY, American Machinist, May 1, 1940.

131 "Equipment for Chucking" by J.R. LONGSTREET and W.K. BAILEY, American Machinist, May 1, 1940.

132 "Adapting Training Courses to Meet the Present Special Needs" by L.D. McDONALD, Vice President, address before the Personnel Conference of the American Management Assoc., February 16, 1940; letters relating to address.

133 "Vocational Education as the Business Man Sees It" by W. SEELY, Secretary, The Ohio Vocational Association News, June 1940, vol. iv, no. 3; correspondence relating to article.

134 "Let’s Nurture the Machine – and Reduce Technological Unemployment!" by C.J. STILWELL, President, Iron Age, June 20, 1940; letters relating to article.

135 "Training People to be Skilled Workers" by W. SEELY, Secretary. Address before the Sectional Meeting of the Silver Bay Industrial Conference, July 25, 1940; correspondence relating to Conference.

136 "How to Control and Plan Production" by G.V. BLACK, Production Manager, Iron Age, July 11, 1940; letters relating to article.

137 "A Coordinated Training Program that has Produced Results" – correspondence relating to article, 1940.

138 "Increasing Productive Capacity through Trained Personnel" by C.S. STILWELL, Executive Vice President, Executive Service Bulletin, August 1940, vol. xviii, no. 8.

139 "How Big a Job is National Defense?" By C.J. STILWELL, President, Iron Age, October 24, 1940.

140 "Selling the Man in the Plane" by HARRY W. FORTEY, Director of Advertising, Paper Progress, October 1940.

141 "Industrial Requirements in Tool Engineering Education" by C.S. STILWELL, Executive Vice President, Address before the American Society of Tool Engineers, March 8, 1940.

142 "The Problem of the Supply of Labor" by C.S. STILWELL, Executive Vice President, address before the National Association of Manufacturers, December 12, 1940; correspondence relating to conference.

143 "We Show Customers’ Operators How” by C.S. STILWELL, Executive Vice President, Factory Management and Maintenance, January 1941, vol. 99, no. 1; Blue Chips, magazine of Warner and Swasey Co., vol. 4, nos. 7-10.

144 "This War for America is Being Fought at the Lathe” by C.S. STILWELL, Executive Vice President, The Clevelander, January 1941.

145 "The Warner & Swasey Learner Training Program” by RAY J. BLYTH, Personnel Director, Address before the American Management
Association, Production Conference, November 13, 1940.

“Man Hour Output is Increased Without Fatigue to Operator” by C.S. STILWELL, President, Steel, January 6, 1941.

“Can’t Use Carbides?” by W.J. BURGER, Director of Engineering, American Machinist, March 19, 1941.

“Light and Defense Production” by SIDNEY W. WATKINS, Electrical Engineer, Electrical Production, April 1941.

“Defense Is a Race Against Time” by C.J. STILWELL, President, The Cleveland Trust Magazine, March-April, 1941, vol. 22, nos. 3-4 letters relating to article.


“Producing Skilled Workers by Short Term Training” by W. SEELY, Secretary, various Chamber of Commerce magazines, 1941.

“Make Machine Tools Work Harder!” by C.J. STILWELL, President, The Cleveland, June 1941; letters relating to article.

“Short-Term Training at Warner & Swasey,” by RAY J. BLYTH, Personnel Director, Iron Age, July 10, 1941.

“All-Welded Telescope Aluminizing Cell” by THOMAS C. WRIGHT, Designer, The Welding Engineer, August 1941.

“ Plenty to Advertise” by W.K. BAILEY, Sales Manager, Address before the Direct Mail Advertising Association, October 8, 1941.

“Lubrication Keeps Production Rolling” by NELS SWENSON, General Superintendent, American Machinist, November 12, 1941.

“Labor Relations Today” by C.J. STILWELL, President, Address before the Labor Relations Forum of the Ohio Chamber of Commerce, November, 1941.


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