

Claude Elwood Shannon Papers

A Finding Aid to the Collection in the Library of Congress



**LIBRARY OF
CONGRESS**

**Manuscript Division, Library of Congress
Washington, D.C.**

2014

Revised 2014 November

Contact information:

<http://hdl.loc.gov/loc.mss/mss.contact>

Additional search options available at:

<http://hdl.loc.gov/loc.mss/eadmss.ms003071>

LC Online Catalog record:

<http://lcn.loc.gov/mm2001084831>

Prepared by Joseph K. Brooks

Collection Summary

Title: Claude Elwood Shannon Papers

Span Dates: 1932-1995

Bulk Dates: (bulk 1938-1989)

ID No.: MSS84831

Creator: Shannon, Claude Elwood, 1916-2001

Extent: 7,000 items ; 20 containers plus 1 classified and 1 oversize ; 8 linear feet ; 10 digital files (211.9 KB)

Language: Collection material in English

Location: Manuscript Division, Library of Congress, Washington, D.C.

Summary: Mathematician, information theorist, and computer scientist. Correspondence, scientific papers, theorems, topical files, articles, notes, speeches, and miscellaneous material relating to Shannon's professional life.

Selected Search Terms

The following terms have been used to index the description of this collection in the Library's online catalog. They are grouped by name of person or organization, by subject or location, and by occupation and listed alphabetically therein.

People

Andrew, Merle M., 1920-2007--Correspondence.
Ashby, W. Ross (William Ross), 1903-1972--Correspondence.
Berkeley, Edmund Callis--Correspondence.
Biunno, Vincent P.--Correspondence.
Bode, Hendrik W. (Hendrik Wade), 1905-1982--Correspondence.
Brown, Gordon Stanley, 1907-1996--Correspondence.
Campbell, J. W. (John William), 1889-1955--Correspondence.
Casby, James U.--Correspondence.
Dowling, Kevin--Correspondence.
Elias, P. (Peter)--Correspondence.
Flanagan, Dennis, 1919-2005--Correspondence.
Flood, Merrill M. (Merrill Meeks), 1908-1991--Correspondence.
Gabor, Dennis, 1900-1979--Correspondence.
Hubbard, L. Ron (La Fayette Ron), 1911-1986--Correspondence.
Kleene, Stephen Cole, 1909-1994--Correspondence.
Lasker, Edward, 1885-1981--Correspondence.
Levy, David N. L.--Correspondence.
Liversidge, Anthony--Correspondence.
McCarthy, John, 1927-2011--Correspondence.
Moore, Edward F.--Correspondence.
Pierce, John R. (John Robinson), 1910-2002--Correspondence.
Piore, Emanuel Ruben, 1908-2000--Correspondence.
Price, G. Baley (Griffith Baley), 1905-2006--Correspondence.
Sagan, Carl, 1934-1996--Correspondence.
Shannon, Claude Elwood, 1916-2001.
Shneidman, Edwin S.--Correspondence.
Singmaster, David--Correspondence.
Stratton, Julius Adams, 1901-1994--Correspondence.
Uttley, A. M.--Correspondence.
Von Neumann, John, 1903-1957--Correspondence.
Weaver, Warren, 1894-1978--Correspondence.

Organizations

Bell Telephone Laboratories.

Subjects

Computer chess.
Computer games.
Computers.
Games--Data processing.
Information theory.
Telecommunication.

Occupations

Computer scientists.
Information theorists.
Mathematicians.

Administrative Information

Provenance

The papers of Claude Elwood Shannon, mathematician, information theorist, and computer scientist, were given to the Library of Congress by Mary E. Shannon in 2001.

Processing History

The Shannon Papers were processed in 2003. The finding aid was revised in 2011 and again in 2014.

Additional Guides

Some of the writings in this collection are in the hand of Shannon's wife, Mary E. Shannon, to whom Claude Shannon often dictated his work. Samples of their handwriting provided by Mrs. Shannon are available for comparison in the Manuscript Division Reading Room. Consult reference staff for information.

Copyright Status

The status of copyright in the unpublished writings of Claude Elwood Shannon is governed by the Copyright Law of the United States (Title 17, U.S.C.).

Access and Restrictions

The papers of Claude Elwood Shannon are open to research. Researchers are advised to contact the Manuscript Reading Room prior to visiting. Many collections are stored off-site and advance notice is needed to retrieve these items for research use.

Security Classified Documents

Government regulations control the use of security classified items in this collection. Manuscript Division staff can furnish information concerning access to and use of any classified items.

Digital Format

Digital files were received as part of the papers of Claude Elwood Shannon. Reference copies were created from the original digital media. Consult reference staff in the Manuscript Division for more information.

Preferred Citation

Researchers wishing to cite this collection should include the following information: Container or digital ID number, Claude Elwood Shannon Papers, Manuscript Division, Library of Congress, Washington, D.C.

Biographical Note

<i>Date</i>	<i>Event</i>
1916, Apr. 30	Born, Petoskey, Mich.

1936	B.S., University of Michigan, Ann Arbor, Mich.
1940	M.Sc., electrical engineering, and Ph.D., mathematics, Massachusetts Institute of Technology, Cambridge, Mass.
1940-1941	Fellow, Institute for Advanced Study, Princeton, N.J.
1948	Published "A Mathematical Theory of Communication," <i>Bell System Technical Journal</i>
1949	Married Mary E. Moore
1941-1958	Research mathematician, Bell Telephone Laboratories, Murray Hill, N.J.
1958-1978	Donner Professor of Science, Massachusetts Institute of Technology, Cambridge, Mass.
1985	Awarded Kyoto Prize
2001, Feb. 24	Died, Medford, Mass.

Scope and Content Note

The papers of Claude Elwood Shannon (1916-2001) span the years 1932-1995, with the bulk of the material dating from 1938 to 1989. Shannon established the field of information theory with several seminal scientific papers, including "A Mathematical Theory of Communication," published in 1948. He was first to realize that the bit, expressed mathematically with only two symbols, ones and zeros, could serve as the basic unit of any kind of electronically generated information in communications and computer systems. His papers are organized in [Correspondence](#), [Speeches and Writings](#), [Miscellany](#), [Oversize](#), [Digital File](#), and [Classified](#) series. A few documents are in French, German, Russian, or Japanese. Some of the writings in the collection, particularly in the Speeches and Writings series, are in the hand of Shannon's wife, Mary E. Shannon, to whom Claude Shannon often dictated his work.

The [Correspondence](#) series, grouped in general and postcard files, documents the promulgation of ideas based on information theory, not only in mathematics, computer science, electrical engineering and other scientific and technical fields, but in sociology, law, economics, psychology, linguistics, and literature as well. The correspondence also relates to areas in which Shannon's professional and avocational interests converged, such as programming computers and automata to play chess and other games, run mazes, juggle, and solve puzzles. There is also additional material on these topics in the [Miscellany](#) series. Scientific papers attached to general correspondence have been filed in the [Miscellany](#) series. The postcards are related mostly to the distribution of Shannon's scientific papers during 1948-1951.

Correspondents include Merle M. Andrew, William Ross Ashby, Edmund Callis Berkeley, Vincent P. Biunno, Hendrik W. Bode, Gordon Stanley Brown, J. W. Campbell, James U. Casby, Kevin Dowling, Peter Elias, Dennis Flanagan, Merrill M. Flood, Dennis Gabor, L. Ron Hubbard, Stephen Cole Kleene, Edward Lasker, David N. L. Levy, Anthony F. Liversidge, John McCarthy, Edward F. Moore, John R. Pierce, Emanuel Ruben Piore, G. Baley Price, Carl Sagan, Edwin S. Shneidman, David Singmaster, Julius Adams Stratton, A. M. Uttley, John Von Neumann, and Warren Weaver.

Articles and scientific papers among the [Speeches and Writings](#) series, including theorems, are organized in alphabetical and chronological files. Dated articles and scientific papers are arranged chronologically, while the undated material is organized alphabetically by title. Shannon's articles and papers published under the auspices of his employer, Bell Telephone Laboratories, Murray Hill, New Jersey, and meant for general dissemination are part of the [Speeches and Writings](#), but technical memoranda, Shannon's work produced at the company, are part of the Bell Telephone Laboratories file in the [Miscellany](#) series.

Organization of the Papers

The collection is arranged in six series:

- [Correspondence, 1938-1995](#)
- [Speeches and Writings, 1938-1987](#)
- [Miscellany, 1932-1993](#)
- [Oversize, 1949-1953](#)
- [Digital File, 1993](#)
- [Classified, 1940-1943](#)

Description of Series

<i>Container</i>	<i>Series</i>
BOX 1-5	<p><u>Correspondence, 1938-1995</u></p> <p>General correspondence with attached material and postcards between Shannon and colleagues, professional associates, scholars, friends, and the public relating to information theory, mathematics, artificial intelligence, computer technology, and other professional interests.</p> <p>Arranged in files of general correspondence and postcards and thereunder chronologically.</p>
BOX 6-11	<p><u>Speeches and Writings, 1938-1987</u></p> <p>Scientific papers, articles, theorems, speeches, lecture notes, interviews, poems, songs, bibliographies, book reviews, and a television program script.</p> <p>Arranged alphabetically by type of material and alphabetically or chronologically thereunder.</p>
BOX 11-20	<p><u>Miscellany, 1932-1993</u></p> <p>Subject files, notes, drawings, diagrams, graphs, technical memoranda, patents, scientific papers, printed matter, and miscellaneous material.</p> <p>Arranged alphabetically by subject or type of material and chronologically thereunder.</p>
BOX OV 1	<p><u>Oversize, 1949-1953</u></p> <p>Diagrams and drawings.</p> <p>Arranged and described according to the series, containers, and folders from which the items were removed.</p>
DF	<p><u>Digital File, 1993</u></p> <p>Computer game. Text and executable files relating to the computer game <i>Word for Word</i>. The material is <i>Microsoft Word</i> document and application files. The series consists of ten files and 211.9 KB of data.</p>
BOX CL 1	<p><u>Classified, 1940-1943</u></p> <p>Documents containing security information removed from the collection.</p> <p>Arranged and described according to the series and folders from which the items were removed.</p>

Container List

<i>Container</i>	<i>Contents</i>
BOX 1-5	Correspondence, 1938-1995 General correspondence with attached material and postcards between Shannon and colleagues, professional associates, scholars, friends, and the public relating to information theory, mathematics, artificial intelligence, computer technology, and other professional interests. Arranged in files of general correspondence and postcards and thereunder chronologically.
BOX 1	General 1938-1955 <i>See also Container 19, Scientific papers by others, Miscellany</i> (12 folders)
BOX 2	1956-1958 <i>See also Container 19, Scientific papers by others, Miscellany</i> (10 folders)
BOX 3	1959-1979 <i>See also Container 19, Scientific papers by others, Miscellany</i> (9 folders)
BOX 4	1980-1985 (10 folders)
BOX 5	1986-1995, undated (6 folders) Postcards regarding distribution of scientific papers, 1948-1951, undated (2 folders)
BOX 6-11	Speeches and Writings, 1938-1987 Scientific papers, articles, theorems, speeches, lecture notes, interviews, poems, songs, bibliographies, book reviews, and a television program script. Arranged alphabetically by type of material and alphabetically or chronologically thereunder.
BOX 6	Articles and scientific papers Alphabetical file, undated A-L (9 folders)
BOX 7	M-T (10 folders)
BOX 8	U-Z and untitled (3 folders) Chronological file 1938-1946 (7 folders)
BOX 9	1948-1955 (8 folders)
BOX 10	1956-1978 (5 folders) Bibliographies and table of contents, 1956, undated Book reviews, 1956, 1962, undated Poems and songs, circa 1981-circa 1982, undated

Speeches and Writings, 1938-1987

Container

Contents

	Speeches, lectures, and interviews 1947-1984, undated (3 folders)
BOX 11	1985-1987, undated (2 folders) Television program, script, undated
BOX 11-20	Miscellany, 1932-1993 Subject files, notes, drawings, diagrams, graphs, technical memoranda, patents, scientific papers, printed matter, and miscellaneous material. Arranged alphabetically by subject or type of material and chronologically thereunder.
BOX 11	Antique Store of the 21st Century, Brookline, Mass., 1983 American Academy of Achievement, Dallas, Tex., 1966-1967 Artificial intelligence, 1955, 1978, 1984, undated Bell Telephone Laboratories, Murray Hill, N.J. 3-Relay Kit, undated Diagrams and photographs International Morse decoder, number display circuit, perpetual calendar, relay circuit analyzer, 1953, undated <i>See Oversize</i> Miscellany, 1940, 1949-1953, undated <i>See Classified</i> Miscellany, 1943-1956 <i>See also Classified</i> Patents, 1946-1953, undated
BOX 12	Technical memoranda, 1940-1955 (5 folders) Berkeley, Edmund C. Miscellany, 1950-1954, undated Probability and statistical kit, 1960, undated
BOX 13	Bibliographies regarding communication theory and machine self- reproduction, undated Biographical material, circa 1951, 1961-1989, undated Brain, mind, and nervous system, undated Notes Typescripts Cember, Richard P, <i>Word for Word</i> , computer game, 1993 <i>See also Digital File, same heading</i> Codrington Club, Oxford, England, 1980, undated Computer memory, bits storage capacity, 1949 Ephemera, 1948, undated Game playing and puzzle solving machines Chess Articles and scientific papers, 1950-1955, 1989, undated Miscellany, undated Condon, Edward U., Nim playing machine, 1940 Maze running Miscellany, 1956, 1978-1979, undated Theseus, undated Miscellany, 1953-1955, undated
BOX 14	Rubik cube solving machines

Miscellany, 1932-1993

Container

Contents

- Miscellany, 1981-1982, undated
Singmaster, David, 1981-1982
Gaussian channels, undated
Generalized central limit theorem, undated
Harvard University, Cambridge, Mass., Whole Sky Search for Life project, 1982-1984, undated
Harvey Prize, Israel Institute of Technology, Haifa, Israel, 1972, undated
Information and communications quotations, undated
Institute for Advanced Studies, Princeton, N.J., 1940, 1977
Institute of Radio Engineers, Professional Group on Information Theory, 1955
Juggling machines
Articles
By Shannon, undated
By others, 1979-1982, undated
Miscellany, 1980-1984, undated
- BOX 15**
Notes, undated
(4 folders)
Kolota, Gina, "A Math Image Problem," 1986
Lang, Serge, 1988
Machine handwriting recognition, undated
Massachusetts Institute of Technology, Cambridge, Mass.
Mechanical hands, 1958-1960, undated
Miscellany, 1950-1965, 1972-1973, 1979, 1985, undated
Musical instruments, pitch meters, and metronomes, undated
- BOX 16**
Notes
Diagrams, drawings, and tables, 1949-1951, undated
(5 folders)
See also Oversize
Miscellany
1957, undated
(4 folders)
- BOX 17**
(7 folders)
- BOX 18**
(7 folders)
- BOX 19**
Notebooks and forms, undated
Photographs of Shannon, undated
Research proposals, 1957, undated
Scientific papers by others
Automata studies project, 1955, undated
Miscellany, 1932, 1939-1942, 1952-1960, 1981, undated *See also Containers 1-3, General*
(5 folders)
Siforov, Vladimir L., 1966
- BOX 20**
Statistical English, codes, and translating machines, 1948-1949, undated
Statue of Albert Einstein, Washington, D.C., 1978-1979, undated
Symposia and meetings
Miscellany, 1950, 1958, 1965, 1972, 1985, undated
"Skeleton Key to the Information Seminar--Notes," undated
(3 folders)

Miscellany, 1932-1993

Container

Contents

THROBAC (Thrifty Roman Numeral Backward Looking Computer), 1953
Unicycles and related problems, undated
Unsolved mathematical problems, undated

BOX OV 1

Oversize, 1949-1953

Diagrams and drawings.
Arranged and described according to the series, containers, and folders from which the items were removed.

BOX OV 1

Bell Telephone Laboratories, Murray Hill, N.J.
Diagrams and photographs
International Morse decoder, number display circuit, perpetual calendar, and relay circuit analyzer, 1953, undated (Container 11)
Notes
Diagrams, drawings, and tables, 1949-1951, undated ([Container 16](#))

DF

Digital File, 1993

Computer game. Text and executable files relating to the computer game *Word for Word*. The material is *Microsoft Word* document and application files. The series consists of ten files and 211.9 KB of data.

Cember, Richard P., *Word for Word*, computer game, 1993 [See also Box 13, same heading](#)
Digital ID: mss84831_62_1

BOX CL 1

Classified, 1940-1943

Documents containing security information removed from the collection.
Arranged and described according to the series and folders from which the items were removed.

BOX CL 1

Bell Telephone Laboratories, Murray Hill, N.J.
Diagrams and photographs
Miscellany, undated (Container 11)
Miscellany
Analogue for the Vernam System for Continuous Time Series, Case 20878, 1943, May 10 ([Container 11](#))
Pulse Code Modulation, Case 20878, Dec. 1, 1943 ([Container 11](#))
Washington, J.S.M., cable to War Cabinet Offices, London, England, 1943, Feb. 20 ([Container 11](#))