

Guide to the Philip McCord Morse Papers, 1927-1980

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Finding aid prepared by Mary Jane McCavitt

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Summary Information

Repository	Massachusetts Institute of Technology. Institute Archives and Special Collections
Creator	Morse, Philip McCord, 1903-1985
Title	Philip McCord Morse papers
Date [inclusive]	1927-1980
Extent	29.0 cubic feet in 29 record cartons
Language	English
Abstract	<p>This collection documents the career of Philip Morse. Morse served on the faculty of the Massachusetts Institute of Technology from 1931 to 1969 and was a leader in the field of operations research. The papers consist of biographical information; correspondence; notes; committee minutes; course material; reports; trip diaries; manuscripts; research data and graphs; and reprints and other printed material. The collection also includes a series of administrative records of the Massachusetts Institute of Technology documenting committee and policy work Morse participated in.</p>

Citation

Philip Morse papers, MC 75, box X. Massachusetts Institute of Technology, Institute Archives and Special Collections, Cambridge, Massachusetts

Biography

Philip McCord Morse was born August 6, 1903, in Shreveport, Louisiana. His parents, Allen Crafts Morse, a telephone engineer, and Edith McCord Morse, soon moved to Cleveland where he grew up. In 1921 Philip Morse started attending Case Institute, but he took the following year off to work in the Radioelectric Shop that he owned with friends. Upon his return to Case he began studying physics with Professor Dayton C. Miller and received his B.S. degree in 1926. That fall Morse went to Princeton University with the help of a scholarship. There, his gas discharge research with Karl Taylor Compton formed the basis for his thesis, "A Theory of the Electric Discharge through Gases." He spent the summer of 1928 at the University of Michigan as a research associate for an industrial research project on electric gas discharge.

In his final year at Princeton Philip Morse received the Porter Ogden Jacobus Fellowship, which is given to the graduate student with the highest standing. During this year he worked with Edward U. Condon to produce the book *Quantum Mechanics*. In April of 1929 he married Annabelle Hopkins and received his Ph.D. in physics two months later. That summer he worked for Bell Laboratories under the guidance of C. J. Davisson.

Philip Morse was an instructor at Princeton for the 1929 academic year, and the following summer he returned to the University of Michigan, this time as a special lecturer in quantum mechanics. He spent the next year on a Rockefeller Fellowship studying with Arnold Sommerfeld in Munich, Germany, and with N. F. Mott and W. S. Massey in Cambridge, England.

At the behest of the new president of the Massachusetts Institute of Technology (MIT), Karl T. Compton, Philip Morse joined the physics department as an associate professor in 1931. His research concentrated on acoustics and on astrophysics. His work on the theory of sound absorption resulted in his 1936 book, *Vibration and Sound*.

Contacts with colleagues at the Harvard Observatory led to the formulation of calculations on the opacities of stellar interiors. Arnold Lowan's WPA work at Columbia on the construction of mathematical tables also interested Morse. He participated in the various mathematical tables projects carried on by the National Bureau of Standards and other federal programs throughout his career. Beginning in 1933, Morse became the graduate registration officer for the physics department, and he continued in this guidance role until 1965 whenever he was at MIT. He was promoted to associate professor in 1934 and professor in 1938.

In response to the growing threat of war, scientists began to change the focus of their research, and Philip Morse was no exception. His association with the Radiation Laboratory housed on the MIT campus started in 1941. There, he identified the similarities of certain ideas used in acoustics to microwaves. At Harvard he served as chairman of a National Research Council project that studied ways to reduce the noise and vibrations made by fighter and bomber planes. During this time he also worked on a National Defense Research Council (NDRC) project for the U.S. Navy, studying methods of countering the new acoustic mines that the Germans were using. In 1942 Morse went to Washington, D.C. to organize and direct a civilian task force to evaluate the United States antisubmarine program. While directly connected

with the Navy, the Anti-Submarine Warfare Operations Research Group (ASWORG) was funded by the NDRC. The group not only evaluated data, but also visited Navy bases to make direct observations. Before disbanding, the group wrote a report about their efforts, *Methods of Operation Research*, which was declassified and widely used after 1950. For his war work Philip Morse received the U.S. Medal of Merit.

In 1945 Morse returned to MIT and helped to establish the Acoustics Laboratory with Richard Bolt and Leo Beranek. Morse's return was shortlived, however. The Associated Universities Inc. wanted to start a civilian nuclear research laboratory in connection with the Atomic Energy Commission. In July 1946 he became the scientific director of the Brookhaven National Laboratory. At this time he was also an active member in the Emergency Committee of Atomic Scientists (the Einstein committee) which sought to educate the public about atomic power.

By 1948 Brookhaven was a firmly established facility and Philip Morse returned briefly to MIT. His assistance was again sought for public service. He went to Washington to organize an operations research team for the Secretary of Defense and the Joint Chiefs of Staff. The result was the Weapons Systems Evaluation Group (WSEG), and he served as deputy director and director of research until 1950. The WSEG's civilian unit became the Institute for Defense Analyses (IDA) in 1956, and he served on their Board of Trustees. A similar group, RAND, was established to advise the Air Force in 1948, and he was on their Board of Trustees until 1962.

Finally, in 1950 Philip Morse returned to MIT for a longer stay, although his public service activities never ceased. His interest in the new discipline of operations research continued at MIT. He was instrumental in promoting wide acceptance of operations research for non-military uses. By 1952 the Institute offered summer courses in operations research and the Operations Research Center became an official interdepartmental facility in 1956. Morse served as director from 1956 until 1969.

Philip Morse initiated another interdisciplinary program at MIT in an effort to introduce students and professors to the uses of computers in research. The Committee on Machine Methods of Computation began in 1952 with him as chairman. This committee supervised research assistantships that were given to graduate students using computers. In 1955 Morse convinced IBM to fund a computer installed in a building that was partially paid for by IBM. Part of the agreement allowed other New England schools to use the facility. This arrangement eventually became the New England Regional Computing Program (NERComp). By 1957, the Computation Center was dedicated at MIT with Philip Morse as director, a position he held until 1967. The Center received funds from NSF and the Rockefeller Foundation to supplement its costs. After several expansions, timesharing was introduced in the 1960s.

Philip Morse remained active outside of MIT as well. He helped to organize the first International Operations Research Conference in 1957. The International Federation of Operations Research Societies originated at this conference. International interest in operations research led to a 1959 NATO conference where the Advisory Panel on Operations Research (APOR) began with Morse as chairman. The panel, in association with the United States Advisory Group for Aeronautical Research and Development, started training programs, organized conferences, and sponsored visiting consultants to NATO countries. Another APOR was started by Morse in 1964 for the Organization for Educational and Cultural Development. This panel emphasized that operations research could be used for many problems that were not military or industrial. Other international operations research projects that Morse was associated with include lecture tours in Japan, India, Israel, and Taiwan sponsored by the Ford Foundation and in

Australia sponsored by the Fulbright Foundation, as well as a fact-finding trip to Nigeria and Tunisia that was associated with the International Relations Committee of the National Academy of Sciences.

Philip Morse's endeavors helped to prove the myriad applications of operations research. His study of the MIT Libraries was one of the first of its kind. Other studies helped him to develop some of his queuing theories.

Philip Morse became an emeritus professor at MIT in 1969. He died in 1985.

Appointments, Positions, Awards, Committees

1923-24	Salesman, Radioelectric Shop, Cleveland
1924-25	Commercial
May 1924	Recipient, Reid Prize in Physics, Case Institute
May 1925	Inducted Tau Beta Pi, Case Chapter
May 1926	Inducted Sigma Xi, Case Chapter
June 1926	Bachelor of Science, Case Institute
1926-28	Class of 1883 Fellow, Princeton University
Jan. 1927	Member, American Physical Society
June 1927	Master of Arts, Princeton University
June-Sept. 1928	Research Assistant, University of Michigan
1928-29	Porter Ogden Jacobus Fellow, Princeton University
June 1929	Doctor of Philosophy, Princeton University
June-Sept. 1929	Research Physicist, Bell Telephone Laboratories
1929-30	Instructor in Physics, Princeton University
June-Sept. 1930	Lecturer at Summer Program, University of Michigan
Oct. 1930 - April 1931	Rockefeller International Fellow, University of Munich
April-Aug. 1931	Rockefeller International Fellow, Cambridge, England
1931-34	Assistant Professor of Physics, M.I.T.
1932-36	Secretary-Treasurer, New England Section, American Physical Society
1933-39	Member, Acoustical Society of America
1933-41	Graduate Registration Officer, Dept. of Physics, M.I.T.

May 1934	Elected Fellow, American Academy of Arts and Sciences
1934-39	Associate Professor of Physics, M.I.T.
April 1936	Elected Fellow, American Physical Society
Feb. 1937	Elected Fellow, Physical Society of London
1939-69	Professor of Physics, M.I.T.
May 1939	Elected Fellow, Acoustical Society of America
1940-42	Member, Board of Editors, American Physical Society
March 1940	Doctor of Science (Hon.), Case Institute
1940-41	Chairman, New England Section, American Physical Society
1940-46	Consultant, Radiation Laboratory, M.I.T.
1940-44	Chairman, NRC Committee on Sound Control
1940-42	Director, Navy-M.I.T. Underwater Sound Project DIC5985
1941-49	Associate Member, New York Academy of Sciences
1942-46	Member, NDRC, Section 6 Board (Undersea Warfare)
1942-46	Director, U.S. Navy Operations Research Group
Feb. 1945	Elected Member, Cosmos Club of Washington
Dec. 1945	Distinguished Service Award, U.S. Navy Bureau of Ordnance
Sept. 1946 - Sept. 1948	Director, Brookhaven National Laboratory
1946-48	Vice President, Acoustical Society of America
1946-48	Member, Naval Research Advisory Committee
1946-48	Member, NRC Undersea Warfare Committee
1946-49	Member, NRC Committee on Program for Nuclear Sciences
1946-50	Technology Review
Dec. 1946	Awarded U.S. Presidential Medal for Merit
1947-50	Member, Council, American Physical Society
Dec. 1947	Josiah Willard Gibbs Lecturer, American Mathematical Society
1948-49	Member, Board of Trustees, RAND Corp.

1948-50	Member, Board of Governors; American Institute of Physics
1948-49	Member, Visiting Committee for Department of Mathematics, Case Institute
Nov. 1948	Lecturer, Armed Forces Staff College, Washington, D.C.
March 1949 - June 1950	Deputy Director and Director of Research, Weapons Systems Evaluation Group
1949-55	Member, Committee on Operations Research, NRC Division of Mathematics and Physical Sciences
1950-65	Graduate Registration Officer, Department of Physics, M.I.T.
1950-52	Consultant, Weapons Systems Evaluation Group
1950-62	Member, Board of Trustees, RAND Corp.
1950-51	President, Acoustical Society of America
1950-51	Consultant, A.D. Little, Inc., on Operations Research
1950-51	Secretary, M.I.T. Chapter, Sigma Xi
1950-52	Committee on Machine Aids to Computation, M.I.T.
1950-53	Lecturer, Naval War College, Newport, R.I.
1951-52	Member, Steering Committee, Acoustics Laboratory, M.I.T.
1951-53	Member, Board of Trustees, Research Society of America (part of Sigma Xi)
1951-58	Member, Ordnance Research Advisory Board (U.S. Army)
1951-52	Member, Founding Committee, Operations Research Society of America
Dec. 1951	Invited Lecturer, AAAS, on O.R. and Physics
March - April 1951	Lecturer, Department of Physics, University of California, Los Angeles
Aug. - Sept. 1951	Consultant, RAND Corp., at Santa Monica
1952-54	Member, Science Library Advisory Committee, M.I.T.
1952-61	Member, Committee on the M.I.T. Centennial
1952-69	Chairman, Operations Research Committee, M.I.T.
1952-55	Member, Libraries Executive Committee, M.I.T.

1952-53	First President, Operations Research Society of America
1952-56	Member, Steering Committee, Operations Evaluation Group (U.S. Navy)
1952-53	Member, Advisory Committee, Ordnance Research Office (U.S. Army)
1952-56	Member, Applied Mathematics Advisory Committee, National Bureau of Standards
1952-53	Member, Reorganization Committee, Operations Research Office (U.S. Army)
Dec. 1952	Lecturer on O.R., Westinghouse Research Laboratories
1953-67	Chairman, Computation Committee, M.I.T.
1953-55	Member, Governing Board, American Institute of Physics
1953-54	Consultant, Corning Glass Co.
1953-54	Member, Bulletin Committee, American Academy of Arts and Sciences
April 1954	Invited Lecturer, Symposium on Applied Mathematics, American Mathematical Society
1954-64	Chairman, NRC Committee on Revision of Mathematical Tables
Dec. 1954	Sigma Xi Lecturer, University of Pennsylvania
1955-63	Member, Advisory Panel on University Computing Facilities of the National Science Foundation (Chairman, 1961-63)
1955-56	Consultant, Philco Corp.
May 1955	Elected Fellow, National Academy of Sciences
1955	Member, ORSA Prize Committee
Feb. 1955	Lecturer, Research Society of America
1956-57	Member, Ad Hoc Committee on NROTC, M.I.T.
1956-69	Chairman, Committee of Institutional Representatives to the M.I.T. Computation Center
1956-62	Member, Long Range Planning Committee, M.I.T.
1956-61	Member, Board of Trustee, Institute for Defense Analyses (IDA)

1956-78	Annals of Physics
1956-60	Member, Physical Science Study Committee, M.I.T.
April 1956	Phi Beta Kappa Lecturer, Duke University (on O.R.)
1956-58	Member, Committee on the Future of the Graduate School (Chairman, 1957-58), M.I.T.
Dec. 1956	Sigma Xi Lecturer, Tufts University (on Computers)
1956-69	Director, Operations Research Center, M.I.T.
Oct. 1956	Alfred P. Sloan Award for Outstanding Performance of M.I.T. Faculty Member
1956-60	Member, Winchester Citizens Advisory Committee to School Commissioner
1957-67	Director, Computation Center, M.I.T.
Sept. 1957	Invited Lecturer, First International Conference on O.R., at Oxford, England
Sept. 1957	Invited Lecturer, First Meeting, French O.R. Society in Paris
1958-60	Chairman of the Faculty, M.I.T.
1958-60	Member, Academic Council (ex-officio), M.I.T.
1958-60	Member, Science Library Committee, M.I.T.
1958-69	Member, Faculty Council, M.I.T.
Feb. 1958	Member, President's Conference on Automobile Traffic (Williamsburg, Virginia)
1958-61	Lecturer, AIP College Visiting Program (St. Olaf College, Carleton College, Hope College Manhattan College)
1959	Member, Goodwin Medal Committee, M.I.T.
1959-68	Journal of Mathematics and Physics
Aug. - Sept. 1959	Lecturer, NATO Symposium on O.R. at TCEA, Brussels; Aachen; Oslo
1960-61	Member, Long Range Computation Study Group, M.I.T.
1960-61	Member, Ad Hoc Committee on Proposed Graduate Center, M.I.T.
1960-68	Member, Board of Directors, Adage, Inc.
1960-64	Chairman, NATO Advisory Panel on Operations Research (APOR)

April 1960	Chairman, Symposium on University Computers, in Chicago (sponsored by National Science Foundation)
1960-64	Science
1961-64	Secretary General, International Federation of O.R. Societies (IFORS)
1961-62	Member, NSF Fellowship Panel for Physics
May 1961	Awarded Silver Certificate, Acoustical Society of America
1961-62	Member, NAS Committee on Natural Resources of U.S. (requested by President Kennedy)
1961-	Member, Board of Trustees, Council on Library Resources
1961-62	Member, Ad Hoc Committee on the Future of the M.I.T. Library
1961	Member, Nominating Committee, American Physical Society
May 1961	Awarded Silver Medal of Acoustical Society of America
Aug. 1961	Director, Visiting Lecture Series on O.R., in Japan (IDA-JUSE sponsored)
Oct. 1961	Visiting Lecturer, Conference on O.R., University of Athens
1962-73	Member, Board of Trustees, Analytic Services Inc. (AnSer)
1962-68	Chairman, OECD Advisory Panel on O.R.
1962-63	Member, Visiting Committee on Mathematics and Physics, Case Institute
March 1962	Distinguished Lecturer, Fulbright Program in Mexico, sponsored by Mexican-American Cultural Society
April 1962	Lecturer, Department of Industrial Engineering and Operations Research, University of California, Berkeley
May 1962	Chairman, Press Conference on Computers and Physics, American Institute of Physics

1962-66	Member, NAS Committee on Computational Needs in Universities
1963-64	Member, Computation Advisory Panel, Honeywell Corp.
July 1963	Organizer, IFORS Conference at Oslo
1964	Member, IDA Review Committee
June 1964	Invited Lecturer, First Meeting, Hellenic O.R. Society, Athens
Aug. 1965	Member, Intrex Planning Conference, M.I.T.
Feb. 1965	Awarded Silver Medal, Operational Research Society (U.K.)
1965-66	Member, Advisory Panel, U.S. Army Development Command
June - July 1965	Director, Visiting O.R. Team to Taiwan, Japan, India (Kanpur-IIT) and Israel
September 1965	Invited Lecturer, NATO Conference on Queuing Theory, Lisbon
October 1965	Chairman, OECD Conference on O.R. in Government, Dublin
1966-69	Member, Faculty Committee on the M.I.T.-Harvard Joint Center for Urban Studies, M.I.T.
1966-	Member, Board of Directors, Control Data Corporation
1966	Consultant, Bolt, Beranek and Newman (BBN) MGH Program
1966-67	Member, Advisory Panel for BBN Program for Advanced Study (PAS)
1966	Member, Panel on Telecommunication Sciences, U.S. Dept. of Commerce
April 1966	Invited Lecturer, Dept. of Industrial Engineering and Operations Research, University of California, Berkeley
September 1966	Chairman, OECD Conference on O.R. in Education, Sandefjord, Norway
December 1966	Chairman, OECD Conference on Urban Planning and Transport, Rome

1967-70	Chairman, Advisory Panel to Technical Analysis Division (TAD), National Bureau of Standards
1967-70) 1967-72	Member, Advisory Committee to the AIP Information Program (Chairman, Subcommittee on System Development of AIP Panel,
1967-70	Member, Scientific Advisory Council, TCU Research Foundation (Texas Christian University)
1967-68	Member, Advisory Panel on Computing to Associated Universities, Inc. (Glennan Panel)
Dec. 1967	Member, OECD Conference on Urban Simulation Models, London
Dec. 4, 1967	U.S. Representative, Royal Society Celebration of 30th Anniversary of O.R., London
1968-70	Consultant, OECD
1968-70	Technical Advisor, Lecturer, BBN Program for Advanced Study
1968-69	Member, Advisory Panel on Regional Medical Programs, U.S. Public Health Service
March 1968	Invited Lecturer, AIAKORSA Conference on Systems Analysis and Social Change
October 1968	Delegate, OECD Conference on Computer Simulation and Urban Planning, Paris
1969-70	Member, NAE Committee on Engineering Education
1969	Chairman, Financial Committee, Union of Concerned Scientists
1969-73	Member, Board of Directors, Teknekron
Aug. 1969	Invited Lecturer, University of Chicago Library School
Oct. 1969	Invited Lecturer, University of North Carolina Library School
November 1969	Awarded Lanchester Prize, ORSA
November 13, 1969	In Honor of Philip M. Morse
1970	Vice-President-Elect, American Physical Society

April - June 1970	Visiting Professor of Operations Research, Dept. of Industrial Engineering and Operations Research, University of California, Berkeley
1970-71	Member, Statistical Data Panel, NAS Physics Survey Committee
1970-71	Member, Committee on Unified Science and Mathematics for Elementary Schools, M.I.T. Education Development Center
1970-74	Chairman, Board of Trustees, New England Regional Computing Network (NERComP)
1971	Vice-President, American Physical Society
1971	Member, Advisory Committee to HUD Subcommittee for Integrated Planning and Management for Community Development
March 1971	Invited Lecturer, University of Hawaii (on O.R. and on physics)
April 1971	Distinguished Visitor to Universities of Adelaide, Melbourne, Canberra, and Sydney, Fulbright Program in Australia, sponsored by the Australian-American Educational Fund
April 1971	Invited Speaker, O.R. Society of South Australia, Adelaide
May 1971	Invited Speaker, Operations Research Society of America Conference, Dallas
May 1971	Invited Lecturer, Lecture Series on Systems Concepts for the Private and Public Sectors, California Institute of Technology
August 1971	Invited Lecturer, University of Chicago Center for Continuing Education (on library O.R.)
1972	President, American Physical Society
1972	Member, Committee on the Future of the APS, American Physical Society
1972	Member, Ad Hoc Committee on Physics and National Domestic Problems, American Institute of Physics
1970-75	Member, Council, American Physical Society

April 1973	Awarded Gold Medal, Acoustical Society of America
1974	Member, Committee on the American Institute of Physics, American Physical Society
1974	Chairman, Lanchester Prize Committee, Operations Research Society of America
February 1974	Invited Speaker, University of Mexico (in honor of Professor M. Vallarta)
March 1974 - Feb. 1977	Member, Governing Board, American Institute of Physics
Feb. 1974	Vice-Chairman, Board of Trustees, New England Regional Computing
1974-76	Network (NERComp)
1974-75	Chairman, Special Study for Strengthening the Capabilities of Less Developed Countries in Systems Analysis, NAS Board on Science and Technology for International Relations
October 1974	Awarded Kimball Prize, Operations Research Society of America
1975-1980	Chairman, Governing Board, American Institute of Physics
1975-76	Chairman, Panel on Public Affairs, American Physical Society
Jan. 1975	Invited Lecturer, Department of Industrial Engineering and Operations Research, University of California, Berkeley
July 1975	Invited Speaker, Plenary Session, International Federation of O.R. Societies Conference on O.R. in the Service of Developing Economies, Kyoto, Japan
July 1975	Director, Visiting O.R. Lecture Team, System Science Institute, Waseda University, Tokyo, Japan
1975-80	Member, Visiting Committee for the School of Library Science, Case Western Reserve University
1977-79	Member, Board of Directors, Perception Technology Corporation

1980-

Chairman, National Academy of Science Committee
on Technical Assistance to the Navaho Nation

Scope and Contents of the Collection

The Philip Morse papers consist of biographical information; correspondence; notes; committee minutes; course material; reports; trip diaries; manuscripts; research data and graphs; and reprints and other printed material.

Philip Morse's association with the Massachusetts Institute of Technology (MIT) spans almost fifty years. After his retirement he remained as a senior lecturer until 1980. He was not only active with research and teaching responsibilities in the physics department, but he was also active in administrative and policy decisions of the Institute. Series 2 reflects the wide range of interests that Philip Morse pursued at MIT. He was a member of both physics department committees and general faculty committees. As his department's graduate registration officer he was involved with a number of graduate policy committees such as Hrones' Committee on the Future of the Graduate School and the Graduate Center Committee. His work with educational policy was not limited to graduate students, however. He was a member of committees that concerned continuing education and education for industrial personnel as well as an ad hoc committee on humanities and an undergraduate policy committee.

Much of the material in Series 2 dates from 1951, when Morse returned to MIT and began developing interdisciplinary programs in operations research and in computation. His files chart the progress of computation at MIT through the minutes, notes, and reports from such early committees as the Hill Committee on Computation, the Committee on Machine Methods of Computation and Numerical Analysis, as well as from the later Committee on Information Processing. There is some material from the Computation Center which Philip Morse directed, including a position paper on the facility. Besides general administrative material there is correspondence, memos, reports, and grant proposals which concern the establishment of a time-sharing arrangement at the Center. His early interest in computers is shown in Series 2 which contains a 1933 memo about Vannevar Bush's differential analyzer.

The collection contains less information about the Operations Research Center, which Philip Morse also directed. The minutes of the Committee on Operations Research and the material from the Operations Research summer course do provide a background for the establishment of the Operations Research Center.

Philip Morse administrative and committee involvements became more numerous after World War II, but he first served on the Library Committee in 1932, and he supported the library's growth whenever he returned to MIT. The Library Committee and the general library files in series 2 contain budget data, collection development material, correspondence, reports, minutes, and statistics. The planning of Project Intrex is documented in this section.

Philip Morse further supported the MIT Libraries through research. His 1956 article, "Attendance and the Use of the Science Library at M.I.T.," concerns one of the first applications of operations research to library circulation records. A sampling of the distributed surveys, circulation cards, and data sheets was kept in series 4 to document the methodology used in this early survey. Another study done in 1962 resulted in the book *Library Effectiveness*. His notes and data sheets for the book are found in series 4.

Philip Morse's writings provide the most complete record of his research work in the collection. These files contain notes, calculations, graphs, and tables as well as correspondence, manuscript drafts, and reprints. In many cases the progress of an article or a book can be traced from raw data to finished product; there are even some book reviews. The files also contain course information and notes and some of this material provided the groundwork for a text. In addition, the collection contains manuscript material that he wrote prior to his arrival at MIT, including early acoustical research work he did at Cambridge with E. C. G. Stueckelberg. While there is little material from the 1940s, when Morse was working primarily for the federal government, there is some operations research data. Series 4 helps to show Morse's many research interests and the gradual progression his interests took; while acoustical studies were dominant in the thirties the emphasis later changed to include computers and operations research. It is interesting to note that his writings and speeches were increasingly geared towards a more general audience in this later period. Both series 2 and series 3 should be checked for further information about his research.

The Alphabetical Subject Files (series 3) form the largest part of the collection and are primarily concerned with Philip Morse's non-MIT activities. His pursuits, however, were often interrelated and there is no clear demarcation between MIT and non-MIT interests. For example, the section on acoustics (Series 2A) concerns his work in that area while at MIT. Series 3 should be checked for special subjects that are not clearly separated between the Institute and outside activities.

Philip Morse belonged to many professional groups and often served on their committees. His memberships and committee activities are well documented in the collection. There is a great deal of material for a number of organizations such as the Acoustical Society of America, the American Institute of Physics, the American Physical Society, and the National Academy of Science/National Research Council. He was instrumental in founding other organizations, including the Operations Research Society of America and the International Federation of Operations Research Societies, and his files trace the beginnings and the development of these societies.

Philip Morse's concerns about science in a modern world and his attempts to educate laymen about science are evidenced in his papers. He was honorary vice chairman of the Emergency Committee of Atomic Scientists, Inc. (the Einstein Committee) and his files contain administrative, policy, and planning information from the committee's inception until it disbanded in 1949 (series 3A). There are also financial reports, minutes, agendas, and publicity material from the committee. *The Bulletin of Atomic Scientists* was a product of the committee and series 3 contains material from his position on its board of sponsors. He was also a member of the Union of Concerned Scientists and the Federation of American Scientists, and his papers contain information from these organizations.

During World War II Philip Morse left academia to work for the government and he continued to serve in public positions after the war. His work with operations research really began with the civilian task force he organized to study the Navy's antisubmarine program. The papers contain little from this war work, but his later consultations with the government and the military about operations research are

well documented. He was on the steering committee of the Navy's Operation Evaluation Group and he served on an Ad Hoc Review Committee for the Army's operations research office as well as the Advisory Committee for the Army's Ordnance Research and Development Division. He served on both the Technical Review Board and the Board of Trustees for the Institute for Defense Analyses, and the correspondence, minutes, and memos in the collection include information on IDA's project with the Weapons System Evaluation Group. There is correspondence and reports in series 3 from the Rand Corporation of which Morse was a trustee. He was also on the Advisory Panel to the Technical Analysis Division of the Institute for Applied Technology, which assists non-military agencies of the government in systems analysis and operations research.

Not all of Philip Morse's government positions were concerned with operations research. He was the first director of the Brookhaven National Laboratory. While most of his files remained at Brookhaven, series 3 does contain correspondence, memos, and press releases from the time prior to and after his term as director, as well as some copies of his replies to correspondents while he was director. Also included is a 1946 planning report about the laboratory.

Throughout his career Philip Morse was interested in the publication and revision of standard mathematical tables. He worked with Arnold N. Lowan of Columbia on the Works Project Administration's Mathematical Tables Project during the 1930s and he continued to serve on Mathematical Table committees for the National Academy of Sciences/National Research Council and for the National Bureau of Standards. In 1954 he organized a conference on mathematical tables. Many of these tables were published by the National Bureau of Standards, and his work on this project is documented throughout series 3.

Philip Morse was also a consultant to non-government organizations. He worked closely with Leo Beranek and Richard Bolt at MIT. When they started Bolt, Beranek and Newman, Inc., Morse became an associate consultant for the firm. His long association with Bolt and Beranek is evidenced in series 3. His consulting work for Romo-Woolridge's fellowship program is documented in his papers. There is also some information that relates to his role as advisor for *Physics Today* and his position on the editorial board of *Science*.

In 1959 the North Atlantic Treaty Organization conducted a study of operations research in NATO countries. The report on the findings led to the establishment of an Advisory Panel on Operations Research (APOR) with Philip Morse serving as chairman. The panel helped to set up conferences, consulting, and other exchange programs in NATO countries. The work of the APOR up to 1965 is well documented in series 3 through correspondence, minutes, trip diaries, reports, and printed material.

A group of operations research experts, with Philip Morse as chairman, met in 1962 with the Organization for Economic Co-operation and Development (OECD). The group sought to place an emphasis on the uses of operations research in the public domain as opposed to already established military and industrial uses of operations research. The meeting led the founding of an Advisory Panel on Operations Research in OECD, and Morse served on this panel. The APOR held symposiums in member countries on issues of national import, with the OECD providing speakers. Material in the collection about the OECD's panel includes reports, correspondence, speeches, support documents, trip diaries, and financial data.

Through a Ford Foundation grant Philip Morse traveled to Japan, India, Israel, and Taiwan where he delivered lectures on operations research. Extensive correspondence about the planning of this trip is in series 3. Also documented is a Fulbright Foundation trip he took as a visiting lecturer on operations

research in Australia. His expertise about international operations research programs was used by the National Academy of Sciences/National Research Council's Commission on International Relations. The Commission set up a Panel to study systems analysis and operations research in less developed countries. Morse served on the panel and went on fact finding missions to Nigeria and Tunisia. The panel's 1975 report and supporting documents can be found in the collection.

Arrangement note

Organized into the following series: 1. Biographical Materials; 2. Massachusetts Institute of Technology Records; 3. Alphabetical Subject Files; 4. Writings.

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Related Archival Materials note

Computation Center Records, AC 62

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Controlled Access Headings

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- Acoustical Society of America
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- American Physical Society
- Bolt, Beranek, and Newman, inc.
- Emergency Committee of Atomic Scientists
- Federation of American Scientists
- International Federation of Operations Research Societies
- Massachusetts Institute of Technology. Committee on Machine Methods of Computation
- Massachusetts Institute of Technology. Computation Center
- Massachusetts Institute of Technology. Libraries
- Massachusetts Institute of Technology. Operations Research Center
- National Academy of Sciences (U.S.)
- National Research Council (U.S.)
- Operations Research Society of America
- Organisation for Economic Co-operation and Development
- Ramo-Woolridge (Firm)
- Rand Corporation
- Society of Sigma Xi
- Union of Concerned Scientists

Personal Name(s)

- Ackoff, Russell Lincoln
- Allis, William P. (William Phelps), 1901-1999
- Beranek, Leo Leroy, 1914-
- Bethe, Hans A. (Hans Albrecht), 1906-2005
- Bolt, Richard H.
- Brillouin, Léon, 1889-1969
- Bush, Vannevar, 1890-1974
- Condon, Edward Uhler , 1902-1974
- Darrow, Karl K. (Karl Kelchner), 1891-
- Kehl, W. B. (William Brunner), 1919-
- Lowan, Arnold Noah, 1898-
- McLucas, John L.
- Menzel, Donald H. (Donald Howard), 1901-1976
- Miller, Dayton Clarence, 1866-1941
- Morse, Philip McCord, 1903-1985
- Oliver, A. L. (Alain Lancelot)
- Oppenheimer, Jane M. (Jane Marion), 1911-
- Roe, Anne, 1904-1991
- Salzman, Charles
- Sandoval Vallarta, Manuel, 1899-1977
- Stueckelberg, Ernst Carl Gerlach, 1905-1984
- Szilard, Leo
- Walsh, John E. (John Edward), 1919-

Subject(s)

- Government consultants.
- Operations research.
- Physicists--Archives.

Bibliography

BIOGRAPHIES

Feshbach, Herman. "Philip McCord Morse, 1903-1985, A Biographical Memoir." *Biographical Memoirs*, vol. 65, National Academy of Sciences, 1994.

Morse, Philip. *In at the Beginnings: A Physicist's Life*. Cambridge, Mass.: MIT Press, 1977.

Bibliography

This bibliography is divided into three sections -- books, contributed chapters, and articles. Each section is in chronological order. An asterisk (*) next to a title indicates that there is some material about the work in the Morse collection.

Books

* (with Edward U. Condon) Quantum Mechanics. New York: McGraw-Hill, 1929.

* Vibration and Sound. New York: McGraw-Hill, 1936; 2nd ed. 1948

(with J.A. Stratton, L.J. Chu, R.A. Hutner) Elliptic Cylinder and Spheroidal Wave Functions. New York: The Technology Press of M.I.T. and John Wiley, 1941

(with George E. Kimball) Methods of Operations Research. New York: The Technology Press of M.I.T. and John Wiley, 1st ed. revised 1951; Russian ed. 1956; Japanese ed. 1958.

* (with Herman Feshbach) Methods of Theoretical Physics, Parts I and II. New York: McGraw-Hill, 1953; Russian ed. 1958.

(with H. Yilmaz) Tables for the Variational Determination of Atomic Wave Functions. Cambridge, Mass.: The Technology Press, 1956.

* Queues, Inventories and Maintenance. New York: John Wiley, 1958; French ed. 1960.

(Editor) Notes on Operations Research. Cambridge, Mass.: The Technology Press, 1959.

* Thermal Physics. New York: W.A. Benjamin, 1962; revised 1965; 2nd revision 1969.

* (Editor with Laura W. Bacon) Operations Research for Public Systems. Cambridge, Mass.: MIT Press, 1967; Italian ed. 1970; Japanese ed. 1972.

Your Ancestors. Privately printed, c. 1967.

* (with K. Uno Ingard) Theoretical Acoustics. New York: McGraw-Hill, 1968.

* Library Effectiveness: A Systems Approach. Cambridge, Mass.: MIT Press, 1968.

(Editor with B.T. Feld, H. Feshbach, and R. Wilson) Nuclear, Particle and Many Body Physics, dedicated to the memory of Amos de-Shalit. New York: Academic Press and Weizmann Institute of Science, 1972.

(Editor with A. W. Drake and R.L. Keeney) Analysis of Public Systems. Cambridge, Mass.: MIT Press, 1972.

In at the Beginnings. Cambridge, Mass.: MIT Press, 1977.

Contributed Chapters

"Operations Research," Chapter 1, pp. 1-12, in Transactions of Symposia on Pure and Applied Mathematics, Vol. II, ed. by F.E. Grubbs et al. New York: Interscience Publishers, Inc., 1955.

"Vibrations of Elastic Bodies," chapter in McGraw-Hill Handbook of Physics, ed. by E.U. Condon and H. Odishaw. New York: McGraw-Hill Book Co., 1958.

* "Operations Research," chapter in Frontiers of Numerical Mathematics, ed. by R.E. Langer. Madison: University of Wisconsin Press, 1960.

(with K. Uno Ingard) "Linear Acoustic Theory," chapter in Handbuch der Physik, Vol. XI/1, ed. by S. Flugge. Berlin: Springer-Verlag, 1961.

"Dynamics of Operational Systems: Markov and Queuing Processes," chapter in Progress in Operations Research, Vol. I, ed. by R. Ackoff. New York: John Wiley & Sons, Inc., 1961.

"Computers and Operations Research," chapter in Applications of Digital Computers, ed. by W.E. Freiburger and W. Prager. Boston: Ginn & Co., 1963.

* "Queues and Markov Processes -- The Response of Operating Systems to Fluctuating Demand and Supply," chapter in System Engineering Handbook, ed. by Robert E. Machol. New York: McGraw-Hill Book Co., 1965.

"On the Prediction of Library Use," (short form) Appendix N in INTREX, Report on a Planning Conference on Information Transfer Experiments, ed. by Carl F.J. Overhage and R. Joyce Harman, Cambridge, Mass.: MIT Press, 1965.

* "Design for a Brain," chapter in Science and the Modern World, ed. by J. Steinhardt. New York: Plenum Press, 1966.

"John Clarke Slater, a Biographical Note of Appreciation," introduction to Quantum Theory of Atoms, Molecules and the Solid State, ed. by P. Lowdin. New York: Academic Press, 1966.

"The International Growth Operational Research," chapter in Beitrag zur Unternehmensforschung: Gegenwartiger Stand und Entwicklungstendenzen, ed. by G. Menges. Wurzburg: Physica-Verlag, 1969.

- * "The History and Development of Operations Research," Chapter 3 in The Challenge to Systems Analysis: Public Policy and Social Change. (ORSA Pubs. #20), ed. by Grace J. Kelleher. New York: John Wiley, 1970.
 - "Comments on the Random Distribution of Events or Levels," article in Topics in Modern Physics (a Tribute to E. U. Condon), 251-260. Boulder: University of Colorado Press, 1971.
 - * "A Queuing Model for Automobile Passing," article in Studi de probabilita, statistica e ricerca operativa in onore de Giuseppe Pompilj. Gubbio, Italy: Tipografia Oderisi Editrice, 1971.
 - * "Library Models," chapter in Analysis of Public Systems, ed. by A. W. Drake, R.L. Keeney, and P. M. Morse. Cambridge, Mass.: MIT Press, 1972.
 - * "George Elbert Kimball, 1906-1967," chapter in Biographical Memoirs 43. Published for the National Academy of Sciences of the United States. New York: Columbia University Press, 1973.
 - * "Search Theory," chapter in Handbook of Operations Research, ed. by Joseph J. Moder and Salah E. Elmaghraby. New York: Van Nostrand Reinhold, 1973.
 - * "Edward Uhler Condon, 1902-1974," chapter in Biographical Memoirs 48. Published for the National Academy of Sciences of the United States. New York: Columbia University Press, 1976.
 - * "John Clarke Slater, 1901-1976," chapter in Biographical Memoirs, NAS, (forthcoming).
 - * "Search Theory," chapter III-6 in Handbook of Operations Research, ed. by J.J. Moder and S.E. Elmaghraby. New York: Van Nostrand Reinhold, 1978.
-

Articles

- (with J.J. Nassau) "A Study of Solar Motion by Harmonic Analysis," Astrophys. Jour. 65, No. 2, March, 1927.
- * (with K.T. Compton) "Theory of Normal Cathode Fall in Glow Discharges," Phys. Rev. 30, 305-317, No. 3, September, 1927.
- * (with W. Uyterhoeven) "Ionization in Positive Ion Sheaths," Phys. Rev. 31, 827-832, No. 5, May, 1928.
- * "A Theory of the Electric Discharge Through Gases," Phys. Rev. 31, 1003-1017, No. 6, June, 1928.
- * (with R.W. Gurney) "Space Charge Sheaths in Positive Ray Analysis," Phys. Rev. 33, 789-799, No. 5, May, 1929.
- * (with E.C.G. Stueckelberg) "Diatomic Molecules According to the Wave Mechanics I: Electronic Levels of the Hydrogen Molecular Ion," Phys. Rev. 33, 932-947, No. 6, June, 1929.

- * "Diatomic Molecules According to the Wave Mechanics II: Vibrational Levels," Phys. Rev. 34, 57-64, No. 1, July 1, 1929.
- (with E.C.G. Stueckelberg) "Storungsrechnung des Wasserstoffmolkulions und des Wasserstoffmolekuls," Helvetica Physica Acta 2, 304-206, No. 5, 1929.
- (with E.C.G. Stueckelberg) "Recombination of Electron and Alpha-Particle," Phys. Rev. 35, 116-117, No. 1, January 1, 1930.
- * "Quantum Mechanics of Electrons in Crystals," Phys. Rev. 35, 1310-1324, No. 11, June 1, 1930.
- * (with E.C.G. Stueckelberg) "Computation of the Effective Cross Section for the Recombination of Electrons with Hydrogen Ions," Phys. Rev. 36, 16-23, No. 1, July, 1930.
- (with E.C.G. Stueckelberg) "Strahlungslose Stossprozesse bei kleinen Geschwindigkeiten," Annalen der Physik 9, 579-606, No. 5, 1931.
- (with E.C.G. Stueckelberg) "Die spezifische Warme von quasifreien Electronen." Zeits. f. Physik 69, 666-667, Nos. 9 and 10, 1931.
- * (with W.P. Allis) "Theorie der Streuung Langsamer Elektronen an Atomen," Zeits. f. Physik 70, 567-582, Nos. 9 and 10, 1931.
- (with E.C.G. Stueckelberg) "Unelastische Stosse zwischen Molekullen," Helvetica Physica Acta 4, 136-137, Nos. 3 and 4, 1931.
- (with E.C.G. Stueckelberg) "Losung des Eigenwertproblems eines Potentialfeldes mit zwei Minima," Helvetica Physica Acta 4, 337-354, No. 5, 1931.
- "Unelastische Streuung von Kathodenstrahlen," Phys. Zeits. 33, 443-445, No. 2, January, 1932.
- * "Quantum Mechanics of Collision Processes," Rev. Mod. Phys. 4, 577-634, No. 3, July, 1932.
- * (with N. Rosen) "On the Vibrations of Polyatomic Molecules," Phys. Rev. 42, 210-217, No. 2, October, 1932.
- (with J. P. Vinti) "Variable Scale Atomic Wave Functions," Phys. Rev. 43, 337-340, March 1, 1933.
- * (with W.P. Allis) "The Effect of Exchange on the Scattering of Slow Electrons from Atoms," Phys. Rev. 44, 269-276, August 15, 1933.
- "Electrons, Photons and Waves," School Science & Math. 34, 200-206, No. 2, February, 1934.
- "Addition Formulae for Spheroidal Functions," Proc. Natl. Acad. Sci. , 21 56-62, No. 1, January, 1935.
- (with W. P. Allis and E. S. Lamar) "Velocity Distributions for Elastically Colliding Electrons," Phys. Rev. 48, 412-419, September 1, 1935.
- * (with L.A. Young and Eva S. Haurwitz) "Tables for Determining Atomic Wave Functions and Energies," Phys. Rev. 48, 948-954, December, 1935.
- * (with J.B. Fisk and L.I. Schiff) "Collision of Neutron and Proton," Phys. Rev. 50, 748-754, October 15, 1936.

- (with J.B. Fisk) "The Elastic Scattering of Neutrons by Protons," Phys. Rev. 51, 54-55, No. 1, January 1, 1937.
- * (with J.B. Fisk and L.I. Schiff) "Collision of Neutron and Proton II," Phys. Rev. 51, 706-710, May 1, 1937.
- (with R.H. Boden and Harry Schechter) "Acoustic Vibrations and Internal Combustion Engine Performance I. Standing Waves in the Intake Pipe System," Jour. of Appl. Phys. 9, 16-23, No. 1, January, 1938.
- (with Charles S. Draper) "Acoustical Analysis of the Pressure Waves Accompanying Detonation in the Internal-Combustion Engine," Proc. Fifth Intl. Congress of Applied Mechanics , 727-732, 1938.
- (with Pearl J. Rubenstein) "The Diffraction of Waves by Ribbons and by Slits," Phys. Rev. 54, 895-898, December 1, 1938.
- * "Some Aspects of the Theory of Room Acoustics," Jour. Acoust. Soc. Amer. 11, 56-66, July, 1939.
- "The Transmission of Sound Inside Pipes," Jour. Acoust. Soc. Amer. 11, 205-210, October, 1939.
- * "The Opacity of Gas Mixtures in Stellar Interiors," Astrophys. Jour. 92, 27-49, No. 1, July, 1940.
- * (with Richard H. Bolt and Richard L. Brown) "Acoustic Impedance and Sound Absorption," Jour. Acoust. Soc. Amer. 12, 217-227, No. 2, October, 1940.
- (with Richard H. Bolt) "Sound Waves in Rooms," Rev. of Mod. Phys. 16, 69-150, No. 2, April, 1944.
- "Of Men and Machines," The Technology Review 49, 29-31, No. 1, November, 1946.
- "Mathematical Problems in Operations Research," Amer. Math. Soc. 54, 602-621, No. 7, July, 1948.
- "Pure and Applied Research," American Scientist 38, 253-259, No. 2, Spring Issue, 1950.
- (with John R. Pellam) "The Thermal Rayleigh Disk in Liquid He II," Phys. Rev. 78, 474-475, No. 4, May 15, 1950.
- "Physics and Radiation," American Scientist 38, No. 3, July, 1950.
- * "Must We Always Be Gadgeteers?," Physics Today 3, 4-5, No. 12, December, 1950.
- "Operations Research," The Technology Review 53, 1-6, No. 4, February, 1951.
- * "Operations Research, What Is It?" Jour. Appl. Phys. 23, 165-172, No. 2, February, 1952.
- "Universities or Project Centers?," Physics Today 5, 4-5, No. 4, April, 1952.
- * "Excitation of Molecular Rotation-Vibrations by Electron Impact," Phys. Rev. 90, 51-55, No. 1, April 1, 1953.
- * "Operations Research--An Application of Scientific Method," The Technology Review 55, 2-8, No. 7, May, 1953.
- "Trends in Operations Research," Jour. Opns. Res. Soc. Am. 1, 159-165, No. 4, August, 1953.

- "Report on the First Summer Program on Operations Research at the Massachusetts Institute of Technology, June 16 - July 2, 1953," Jour. Opns. Res. Soc. Am. 1, 303-305, No. 5, November, 1953.
- "Operations Research," Mechanical Engineering , 231-235, March, 1954.
- * "Operations Research," Appl. Mechanics Reviews , 89-93, March, 1954.
- (with H.N. Garber and M.L. Ernst) "A Family of Queuing Problems," Jour. Opns. Res. Soc. Am. 2, 444-445, No. 4, September, 1954.
- * "Operations Research: Past, Present and Future," Advanced Management 19, 10-15, No. 11, November, 1954.
- * "Operations Research," Communications on Pure and Applied Mathematics 8, 1-12, No. 1, February, 1955.
- "Acoustics and Basic Physics," Jour. Acoust. Soc. Amer. 27, 213-216, No. 2, March, 1955.
- "Stochastic Properties of Waiting Lines," Jour. Opns. Res. Soc. Am. 3, 255-261, No. 3, August, 1955.
- "Where Is the New Blood?," Jour. Opns. Res. Soc. Am. 3, 383-387, No. 4, November, 1955.
- * "Statistics and Operations Research," Jour. Opns. Res. Soc. Am. 4, 2-18, No. 1, February, 1956.
- * (with G.C. Bush and H.P. Galliher) "Attendance and Use of the Science Library at M.I.T.," Amer. Documentation 7, 87-109, No. 2, 1956.
- * "Waves in a Lattice of Spherical Scatterers," Proc. Natl. Acad. Sci. 42, 276-286, No. 5, May, 1956.
- * "On the Use of Digital Computers," Phys. Today 9, 19-23, No. 10, October, 1956.
- (with H. Feshbach) "Uber den Feldbegriff in den Theoretischen Physik," Physikalische Blatter 12, 439-441, No. 10, 1956.
- "Training in Operations Research at the Massachusetts Institute of Technology," Opns. Res. 4, 733-735, No. 6, December, 1956.
- "Operations Research Is Also Research," Proc. of the First Intl. Conf. on O.R., Oxford, September, 1957.
- "Teaching Machines to Reckon," The Technology Review 60, 1-6, No. 6, April, 1958.
- "Solutions of a Class of Discrete-Time Inventory Problems," Opns. Res. 7, 67-78, No. 1, January-February, 1959.
- (with H.P. Galliher and M. Simond) "Dynamics of Two Classes of Continuous Review Inventory Systems," Opns. Res. 7, 362-384, No. 3, May-June, 1959.
- (with G. F. Koster) "MIT Physics Graduate Alumni, Graduate Record vs. Achievements," Physics Today 14, 20-29, No. 8, August, 1961.
- "Report on International OR Activities," Opns. Res. 9, 910-912, No. 6, November-December, 1961.
- * "Concerning Bottlenecks," (review) Science 137, 742-743, No. 3532, September 7, 1962.

- * "The Prospects for Mechanization," College and Research Libraries 25, 115-119, No. 2, March, 1964.
- * "Computers & e.d.p.," Industrial Research 6, 62-70, No. 6, 1964.
- * "Computing Machines as Research Assistants," Proc. Amer. Phil. Soc. 108, 291-297, No. 4, August, 1964.
- "Acoustic Scattering from an Inhomogeneity of the Medium," Helvetica Physica Acta 38, 53-55, No. 1, 1965.
- * "Transmission of Sound Through a Circular Membrane in a Plane Wall," Jour. Acoust. Soc. Amer. 40, 354-366, No. 2, August, 1966.
- "Lines at the Airport," a review of "Applied Queuing Theory," by A.M. Lee, in Science 155, 993, No. 3765, February 24, 1967.
- * "George E. Kimball" (in Memoriam), Opns. Res. 16, 871-874, No. 4, July - August, 1968.
- * (with Caroline Elston) "A Probabilistic Model for Obsolescence," Opns. Res. 17, 36-47, No. 1, January - February, 1969.
- * "Background of the NATO O.R. Panel," presented at the Tenth Anniversary Symposium of the Advisory Panel on Operations Research, held at NATO Headquarters, Brussels, Belgium, March, 1970.
- * "Search Theory and Browsing," The Library Quarterly 40, 391-408, No. 4, October, 1970.
- * (with Harold J. Yaffee) "A Queuing Model for Car Passing," Transportation Science 5, 48-63, No. 1, February, 1971.
- "Measures of Library Effectiveness," The Library Quarterly 42, 15-30, No. 1, January, 1972.
- * "Optimal Linear Ordering of Information Items," Opns. Res. 20, 741-751, No. 4, July - August, 1972.
- * "George Elbert Kimball, 1906-1967," Biographical Memoirs , NAS 43, 1973.
- * "Edward Uhler Condon, 1902-1974," Reviews of Modern Physics 47, 1-6, No. 1, January, 1975. Also Biographical Memoirs, NAS 48, 1976.
- (with Ching-chih Chen) "Using Circulation Desk Data to Obtain Unbiased Estimates of Book Use," The Library Quarterly 45, 179-195, No. 2, April, 1975.
- (with Ronald W. Cornew) "Distributive Computer Networking: Making It Work on a Regional Basis," Science 189, 523-531, August 15, 1975.
- "The Geometric and the Bradford Distributions, a Comparison," Working Paper OR 049-76, Operations Research Center, M.I.T., February, 1976 (Submitted to Journal of Documentation, U.K.)
- * "Demand for Library Materials," Collection Management 1, 47-78, 1976.
- "Exact Solution for the Bradford Distribution," Opns. Res. (forthcoming).
- * "John Clarke Slater, 1901-76," Biographical Memoirs , NAS 1980.
- * "A Queuing Theory, Bayesian Model for the Circulation of Books in a Library," Opns. Res. 1979.

"Karl Taylor Compton, 1887-1954," Vignette No. 190, A Supplement to the Cosmos Club Bulletin, 1980.

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