University of Chicago Library

Guide to the John A. Simpson Papers 1940-1988

Table of Contents

Descriptive Summary

Identifier	ICU.SPCL.JASIMPSON
Title	Simpson, John A. Papers
Date	1940-1988
Size	195 linear feet (394 boxes)
Repository	Special Collections Research Center University of Chicago Library 1100 East 57th Street Chicago, Illinois 60637 U.S.A.
Abstract	John A. Simpson (1916-2000) Papers include professional and personal correspondence, scientific research notes, lectures and articles, teaching materials, grant proposals, and technical reports and drawings. They document Simpson's graduate work at New York University, his activity in the Metallurgical Laboratory during World War II and his teaching and research at the University of Chicago. They also document his invention and development of radiation counters, cosmic ray neutron monitors, and numerous types of charged-particle analyzers designed for space research. Simpson utilized for his research the material and financial resources of the Air Force, Navy, NSF, and NASA, and these relationships are documented in the papers. They also document his chairmanship of the Atomic Scientists of Chicago in 1945-1946 and his work with the Bulletin of the Atomic Scientists. The papers represent Simpson's scientific and administrative roles in the International Geophysical Year of 1957-1958, and his later interactions with European and Soviet scientists and space agencies.

Acknowledgments

In September 1987 Professor John A. Simpson began his tenure as the third incumbent of the Martin Marietta Chair in Space History at the National Air and Space Museum of the Smithsonian Institution. Under the auspices of that chair, Professor Simpson drafted selected memories of his distinguished career in science and consulted with historians working within the Museum's Space History Department. As part of this effort, using funds associated with the Martin Marietta Chair, a cooperative effort was initiated between the Department of Space History of the National Air and Space Museum and the Department of Special Collections of the University of Chicago Library to appraise process and prepare a finding guide for Professor Simpson's extensive professional papers. Subsequently, additional financial support was obtained from the National Aeronautics and Space Administration (under contract NASW-4354) to complete the work.

Information on Use

Access

Access to materials in Series XI is restricted until 2020.

Citation

When quoting material from this collection, the preferred citation is: Simpson, John A. Papers, [Box #, Folder #], Special Collections Research Center, University of Chicago Library

Biographical Note

John Alexander Simpson was born November 3, 1916 in Portland, Oregon. His father, the youngest of five sons in Greenock, Scotland, came to Portland in 1910 and established a shoe and leather goods store. His mother, Janet Christie Brand, also from Greenock, was engaged to his father in Greenock and came to Portland to be married in 1914. A younger brother, William Brand, was born in 1919.

He married Elizabeth Alice Hilts in 1946. They had two children, Mary Ann born in 1954 and John Alexander in 1958. He was divorced in 1977 and married Elizabeth Scott Johnson in 1980.

Simpson's early schooling, delayed by illness, was in public schools until he enrolled in Reed College, where he received an A.B. degree in 1940. He continued his study of physics with a scholarship and teaching assistantship at New York University at University Heights. He received an S.M. degree in 1942 and a Ph.D. degree in 1943.

After requesting an opportunity to help in the war effort, Simpson received a visit in 1942 from Volney Wilson of the University of Chicago, an assistant of Arthur Holly Compton. Compton was then director of the Metallurgical Laboratory devoted to producing a nuclear chain reaction and to producing plutonium for a nuclear bomb. Wilson encouraged Simpson to develop new radiation detectors which could be used to measure radiation of high intensity. In 1943, at the invitation of the Comptons, Simpson was given a room on the top floor of their home and was soon a scientific group leader for novel instrumentation and measuring methods required for the support of the ongoing work at Chicago, Oak Ridge, and Hanford.

In 1945, Simpson requested permission to hold weekly seminars on the international control of atomic energy in Ryerson Hall. These seminars and discussions with senior physicists in the Metallurgical Laboratory resulted in the formation of the Atomic Scientists of Chicago in August 1945, with Simpson as Chairman. Soon thereafter similar organizations appeared at Oak Ridge and Los Alamos. Simpson participated in founding the Bulletin of the Atomic Scientists in 1945 and was its first chairman. The activities of the scientists' movement in Washington, D.C. in the fall of 1945 through the spring of 1946 were important for the establishment of a civilian bill for the control of atomic energy.

In August 1945 Simpson accepted, along with about ten other physicists and chemists, an appointment in the newly-formed Institute for Nuclear Studies (now the Enrico Fermi Institute), at the University of Chicago, as well as a joint appointment as instructor in the Department of Physics and the College. Subsequently, his join appointments included: Professor (1947), Associate Professor (1949) and Professor (1954). In 1968 he became the Edward L. Ryerson Distinguished Service Professor and in 1974 the Arthur H. Compton Distinguished Service Professor. Since 1987 he has been the Arthur H. Compton Distinguished Service Professor, Emeritus.

Among his administrative appointments, Simpson served as Chairman of the Committee on Instruction and Biophysics (1951-1952) and Director of the Enrico Fermi Institute (1973-1978). In 1962 he founded the Laboratory for Astrophysics and Space Research in the Enrico Fermi Institute.

Simpson's scientific career began as an undergraduate at Reed College where, for a senior thesis in 1939, he designed and constructed a two-stage electron microscope. The original aspects of that work were published by him in his first two publications. After World War II he began investigations of the energy spectrum of the primary galactic cosmic ray protons by means of their production of a secondary nucleonic component cascade in the atmosphere. Using the fast neutron production as a tracer of the nucleon cascade he discovered the existence of the large latitude dependence of the cascade, the production of which was shown to extend to very low primary particle energies. From these studies Simpson invented in 1948 the concept and instrumentation called the neutron monitor pile, based on the early nuclear chain reaction at Chicago, which for the first time enabled the investigation of the time-dependent intensity changes of the very low energy primary cosmic ray nucleon component. His studies of the time dependence of the nucleonic component over a wide range of incident particle energies led to the proof that the cosmic ray intensity variations were due to interplanetary electrodynamical processes of solar origin-called the solar modulation of the galactic cosmic rays. In 1950-1951 he established a network of these neutron monitors extending from the geomagnetic equator to high latitudes. It was his neutron monitor network which recorded the flare of February 23, 1956 leading to his demonstration with colleagues Peter Meyer and Eugene Parker that there existed a large-scale heliosphere of magnetic fields surrounding The Solar System.

Simpson's neutron monitor design became the world standard for cosmic ray research sponsored by the 68 nations participating in the International Geophysical Year in 1957-1958.

Beginning with the Office of Naval Research's sponsorship in 1946, Simpson's early research was mainly supported by ONR and the U.S. Air Force. This enabled him to undertake high altitude measurements with B-29 and RF-80 aircraft, and to use U.S. Navy icebreakers for investigations around the world extending from the magnetic equator to high latitudes. Simpson worked along at first and later with graduate students. He brought Peter Meyer to Chicago in 1953 and Eugene Parker in 1955 to expand the range of his researches, largely supported by federal funds.

Following the launch of the first U.S.S.R. satellite in October 1957, U.S. rockets and satellites were made available for civilian scientific research beginning in 1958, which enabled Simpson to undertake the development of an expanded laboratory and novel instrumentation to attack problems in cosmic rays, interplanetary phenomena and solar accelerated particles directly in the interplanetary medium and the trapped radiation belts of Earth. His first spacecraft experiment was on Pioneer 2, November 1958 (see "Satellite and Space Probe Missions," p. 6).

It was in the period 1958-1960 that Simpson laid out his three interrelated areas of research goals in space and programs to achieve them:

1) The investigation of the acceleration mechanism of charged particles in nature on all astrophysical scales

2) Using charged particles as probes for the electrodynamical processes in astrophysical settings-interstellar, interplanetary, heliospheric, and planetary magnetospheres, and

3) The investigation of the origins of isotopic and chemical composition of matter measured in galactic cosmic rays, solar flares, comets and the nucleosynthesis in stars.

This "triad" of astrophysical problems-all intimately interconnected and based on his earlier researches-were to be his principal guide for experiments and theoretical research for more than thirty years. This involved space-based research between 1958 and 1990, with Simpson acting as principal investigator for more than 30 experiments. These experiments were carried on spacecraft sent to Mercury, Venus, Earth, Mars, Jupiter and Saturn-as well as to comet Halley and into the third dimension of the heliosphere. All of Simpson's research was conducted with the strong participation of his graduate students. His space missions provided the these for most of the 32 Ph.D.s awarded to students under Simpson's supervision. He required that each Ph.D. thesis be published as a sole author contribution.

His experimental program in space would not have been possible without his development of a strong technical, and then later administrative, infra-structure. Simpson oversaw the creation of a solid state sensor laboratory in 1959 and the recruitment of a dedicated technical staff, which could transform original designs and models into flight-worthy instrumentation. Other components of the infra-structure included software development, computing, and data analysis. All of these factors were brought together in the LASR's building, funded by NASA in 1962 and in full operation by 1964. Recognizing that his work represented modest-scale fundamental research in a university setting but that the space missions for carrying out these experiments were very large-scale efforts, Simpson evolved a style for the conduct of original research. This style was intended to interface small, fundamental science in the university with the big science aspects of major science missions. This included missions to the planets where many individuals and organizations were required by NASA to interact with the Principal Investigator. Simpson published his concept of conducting original and successful space science programs in a university setting, which integrated the work of students, technicians, and research scientists (see papers 12B, 13B, and 14B in Simpson's publication list).

In support of these concepts for the conduct of space science NASA provided "Technology for Science" grants to LASR faculty from the mid-1960s to the early 1980s. These grants enabled Simpson and his colleagues to develop new concepts, including Simpson's invention of polyvinylidene fluoride polymer sensors for detection of super heavy charged particles or mass measurements of dust particles in the coma of Comet Halley (1986). This technology support, plus the sequence of discrete space missions, provided a sustaining level of support for his group in LASR. The ability of his laboratory to respond rapidly to new opportunities is illustrated by the Vega missions. Simpson invented his dust detector in 1983 and it was incorporated into an instrument in the spacecraft and launched in 1984.

Federal support from ONR and the USAF continued into the 1960s, along with the new space agency, NASA, until Congress passed the Mansfield Amendment requiring that all Department of Defense support to universities be related to direct military objectives. At this point, Simpson refused to compromise the university's research program and realigned his research support through NASA and the National Science Foundation.

There were two major periods where NASA was unable to provide access to space for Simpson's experiments. The first period was 1960-1962 (marked by the failure of the Ranger missions). In this interval Simpson obtained three space flights by riding experiments "piggyback" on military missions-i.e. the Discoverer series. The second interval, approximately 1976-1989, was caused mainly by NASA's ill-fated decision to discontinue expendable launch vehicles and to concentrate on shuttle launches. The Challenger accident in 1986 accentuated this problem. For this period Simpson again turned to ONR for non-funded sponsorship of NASA-financed instruments to be carried unclassified on U.S. Air Force missions. This period also saw the initiation of the out-of-the-ecliptic mission, realized first as the "ESA/NASA International Solar Polar Mission" and later as the ESA spacecraft designated Ulysses. This was a mission which Simpson had been urging NASA to undertake since the early 1960s and one where he and his staff had developed the required instrumentation in the 1960s and 1970s (see "Chart of CRRES and Ulysses Missions," p. 12).

Although this period was a difficult one for gaining access to space for new missions, it continued to be a productive and creative period for research. Pioneer 10, Pioneer 11, IMP 7, IMP 8, and Mariner 10 (along with neutron monitors in Peru and Colorado) constituted a heliosphere "laboratory" for astrophysical investigations covering the triad of objectives noted above.

Since the deep space missions were mainly justified by planetary encounters, Simpson designed his experiments to take advantage of both their interplanetary travel phase and, by suing different sensors or operational modes, the planetary encounters to study planetary magnetosphere particle acceleration. Continuous observations and investigations over four successive 11-year periods of solar activity and more than one and one-half solar magnetic cycles have provided a unique set of data for investigating both high energy astrophysical phenomena surrounding a typical rotating magnetic star and for galactic cosmic ray studies.

The writings listed in Part B of Simpson's publication list reflect Simpson's personal view that scientists have an obligation to use their knowledge and approach to the solution of problems to influence national and international efforts for controlling the use of nuclear weapons and for promoting cooperation among nations. This view accounts for his extracurricular activities on behalf of the peaceful uses of nuclear energy, as well as his participation in the 68 nation International Geophysical Year as one of its twelve science organizers during the period of the so-called Cold War. It also was a factor in the pre-glasnost cooperative space effort to Comet Halley on two Soviet spacecraft. His support for the participation of universities in the U.S. civil space program led to his organizing the Space Science Working Group in Washington, D.C. in 1982.

Scope Note

The papers of John A. Simpson comprise 195 linear feet of materials including professional and personal correspondence, scientific research notes, lectures and articles, teaching materials, grant proposals, and technical reports and drawings. Most of these belong to the period between the late 1940s and the mid-1980s and they document Simpson's graduate work at New York University, his activity in the Metallurgical Laboratory during World War II and his teaching and research at the University of Chicago. They also document his invention and development of radiation counters, cosmic ray neutron monitors, and numerous types of charged-particle analyzers designed for space research. Simpson utilized for his research the material and financial resources of the Air Force, Navy, NSF, and NASA, and these relationships are documented in the papers. They also document his chairmanship of the Atomic Scientists of Chicago in 1945-1946 and his work with the Bulletin of the Atomic Scientists. The papers represent Simpson's scientific and administrative roles in the International Geophysical Year of 1957-1958, and his later interactions with European and Soviet scientists and space agencies. Most vividly, Simpson's papers illustrate the changing nature of astrophysical research after World War II. Because many of the experiments Simpson, his colleagues, and staff produced were ultimately integrated into spacecraft produced at much larger laboratories, Simpson's papers offer a window on the growing complexity of both university-based research and "big science" during these years.

Roughly three-fourths of Simpson's inactive files held in storage were incorporated into the permanent archival collection. Duplicate papers, publications, and papers bearing an incidental relation to Simpson's work were not generally included. Documents or papers bearing notations made by Simpson, or accompanying more important documents as enclosures or attachments, were retained. In cases where Simpson made notes on the original folder or notebook containing papers, those notes were photocopied and included as the first items in that folder. In some cases papers which were not produced by Simpson were preserved in order to illustrate more fully the context in which Simpson worked. Student research notebooks or laboratory log books, for instance, are included in the Early Work subseries of Series IX. In some cases, such as Pioneer and Mariner project files, a considerable number of NASA technical documents are included which illustrate the engineering complexities of matching scientific instruments with their host spacecraft. Active files, including most of Simpson's files dated after 1986, will be transferred to the archives at a later date.

The complete runs of scientific data produced by Simpson's research projects were excluded from the collection. These are stored in LASR in printed form and on magnetic tape. The kinds of data Simpson's experiments produced and the ways he utilized this data are usually represented in each project subseries, often in folders associated with his scientific writings.

It must be noted that the papers in this collection do not contain all the documents created or utilized by any of Simpson's scientific projects. The papers collected here are only those that passed through or originated in Simpson's office. Papers of other scientists in Simpson's project group, and those of LASR personnel such as Gordon Lentz, Peter Meyer, and others, some of which relate directly to projects on which Simpson and these individuals collaborated, are stored in LASR and other EFI buildings.

The John A. Simpson Papers are arranged in 11 series:

I. General Correspondence

Boxes 1-32

II. University of Chicago, Boxes 33-76

III. Progessional Affiliations, Boxes 77-128

IV. Lectures and Conferences, Boxes 129-139

V. WritingsBoxes, 140-152

VI. Appointment Books, Boxes 153-157

VII. Scientific Notebooks, Boxes 158-177

VIII. Contracts and Funding, Boxes 178-194

IX. Scientific Projects, Boxes 195-386

X. Instrument Drawings, Boxes 387-389

XI. Restricted Correspondence, Boxes 390-394

Series I: GENERAL CORRESPONDENCE

This series includes both professional correspondence and files which Simpson designated "personal" correspondence. The former pertains principally to Simpson's scientific and professional activities, the latter to non-scientific community and family-related matters. Both subseries are arranged alphabetically by correspondent. Headings include both individuals and institutions. Simpson maintained a file for an individual when correspondence became regular, typically for a period of one or more years when a particular project, grant, or contract entailed regular correspondence with that individual. Most of the correspondence in this series was in sequences labeled "general correspondence," each covering a period of several years, and this series was constructed by collating these files. In some cases, miscellaneous correspondence found with papers of other series was added to this correspondence series. However, individual letters were usually left in the folders where they were found, and consequently letters and memos can be found throughout the Simpson papers. Correspondence with a particular individual or institution can often be found in files for particular projects in Series IX, and elsewhere depending on the nature of the relationship.

Series II: UNIVERSITY OF CHICAGO

Papers relating to Simpson's teaching and administrative duties at the University of Chicago are compiled in Series II. Lectures, notes, overhead transparencies, and quizzes are contained in the course materials subseries and listed by class number and the academic quarter in which the course was taught. They are arranged by course number.

Included in this series is a selection of annotated drafts of student dissertations which illustrate Simpson's involvement with graduate students and their research. He required each of his students to publish a single-author research paper. The most heavily annotated draft was selected from the six or eight in Simpson's files.

The Department of Physics subseries comprises files that Simpson usually labeled "Responsibilities," which cover a wide range of academic and administrative matters. These files are now labeled "general departmental files."

Simpson was director of the Enrico Fermi Institute from 1973 to 1978. The papers in the EFI subseries reflect that responsibility along with his professorship in the Institute.

The LASR subseries contains papers relating to the planning, financing and construction of the Laboratory for Astrophysics and Space Research. Included is NASA correspondence, extensive documentation of Skidmore, Owings and Merrill's architectural planning of the building, various plans for the expansion of the facility, and documentation of its sometimes turbulent financial history.

The College of the University of Chicago subseries reflects Simpson's involvement with several committees involved with undergraduate teaching.

Series III: PROFESSIONAL AFFILIATIONS

Series III documents Simpson's relationships with a number of scientific organizations. The first subseries contains papers referring to Simpson's involvement with the Atomic Scientists of Chicago, the Bulletin of the Atomic Scientists, and other national and international organizations concerned with science, atomic energy, and society during the years immediately following World War II. His activities in Washington D.C., as well as those of other scientists concerned with atomic energy policy, are reflected in these files.

Files on the International Geophysical Year (IGY) of 1957-1958 reflect both Simpson's administrative and scientific involvement. The latter, however, is more thoroughly documented in Series IX. These, mostly administrative, papers are divided into those relating to the Comité Spécial Année Géophysique International (CSAGI), meetings and conferences of CSAGI, and the United States National Committee for the IGY (USNC-IGY). Simpson was a representative of the International Union of Pure and Applied Physics (IUPAP) to CSAGI, and he was a member of the USNC Technical Panel on Cosmic Rays. The subseries also contains reports from countries participating in the IGY programs.

Following the IGY subseries are files concerning his membership in the Space Science Board (SSB), an organization of the National Academy of Sciences (NAS) involved with planning national policy for space research. Simpson was a member of the Committee on Physics of Fields and Particles in Space. The papers reflect the activities of Simpson and the SSB from its founding in the late 1950s through the 1960s. Several files containing SSB documents and position papers from the 1980s are also included.

The Astronomy Missions Board was a science policy board established by NASA. It met between 1967 and 1971, at which time it was dissolved and its function undertaken by the Space Program Advisory Council. Simpson was involved with the Fields and Particle Astronomy Panel during the years 1968 and 1969 when the panel drew up recommendations for particle astronomy to be supported in the 1970s. The files include meeting minutes, reports, and position papers.

Files on the National Academy of Sciences document Simpson's election to the Academy in 1959 and his activity with the Academy throughout his career.

Series III continues with files concerning the Space Science Working Group which Simpson formed in early 1982. Under the auspices of the American Association of Universities, the working group lobbied Congress and opposed budget cuts affecting allocations for space science that were made early in President Ronald Reagan's tenure. The working group primarily opposed cutbacks affecting NASA's Office of Space Science and Applications and Office of Tracking and Data Acquisition. Simpson's activities included correspondence, presiding at meetings, and making presentations to university and government personnel.

The Committee on Space Research (COSPAR) exists within the International Council of Scientific Unions (ICSU), a United Nations sponsored umbrella organization. Simpson was involved with COSPAR by way of its relations with the Space Science Board and with LASR, both of which reported to COSPAR during the 1960s and 1970s.

The Advisory Group on Science Policy (AGOSP) subseries contains files representing Simpson's activity in this group spanning 1972 to 1976. Meeting minutes, position papers, and reports are included in these files.

Miscellaneous files at the end of the series represent Simpson's membership on the Board of Trustees of the Adler Planetarium, his appointment by the Harvard University's Board of Overseers for Astronomy, and his correspondence with several other professional and academic organizations.

Series IV: LECTURES AND CONFERENCES

The files in this series relate to various meetings and conferences which Simpson either attended or in which he participated, and which do not relate directly or exclusively to a particular scientific or professional project. Files on conferences on the results of particular space probes, for instance, will be found in the appropriate project subseries in Series IX. The first section of the series includes files for non-technical or popular meetings and talks, such as those concerning science policy or those presenting scientific information to a non-scientific audience. After the general subseries, there are sections for particular scientific organizations sponsoring conferences. These include the American Geophysical Union (AGU), American Physical Society (APS), Midwest conferences on cosmic rays, and International Union for Pure and Applied Physics

(IUPAP). The title of the lecture Simpson delivered appears first in the folder heading. When no such title is given, Simpson probably only attended the meeting.

Simpson kept a series of notebooks devoted to meetings and conferences in which he participated. These are contained in Series VII.

Series V: WRITINGS

The Writings series contains one copy of each of Simpson's publications (to 1987) and a publication list indexing these (Box 140, Folder 1). The scientific papers subseries contains files produced over the course of Simpson's writing and research for papers whose results are not the outcome of one particular mission. Files for other publications are included in the appropriate project subseries. This series also includes photocopies of annotations Simpson made in various journal articles (Box 144, Folders 6-10).

Series VI: APPOINTMENT BOOKS

This series includes the yearly appointment books Simpson kept from the years 1951 to 1988. In them his appointments, daily projects, and activities are listed on a daily basis. They should be useful to the researcher studying any particular course of events in which Simpson was involved.

Series VII: SCIENTIFIC NOTEBOOKS

Simpson maintained several series of research notebooks. These are grouped according to a letter and number system Simpson employed. Loose papers that Simpson accumulated in the notebooks have in most cases been placed either with the notebook or in an adjacent folder. The original location of the loose papers (from inside the front or back cover, or from a particular page in a notebook), is indicated in the folder heading, or is penciled on the document in the upper right-hand corner.

Alongside the Projects Series, the notebooks constitute an independent record of Simpson's scientific work. Although notes and ideas are to be found written on papers throughout the Series IX, Simpson used these books for the bulk of his note taking, project planning, thinking-on-paper, and so on. Different series of notebooks were designated by Simpson by letters. The "A" and "B" series represent research on radiation counters Simpson undertook at NYU; the "C" series (one notebook) documents notes from the late 1940s on cosmic ray instrument designs; the "D" series reflects research on radiation counters and experiments Simpson placed on balloons and aircraft in the 1940s and 1950s; the "E" series (one notebook) is devoted to “betatron research” of the late 1940s. The larges series are the “F” series devoted to satellite and space probe missions, and the “G” series used for taking notes at conferences and meetings.

Series VIII: CONTRACTS AND FUNDING

This series contains papers and correspondence concerning the financing of various scientific projects. Much of Simpson’s funding came to him in grants which he utilized to fund several projects. These general grants and contracts are included in this series. Papers pertaining to project-specific funding are found in the appropriate project subseries in Series IX.

After a general subseries for miscellaneous or single project research grants, the files are organized according to the granting agency. Folder headings begin with the grant or contract number and, when available, the title of the research grant. Particular grants and contracts were often active for several years during which time Simpson’s uses of the financial support changed.

Series IX: SCIENTIFIC PROJECTS

The largest series of the collection contains papers produced by Simpson and his colleagues, students, and LASR staff concerning individual research projects and space missions. These project files typically include correspondence, memos, notes, data in various formats, drafts of scientific papers and funding proposals, and photographs of instruments. The subseries are ordered chronologically, although satellite and space probe projects typically consumed several years and overlap one another. Papers pertaining to one project can often be found in other project folders. Folder headings indicate where such overlap occurs. Subseries representing satellite and space probe projects are usually named according to the spacecraft utilized. NASA named the individual spacecraft within a series of missions with a letter, which would be replaced with a number after the spacecraft was successfully launched. “IMP A,” for instance, would become “IMP 1”; if IMP B had been successfully launched first, then it would become “IMP 1.” Successful missions therefore have multiple names. Subseries and folder labels generally reflect the nomenclature found in the papers the folders contain.

The “early work” subseries reflects the end of Simpson’s student work and the beginning of his professional research in cosmic ray physics. It contains several folders of papers from Reed College and New York University, including his A.B. and Ph.D. theses, and several folders relating to his activities in the Metallurgical Laboratory of the University of Chicago. Simpson’s work designing fast and convenient radiation counters in the Metallurgical Lab dovetailed with his earliest projects designing and fabricating various species of radiation counters. The subseries contains research files on counters and writings stemming from this research during the mid to late 1940s.

Files relating to both the aircraft and balloon experiments that Simpson undertook during the late 1940s and 1950s are also included here. Simpson's expansion of his neutron monitor network, before, during, and after the IGY, is also documented here. One important feature of the monitor stations was their continuous operation with mechanisms that would trigger alarms during sudden increases in cosmic ray activity. As these increases are related to solar activity, Simpson used the monitor stations to study solar behavior and to chart how solar, interplanetary, and terrestrial magnetic fields modulate solar and galactic cosmic rays. The subseries contains numerous files on observations of solar flare events taken from around the world by neutron monitor stations and by other researchers. Finally, this subseries contains a subgroup of files reflecting Simpson's preparation of papers and lectures which stem from his researches during this period.

The "early satellites" subseries contains files that document the beginning of Simpson's extraterrestrial measurements of cosmic rays. Because of weight, size, and mechanical and thermal stability constraints placed on instruments in space, this phase of Simpson's research witnessed rapid developments in the design and sophistication of Simpson's instruments. Discoverer 31, launched in September of 1961, marked Simpson's first use of a solid-state particle telescope. These files also illustrate the nature of research under the newly-formed NASA and the administrative complexities attending the growth of space science. Many of these early satellites were engineered by either Space Technology Laboratories (STL, becoming eventually TRW) or by the Jet Propulsion Laboratory (JPL). The papers evidence Simpson's interactions with these labs and, to some extent, the history of their development.

Files for the projects dating near the mid-1960s, such as Pioneer 6 and 7 in this subseries and early Mariner space probes, are organized into sections according to different functional and/or chronological phases of the project. Beginning with projects dating to this time, the number and complexity of the original files lent themselves to organization into categories such as: project planning and proposals, instrument construction, instrument testing, post-launch data collection, and publications. Pioneer 6 and 7, for instance, is divided into "design and testing" and "post-launch" phases, with an added section containing technical documentation from Ames Research Center and STL which were involved in the project. Later project subseries are usually subdivided into finer and sometimes different project phases.

The Pioneer 10/11 subseries is very large, illustrating both the increasing volume of correspondence and documents entailed by deep space probes and as well the growth of Simpson's own research group within LASR and the complexity of his instrument package for the spacecraft. For these experiments Simpson designed both a fission detector and an electron current detector (ECD) to supplement two charged particle telescopes. This instrument package led to the discovery of Jovian electrons propagating throughout interplanetary space. The Pioneer 10 and 11 spacecraft also utilized radioisotope thermal generators (RTGs) as non-solar power sources. A number of files document Simpson's activities in designing instruments shielded from the radiation that the RTGs themselves produced. Like Pioneer 6 and 7 files, this sub-subseries incorporates a number of technical documents from Ames Research Center.

The OGO/EGO/POGO files represent a series of earth orbiting satellites on which Simpson placed instruments during the 1960s and early 1970s. They were, in Simpson's words, "big, dumb platforms" designed to carry scientific instruments. The nomenclature involved with these satellites is complex. The Orbiting, Eccentric, and Polar Orbiting Geophysical Observatories, respectively, are not independent projects; OGO-A and OGO-B are synonymous with EGO. Folder headings preserve the terminology used to describe these various projects.

The Interplanetary Monitoring Platform (IMP) satellites were also earth-orbiting satellites on which Simpson and his group often placed instruments. The IMP F and G missions are well represented in this subseries. IMP H and J and IMP I (or "Eye") files each comprise their own subseries. Like the neutron monitors, the IMP instruments helped establish baselines of measurements against which data from space probes and other satellites could be compared.

The Mariner series of missions to Mars, Venus, and Mercury comprises three subseries. The Mariner A, B, and C papers documents Simpson's early relationship with the Jet Propulsion Lab and the growing complexity and legality of Simpson's relationship to JPL and NASA regarding data exchange, scientific priority, and spacecraft-instrument interface. Mariners '67, '69, and '71 were missions which were either cancelled or for which Simpson's proposal was not accepted. Only a few files exist from the first two of these missions.

The Mariner Venus-Mercury '73 mission subseries is the largest in Series IX. It perhaps best represents the complexity of planning and executing space probe missions. The first section represents a planning phase during which NASA constituted various teams of potential experimenters to advise NASA on how a space probe could maximize its scientific return. Additional sections document the design, construction and testing of Simpson's instrument (much of which was identical to the instrument package flown on Pioneer 10 and 11); activities centered around data acquisition and processing; planetary encounters; data exchange and publications; and finally, as with the earlier Mariner and Pioneer subseries, NASA, JPL, and Boeing technical documentation.

The "Grand Tour" subseries represents papers stemming from Simpson's role in the late 1960s and early 1970s helping NASA define a grand tour mission. The mission would have a space probe encounter and swing by several planets of The Solar System. Simpson did not participate in what became a Mariner Jupiter-Saturn (MJS) mission. The subseries contains extensive notes by Simpson concerning the design of the instrument he proposed for this mission.

The International Sun-Earth-Explorer (ISEE) was a mission from which Simpson's experiment was removed after initial acceptance. The mission entailed three spacecraft, one to be placed in a heliocentric orbit and two others to be placed in earth orbit. In early 1973, Simpson's plans to modify his experiment package, accepted for placement on the "mother" satellite, met with controversy. Some felt the modification would allow Simpson to make isotopic particle measurements before other similar experiments on the helicoentric satellite. Later, in 1975, Simpson's instrument was removed from the mission. This experience encouraged Simpson to seek additional scientific support from agencies outside NASA.

Files in the Cosmic Ray Isotope Experiment (CRIE) subseries document a series of mission opportunities during the 1970s and 1980s on which Simpson sought to place experiments designed to analyze solar and cosmic ray isotopes. The mission opportunities included offerings by NASA, the Air Force, the Office of Naval Research, and the National Research Council of Canada. The experiments Simpson promoted include the Solar Isotope Separator (SIS), Solar Isotope Radition Experiment (SIRE), CRIE, and the Energetic Heavy Ion Composition Experiment (EHIC). After a series of experiment modifications and mission cancellations, the low energy telescope section of the experiment package (Phoenix 1) was launched in 1982 on a polar orbiting Air Force satellite. The high energy portion of the package was included in the CRRES mission, launched in July 1990. The subseries illustrates how Simpson continued to refine his instruments during this period while simultaneously negotiating with different agencies to place his instruments in space.

The International Solar Polar Mission, like CRIE, represents the result of a long process of mission definition in which Simpson played an important role. The subseries documents Simpson's promotion of the scientific importance of out-of-the-ecliptic mission in the early 1970s; his involvement with NASA and the European Space Agency (ESA) in defining the mission; his role as a consultant to JPL; his own work as principal investigator in the Cosmic and Solar Particle Investigation (COSPIN) experiment; his efforts to fight Congressional cutbacks in the early 1980s which curtailed NASA's commitment to the mission. In 1990, this joint ESA-NASA mission, in its final form as Ulysses, was finally launched by NASA.

The "solar flare studies" subseries includes files relating to various aspects of Simpson's solar particle research during 1972-1978. A variety of research papers, lectures, experiments, and correspondence is documented, as are Simpson's continuing researches on detection and measurement of cosmic ray neutrons.

Simpson's interest and involvement with solar energy technology is illustrated by the files he kept on Roland Winston's Compound Parabolic Concentrator experiments. Winston's patent dispute with General Electric Corporation and Simpson's efforts on behalf of Winston are documented in this subseries.

The "glossy print file" is a collection of photographs and figures which Simpson compiled since the 1960s. Most of the prints represent scientific data in their final form for inclusion in research papers.

Finally, the miscellaneous projects and files subseries was created to contain files which did not belong to other series. Files included range from miscellaneous papers by other scientists to several files documenting Simpson's participation in the two Vega missions of the U.S.S.R.

Series X: INSTRUMENT DRAWINGS

This series contains technical instrument drawings selected from LASR's collection. In addition to the technical drawings dispersed throughout Series IX, these illustrate the mechanical, electronic, and logical detail of several of Simpsons's instruments and, by the various kinds of drawings, the processes involved in their design and construction. The selection of Ranger and Pioneer F/G drawings, in particular, were chosen to illustrate how schematic drawings for one instrument "nest" within one another. A functional unit represented on one drawing will be exploded in detail in another drawing, whose units are in turn detailed in other drawings. The index of drawings included in the series indicates the nature of the larger drawing collection stored in LASR.

Series XI: RESTRICTED CORRESPONDENCE

Restricted correspondence is contained in Series XI. Folders containing letters of reference for various individuals are first listed alphabetically. A few folders containing materials on EFI and LASR personnel are then followed by a subseries of folders of referee reports organized alphabetically by institution and journal.

Access to the materials in Series XI is restricted until the year 2020.

Related Resources

The following related resources are located in the Department of Special Collections:

http://www.lib.uchicago.edu/e/spcl/select.html

John A. Simpson. Papers. Addenda

Department of Physics. Records

Bulletin of the Atomic Scientists. Records

Atomic Scientists of Chicago. Records

Chandrasekhar, Subrahmanyan. Papers

Subject Headings

- Simpson, John A. (John Alexander), 1916-
-
- Atomic Scientists of Chicago
- University of Chicago. Department of Physics
- Physics
- Physicists

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