



Photograph of the SLAC Large Detector, known locally as the 'ants on the detector' photograph. It illustrates the sizes of large detectors and collaborations in high-energy physics in the mid-1990s. Photo courtesy of Harvey Lynch.

Bohr-Heisenberg Drama Continues to Stir Debate

by Finn Aaserud, Director, Niels Bohr Archive, Copenhagen

Michael Frayn's play *Copenhagen*, drawing on the meeting between Niels Bohr and Werner Heisenberg in the Nazi-occupied Danish capital in September 1941, has experienced public attention and critical acclaim rarely seen for a fictional account drawing on events and issues from the history of science (see this *Newsletter*, Spring 2000). Although it recently ended its run on Broadway—as well as in London, where it premiered back in May 1998—the play continues to be staged and to draw interest internationally. The play was presented in Berlin in February this year, and in the fall of 2001 it will begin a U.S. tour, starting in San Francisco.

Whereas theater critics and physicists have reacted to the play with virtually unanimous acclaim, the response of historians of science who have worked with Frayn's historical issues has been mixed. The ongoing dispute is mainly rekindled when one historian or another takes issue with the historical veracity of

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What Should Be Done to Preserve the History of Large Collaborations?

by Joan Warnow-Blewett

The AIP's ten-year study of multi-institutional scientific collaborations was designed to learn how to preserve the history of these crucially important but transient institutions. What materials best document their functions and activities? What steps should be taken to secure these materials for scientist-administrators, future historians, and others? (See previous issues of this *Newsletter*.) The project has now issued its recommendations. They are—quite literally—a call to action on the part of federal science agencies, academic archives, the National Archives and Records Administration, and other institutions. The project recommendations pertain most directly to the scientific fields studied: high-energy physics, space science, geophysics, ground-based astronomy (including observatory builders and observatory users), heavy-ion and nuclear physics, materials science and medical physics.

The AIP Center takes a hard-nosed position that only a very, very small fraction of the records created can possibly be saved. To preserve even these for posterity, action is necessary now.

After a decade of research and analysis we reached a point where we felt confident that we were in a position to make solid recommendations. Project staff:

- carried out fieldwork involving over 650 interviews with participants of selected collaborations and scores of site visits to archivists and records managers in academia, government-contract laboratories, federal agencies, and elsewhere;
 - prepared historical and archival analyses of findings based on fieldwork and previous knowledge of AIP Center staff;
 - experimented with three approaches to the appraisal of records created by collaborations: a typology, functional analysis, and standard appraisal guidelines; and
 - produced an assessment of current archival practices.
- When we compared the scope of the records needed to document collaborations against our assessment of current archival policies and practices, the urgency of our project recommendations became abundantly clear.

The project recommendations are now available. The first section looks at **POLICIES AND PROCEDURES**. The following synopsis focuses on recommendations addressed to academic institutions and to federal science agencies, because we found that it is these two

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Frayn's account of why Heisenberg traveled to Copenhagen in 1941, and more generally the question of why Nazi Germany did not get far towards building an atomic bomb. Debate continues especially in the U.S. news media. Frayn, who presented his historical sources in a "Postscript" to the published version of his play, has been quite willing to engage in this debate on the historians' premises (e.g., *Los Angeles Times* December 31, 2000 and January 21, 2001, and *New York Review of Books*, February 8, 2001).

This has created opportunities for a constructive dialogue between dramatists, physicists and historians about what sort of communication and collaboration is possible among the three disciplines of drama, physics and history. This issue has been addressed, for example, in the New York symposium organized in connection with the opening of the play on Broadway (see the Web site <http://web.gsuc.cuny.edu/ashp/nml/copenhagen>), in a German-language book being published by the Max Planck Institute for the History of Science in Berlin, and in a seminar organized in November 1999 by the Niels Bohr Archive

Copenhagen on Tour

A U.S. national tour of the play *Copenhagen* begins in November. In addition to the main tour described below, a number of other performances (including one-nighters) will be given at various locations, so watch your local media. The tour will begin in Santa Fe, NM (appropriately near Los Alamos), November 16-18, 2001. The tentative schedule after that is as follows (for the weeks beginning on the given dates):

Weeks of 11/19 through 12/31, 2001: Los Angeles (Wilshire)

Weeks of 1/7 through 1/28, 2002: San Francisco (Curran)

Weeks of 2/4 and 2/11, 2002: Chicago (Shubert)

Weeks of 2/18 and 2/25, 2002: to be determined, Philadelphia and Midwest

Weeks of 3/11 through 3/25, 2002: Washington DC (Eisenhower)

Weeks of 4/1 and 4/8, 2002: Detroit (Fisher)

Weeks of 4/15 and 4/22, 2002: Boston (Wilbur)

These dates and locations are not final and may be changed.

More Plays About Physicists

QED, a new play by Peter Parnell, inspired by the writings of Richard Feynman and by Ralph Leighton's *Tuva or Bust!*, held its world premiere in Los Angeles in March. Alan Alda played the role of Feynman. Meanwhile *Louis Slotin Sonata*, a new play by Paul Mullin, was briefly performed last year in Los Angeles and played in New York City this April. It is based on the last days of Louis Slotin, who died of radiation poisoning at Los Alamos in 1946 after an experiment measuring the critical mass for an atomic bomb went awry. These performances were supported in part by the Alfred P. Sloan Foundation as part of its long-term efforts to improve public understanding of the scientific community through popular works incorporating history of science.

(for a complete transcript, including the animated and extensive discussion with the audience, see <http://www.nbi.dk/NBA/files/sem/copintro.html>).

The Niels Bohr Archive (NBA) is now planning a second, more ambitious symposium, sponsored by the Danish Ministry of Research and the Faculty of Science at the University of Copenhagen. At this event, Frayn will meet some of the foremost historians of science with special knowledge of the issues and events taken up in the play. Nevertheless, the objective is less to continue the dispute about the 1941 Copenhagen meeting than to explore further the possibilities for communication and collaboration between dramatists and historians of science. In addition, the symposium will address questions such as perspectives for transforming historical events into contemporary issues, why the play has been so extraordinarily successful, and how it is understood by the wider public. Sessions are expected to take place at Niels Bohr's residence at the Carlsberg Mansion, where the action of Frayn's play occurs, and at the Niels Bohr Institute, where Heisenberg lived and worked with Bohr in the 1920s. More detailed information about the symposium, which is tentatively scheduled for September 22-23, 2001, will be posted on the NBA's Web site, <http://www.nbi.dk/nba>. Questions may be addressed to the Niels Bohr Archive, Blegdamsvej 17, DK-2100 Copenhagen, Denmark; e-mail nba@nbi.dk, phone +45 353 25219, fax +45 353 25428.

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sectors that bear the greatest burden of documenting multi-institutional scientific collaborations.

Academic Institutions. We recommend, first of all, that the papers of faculty who have regularly led or participated in important collaborative research be saved. In other cases, collaboration-related records kept by a faculty member should be accessioned (whether or not the balance of the individual's papers are), especially if the collaboration was deemed significant. A second recommendation asks academic archives to enlarge the scope of their collecting policies in order to accession non-federal records of NSF centers, science management offices, and consortium headquarters offices within their institutions. Finally, because these two recommendations stretch the means of most academic archives, we urge universities with strong science programs to request modest increases in their federal grant overhead rates to support their archives.

Federal Science Agencies. The two most important recommendations to this sector are: (1) federal agencies responsible for negotiating overhead rates to universities should support a marginal increase to provide the modest additional support academic archives need to document collaborative and other federally funded research and (2) federal science agencies should recognize the needs and benefits of providing adequate support for their own agency records management program. Throughout the AIP Study, project staff were taken aback by the meager resources made available to in-house records management programs. We ask federal science agencies to recognize that, with the exception of the Department of Energy, their own agency records management programs lack the resources to meet even the legally required standards of securing adequate documentation of their programs and activities.

Our complete Project Recommendations include ones addressed to specific federal science agencies. We give particular attention to the facilities of the **National Science Foundation**. Readers may be aware that the NSF supports major facilities (e.g., National Observatories) and centers (both its Materials Research Science and Engineering Centers and its Science and Technology Centers) but may not be aware that these institutions do not create federal records that would provide them with some protection by the National Archives. Accordingly, we recommend that NSF should fund fully the archival programs at its national facilities and provide fiscal and moral support for proper maintenance of records at its centers and at other major research institutions it funds.

National Archives and Records Administration. Multi-institutional collaborations are virtually all funded by federal science agencies and much of the research and development is carried out at agency facilities. Some of the most important of the AIP Study's recommendations are those addressed to NARA—which plays such a critical role in determining which records documenting federal functions and activities are saved. Among other things, we urge NARA to solicit increased input from subject matter experts so that it can make more informed deci-

sions on records appraisal and, also, to work with agencies to monitor and promote agency records management practices to insure that legal regulatory responsibilities are met, including the identification and maintenance of records of permanent value.

Another major recommendation is directed to **nonacademic research laboratories** (government, Federally Funded Research and Development Centers, corporate, and free-standing institutions). We found that these laboratories—however important their contributions to postwar science may be—almost without exception lack programs to protect their valuable records. We ask them to initiate archival programs.

The next main section of the full report suggests **WHAT TO SAVE**. This covers **policy and planning records** as well as **records of specific scientific disciplines**. Among the disciplines covered by the AIP Study, we found policy-making bodies that have had a direct influence on collaborations in the fields of geophysics and space science; institutional records to be saved include those of the relevant Boards of the National Academy of Sciences, the International Council of Scientific Unions, and the World Meteorological Organization. We also list, under specific disciplines, core records (a small set to be preserved for each collaboration) and the more extensive files to be retained for the most significant collaborations.

A section on **HOW TO SAVE** contains recommendations to **identify past and future collaborations of major significance**. Our first concern must be the identification of past collaborative research projects, since the documentation becomes endangered as soon as the project has ended and scientists turn their attention to other matters. We ask for the participation of all knowledgeable parties including individual scientists, academic departments or research laboratories, policy and planning bodies, and history committees of AIP Member Societies and suggest specific actions they might take. We ask scientists and research directors at laboratories and other research centers to set up a mechanism to secure records of future significant experiments. Put briefly, we ask that once a proposal for an experiment/project of likely significance is approved, the relevant administrator at the research site should require the collaboration to identify an individual collaboration member to be responsible for collaboration-wide records and which, if any, records on the team level should be retained on a long-term basis because of scientific or historical significance.

The Final Report of the AIP Study of Multi-Institutional Collaborations, consisting of *Highlights and Project Recommendations* and the more complete *Documenting Multi-Institutional Collaborations* (which also includes the Recommendations) will be available shortly from the AIP Center on request. The text of these and other project reports will also be found on our Web site at <http://www.aip.org/history/pubslst.htm#collabs>.

Nowadays one branch of physics is not readily comprehensible even to other physicists if they work in different areas. How will historians cope, or will we become dependent on the memoirs of retired scientists with no formal training in historical analysis?

—Neil Brown

Library of Congress Acquires Electronic Archive of APS Publication

By Scott Carlson

The Library of Congress is acquiring its first complete electronic archive of a set of publications—journals published by the American Physical Society.

The library will provide a backup archive for the Society's physics journals, guarding them in the event that the Society's main server is destroyed by a disaster or if the Society goes out of business.

The Society's eight physics journals together publish about 14,000 articles every year. Under the deal, the Library of Congress will assume ownership of the material if the Society goes under or is no longer able to maintain its electronic archives.

Other than the cost of buying and maintaining the server, the Library of Congress will not have to pay anything for the arrangement. Nancy Davenport, the library's director of acquisitions, says the library can't estimate the cost of setting up the server until the American Physical Society begins providing electronic copies of its journals, sometime this month.

Robert A. Kelly, director of journal information systems at the Society, estimates that a server and storage unit might cost the library \$125,000. Mr. Kelly says the institutions began discussing the arrangement a year and a half ago, when he ran into a Library of Congress representative during a fire drill at a National Institute of Standards and Technology conference.

Although the library will not be charged for the online data, it will still pay subscription fees as long as it gets the paper versions of the journals. Library users will have access to the electronic versions.

The agreement, which was announced last month, seems to begin to provide solutions to a set of nagging problems and challenges facing both organizations. "This was a very convenient set of circumstances in that APS was looking for a solution to the archiving problem, and the Library of Congress was looking at getting into electronic publications in a substantial way," says Thomas McIlrath, publisher and treasurer of the Physical Society.

The Society had been looking for ways to back up the electronic versions of its journals, one of which is published only in electronic form. By the end of the year, the Society hopes to have the entire history of its publications online. Although the Society's oldest publication began in 1893, the electronic archives go back to only 1981.

The Library of Congress, meanwhile, was recently criticized by the National Research Council, which reported that the institu-

tion was lagging behind in receiving and archiving "born digital" documents of American history and culture. Congress recently approved \$100 million for digital archiving projects at the library. Of that amount, an initial \$25 million can be used to start the program and form a plan for its operation, which must first be approved by the appropriations committees of the House of Representatives and the Senate. The library will have to work with various government agencies—such as the National Library of Medicine and the National Institute of Standards and Technology—along with private electronic publishers in writing the plan.

The remaining \$75 million will be provided only to match donors' contributions, which the library will have to raise before March 2003. Guy Lamolinara, a spokesman for the library, says it is too soon to say where the library will solicit funds.

Ms. Davenport says the arrangement with the Physical Society was not a direct response to the critics: "We were in discussions with [the Society] long before this report came out. But the agreement is absolutely in the spirit of the report." She says that the library will begin talking about similar arrangements with publishers of other electronic journals and publications this year.

Ms. Davenport says that some people think that the software used in the archiving system should be preserved, but the library is mainly interested in protecting the journals' content and providing access to them. "There may be occasions to preserve software because it is important unto itself, but as we see this developing into the future, we want to preserve access to the content, even if that means creating new access," she says.

Past critics of the Library of Congress see the agreement with the American Physical Society as a positive development since the release of the National Research Council report.

"I think they are making efforts to catch up," says Margaret L. Hedstrom, an associate professor in the School of Information at the University of Michigan at Ann Arbor and a member of the committee that wrote the report. "They've taken the report from the National Research Council fairly seriously, and this is a good indication of starting to put some of those things in practice."

Volunteer Sought to Search the Web

The History Center's Web pages of history of science community links and exhibits are a unique resource for scholars and students, receiving thousands of visits each month (<http://www.aip.org/history/web-link.htm> and <http://www.aip.org/history/exhibit.htm>). Unfortunately our staff lacks the time to keep these entirely up-to-date with the swiftly evolving Web. Some sites shift their location, while others arise without our knowledge. We would much appreciate having the help of a volunteer who could spend a few hours a month surfing the Web and recommending links that we should add or change. To discuss this, e-mail swart@aip.org



President Lyndon B. Johnson on the telephone at Mission Control, Cape Kennedy, September 15, 1964. Photo courtesy of the Lyndon B. Johnson Library. Photo by O.J. Rapp.

between the Atomic Energy Commission and NASA.

The Library contains many other materials documenting the interplay of science and public policy during the Johnson years. The Administrative History collection, created to document the history of executive agencies during the Johnson administration, includes histories of the Office of Science and Technology, NASA, the National Aeronautic and Space Council, the Atomic Energy Commission, and the U.S. Arms Control and Disarmament Agency. Other collections of interest are the Recordings of Johnson's Telephone Conversations, Office Files of White House Aides, pa-

pers of the President's Advisory Committee on Supersonic Transport, the collection of oral history interviews, and various Personal Papers collections, especially the papers of Donald Hornig, Director of the Office of Science and Technology and LBJ's science advisor.

Also of interest are Johnson's pre-presidential papers. The Senate Papers include documentation on LBJ's role as chairman of the Armed Services Preparedness Subcommittee, which investigated the U.S. satellite program following the Soviet launch of Sputnik in 1957, and his roles as chairman of the Senate Special Committee on Space and Astronautics and the Special Committee's successor, the Senate Committee on Aeronautical and Space Sciences. The Vice Presidential Papers and the Vice Presidential Security File document LBJ's role as chairman of the National Aeronautics and Space Council. Those searching for the official records of the Preparedness Subcommittee, the Space Committees, and the Space Council, however, should contact the National Archives at (301) 713-6800 or by e-mail at inquire@nara.gov.

For more information, researchers should refer to the Library's Web site at <http://www.lbjlib.utexas.edu>. This site includes copies of relevant reference guides and some transcripts of oral history interviews. The Lyndon B. Johnson Library and Museum is one of ten presidential libraries administered by the National Archives and Records Administration. Scholars may inquire about research by writing the LBJ Library, 2313 Red River St., Austin, Texas, 78705, or by e-mail at Library@johnson.nara.gov.

History of Science Documentation in the Lyndon B. Johnson Library

by Mary Knill, Archivist

When Lyndon B. Johnson took the oath of office on November 22, 1963, the United States was in a race with the Soviets to put a man on the Moon, as well as embroiled in the Cold War. The race to accomplish a manned lunar landing by 1970 prompted advances in nuclear energy, jet propulsion, development of synthetic materials and computer technology. Other areas of science that grew in the 1960s were radiological health, irradiation in agriculture, meteorology, electronics, communications and communications satellites and supersonic transport.

Collections at the LBJ Library that are useful to researchers of science and science policy include the White House Central Files (the main filing unit for the White House) and the National Security File, which contains the majority of material pertaining to foreign policy issues. White House Central Files subject areas of possible interest include atomic energy, civil aviation, international organizations, outer space, peace, and science. Materials of particular interest in the National Security File include the Subject and Agency Files, the Files of Spurgeon Keeny and the Files of Charles Johnson. Spurgeon Keeny served concurrently on the National Security Council and with the Office of Science and Technology. Charles Johnson handled issues concerning arms control, atomic energy, space and other scientific matters, serving as liaison

Improved Online Access to Historical Resources at the IEEE History Center

By Michael N. Geselowitz, Director

The history of physics can hardly be separated from the history of its applications to electrical, electronic and information engineering, and allied fields. The IEEE History Center vigorously preserves, researches, and promotes the legacy of electrical engineering, computing, and all related fields of interest to the members of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). The largest professional technical society in the world, IEEE represents some 400,000 practitioners in the fields of electrical and computing engineering and science. Founded in 1980 at IEEE's Manhattan headquarters, it was relocated to the campus of Rutgers, the State University of New Jersey in 1990. The IEEE History Center is co-sponsored by these two institutions. The fields of interest of the IEEE and its History Center include many areas of concern to physicists, such as antennas and propagation, geoscience and remote sensing, lasers and electro-optics, magnetics, microwave theory, nuclear and plasma sciences, and superconductivity. The Center's mandate includes the history of these technologies, the history of the engineering professions, and the institutional history of IEEE and its predecessor organizations.

The Center has traditionally carried out this work through a number of programs. Of special interest is our collection of oral histories of prominent participants in the field. These include a number of physicists, for example: Elizabeth Laverick, a pioneering woman in the field of microwaves; Physics Nobel Prize laureate Arno Penzias; Herman Schwan, internationally recognized for his work in biophysics as well as biomedical engineering; and Charles Townes, one of the developers of the MASER.

The Center staff also conduct historical research and present articles in IEEE publications, historical publications, and publications of interest to the general public. They publish monographs, a newsletter, and collections of papers; hold conferences; prepare exhibits; collect historical images; maintain an archive of unpublished IEEE papers; answer reference requests; and host relevant Web pages on the IEEE Web site. In addition, Center staff teach classes at Rutgers and participate in the other educational activities there. Finally, we support volunteers in other historical activities of IEEE such as the selection of a postdoctoral fellow in electrical history, the awarding of a historical paper prize, and the designation of sites as Milestones in Electrical Engineering and Computing.

In the past few years, the History Center has been doing an increasing portion of its business electronically. Abstracts and transcripts of more than half of its almost 400 oral history interviews (including all those mentioned above) can now be found on-line, as can several historical articles and research guides, a threaded bulletin board for historical discussion and exchange, a list of IEEE Milestones, past issues of newsletters,

rotating special features, and more information on our programs, products and services.

Traditionally, our main audiences have been professional engineers and historians and, to a lesser extent, journalists and decision makers. In keeping with a recent increasing emphasis at IEEE on reaching the broader public and, particularly, pre-college youth, and in keeping with the goal to deliver products and services more broadly through use of Internet technology, our latest initiative is to build a "virtual museum". The IEEE Virtual Museum will explore and present the global and social impact of technology. It will also demonstrate the relevance and significance of engineering and engineers to society, through a focus on electro- and information technologies and their history. Using the latest internet-based techniques, it will seek to educate the general public, with an emphasis on younger generations. The IEEE Virtual Museum is slated to open in early 2002, and in the meanwhile its progress can be tracked on the regular IEEE History Center Web pages.

The IEEE History Center is located on the Rutgers University College Avenue Campus, 39 Union Street, New Brunswick, NJ 08901-8538, phone +1 732 932 1066, fax +1 732 932 1193, history@ieee.org. We especially welcome our colleagues and historians in physics and allied fields to visit us online at http://www.ieee.org/history_center.



Telstar receiving antenna at Goonhilly Downs, Cornwall. Photo courtesy of MIT Museum.

MARAC Honors Physics History Finding Aids Web Site

The Mid-Atlantic Regional Archives Conference (MARAC) has selected the History Center's Physics History Finding Aids web site as a recipient of the 2000 MARAC Finding Aids Award (second place, collection guides). The Finding Aids Awards Committee "was impressed with the Web site. It has a good search engine, downloads quickly, is easy to use, and is a good innovation." The Committee also noted that the site offers a useful choice between frames or non-frames.

The Physics History Finding Aids Web site is online at <http://www.aip.org/history/ead>. For a full description see "Finding Aids to Major Collections at Ten Archives Now Online" in the Fall 2000 *AIP Center for History of Physics Newsletter*. Development of the Physics History Finding Aids Web site was supported in part by a grant from the National Endowment for the Humanities.

Preserving the Papers of Nobel Laureates and Other Leading Scientists

By Joe Anderson, Assistant Director, Center for History of Physics

One of the AIP History Center's primary efforts is to identify and place the papers of leading scientists at their home institution's archives or other appropriate repositories, combined with efforts to strengthen and support those archive programs. We are able to handle an average of a little over 50 new cases a year. Over the last few years we have altered the nature of the papers that we target. In the past, most new cases we initiated were for papers of scientists who had died recently. We have cut back on the number of these cases so that we can attend to particularly important individuals who are at retirement age or who for other reasons are ready to transfer their papers to an archives.

We began systematically focusing on living scientists in 1995 when we realized that even the papers of the best-known group of physicists, those who have received the Nobel Prize, are not always sure of finding a permanent home. We addressed this problem by contacting the home institution archivist for each living Nobel physicist at or past retirement age. We informed the archivist that they had laureates at retirement age, asked if they had already made arrangements for their papers, and offered to contact the physicists on their behalf. Since 1995 we have added new Nobelists to our list as they turned 65 and have regularly contacted their home institution archives. Over the last six years we have contacted archivists about the papers of more than 60 living Nobel physicists. The immediate results vary—many archivists tell us that they have already been in contact with the scientist, others say that they'll get in touch with them, and still others ask us to write on their behalf. Over the long term we believe that these efforts are helping to ensure that archivists and Nobel laureates work together to preserve resources that will provide future researchers with essential insights into the development of modern physics.

We are also concerned with the papers of other living scientists, including physicists of high caliber who have not received the Nobel Prize and astronomers and geophysicists who are not eligible for it. One sure source of information on the papers of important scientists is scientists themselves, who contact us to inquire about placing their own papers or those of colleagues. We have seen an increase in these direct contacts over the last year or so. We have also tried to come up with objective criteria for identifying individuals who have accomplished important work. For example, we have begun contacting the home institution archivists of retirement-age astronomers who have received three high honors in the field: the Russell Lectureship of the American Astronomical Society, the Bruce Medal of the Astronomical Society of the Pacific, and the Gold Medal of the Royal Astronomical Society. Only nine men now living have received all three of these honors, and their papers will offer vital keys to understanding 20th century astronomy. For geophysicists, we have worked with the History Committee of the American Geophysical Union, who in 1997-1998 identified a set of leading geophysicists (see this *Newsletter*, Fall 1997). We surveyed them and are following up with senior figures who told us they have papers which should be preserved.

The goal of the work is to help identify the relatively small group of papers and records whose preservation is most critical to future generations' understanding of contemporary science, and then encourage scientists, archivists and historians to work together to preserve them. Those interested in more information on how to preserve papers should check our recently updated brochure, *Scientific Source Materials: Saving Personal Papers and Archival Records in Physics and Allied Fields* (on the Web at <http://www.aip.org/history/source.htm>), or contact the History Center's director or assistant director.



The U.S. science funding system ca. 1950. A worthy scientist receives a sack of “Ye Swag” from the Renaissance princes of the Office of Naval Research. Drawing by Mike Dormer, reprinted with permission from National Research Council, Ocean Studies Board, Fifty Years of Ocean Discovery: National Science Foundation 1950-2000, copyright © 2000 National Academy of Sciences. Courtesy of the National Academy Press, Washington, D.C.

Russian Archives Still Unexplored after a ‘Gold Rush’ Decade

by Alexei Kojevnikov

Researchers whose topics have some connection with Soviet history have labeled the last decade “the era of archives.” Political upheavals in the USSR and its successor states, and the subsequent opening of archival collections that had been strictly guarded, were so sudden and massive that they irreversibly changed the criteria and practices of historical research. In many cases where former generations of historians had relied on rumors, propaganda or theoretical schemes, the new cohorts dug deep into archival dust, especially that left from Stalin’s times. Some finds had particular importance for the history of physics: Anatoly Sonin and others found documents from the 1949 ideological discussion that attempted to reproduce in physics what the infamous 1948 meeting in agricultural sciences did to Soviet genetics, a discussion that luckily was cancelled at the last moment [1]. Vladimir Vizgin published and commented on a selection of documents leaked from the foreign intelligence service, which revealed to some degree what Soviet spies had learned about the Manhattan project [2].

This “gold rush” decade delivered scores of other precious archival nuggets, but it may be the right time now to warn of some inadequacies. The sheer volume of newly accessible documents has often exceeded the ability of historians, including the current author, to digest and carefully rethink their historical meanings. This has led, for example, to many books or journal articles that consist mainly of a fully printed text of an archival document with only skimpy commentaries. As a result, serious analysis has given way to journalistic superficialities. The archival digging itself was largely guided by a narrow drive for sensational revelations and the desire to uncover secrets. While many lies of Soviet propaganda have been successfully unmasked, the lies of anti-Soviet propaganda were mostly repeated uncritically, even when they were in contradiction with archival evidence. Now that the initial shock has passed, a more serious and thoughtful historicism is in order to overcome the narrowness of politically-driven sensationalism and Cold-War prejudices.

The new historicism will require, *inter alia*, a more thorough and systematic work with archival sources. In this regard, Russian archives can still be considered virtually unutilized, with many first-rate collections still waiting for historians. Let me point to several examples of primary importance to the history of physics. The Archive of the Russian Academy of Sciences has been a major source for researchers even before the openings of the last decade. Lately it has been adding and cataloging (in part with the help of grants from the AIP Center for History of Physics) a number of new personal collections. Perhaps the most interesting of the recent acquisitions are the papers of Ya.B. Zel’dovich, one of most important physicists of the last century in several fields (chemical physics and chain reactions, physics of explosions, nuclear and elementary particle physics, cosmology and astrophysics), the papers of admiral A.I. Berg, the chief Soviet expert on cybernetics and electronics, and the papers of V.V. Shuleikin, one of the founders of Soviet geophysics and oceanography.

By comparison with the Academy’s archives, the archives of the Universities have been used by historians of science much less intensively and remain a largely uncharted territory.

Outside academic collections per se, one of the major sources of recent archival discoveries and a dramatic example of the

transition from secretiveness to openness is what used to be the Archive of the Communist Party of the Soviet Union. If not for the annoying habit of frequently changing its official new name, which disorganizes citations to its documents, it could be the most researcher-friendly archive in Russia. Historians have primarily studied its collections of political documents from the Stalin era [3]. Very little has been understood so far about the relationship between science and politics in later periods of Soviet history and the role of scientists as experts in decision-making processes. For this, one should also consult documents from another archive, formerly known as the Archive of the Party's Central Committee, which extend chronologically into the 1980s.

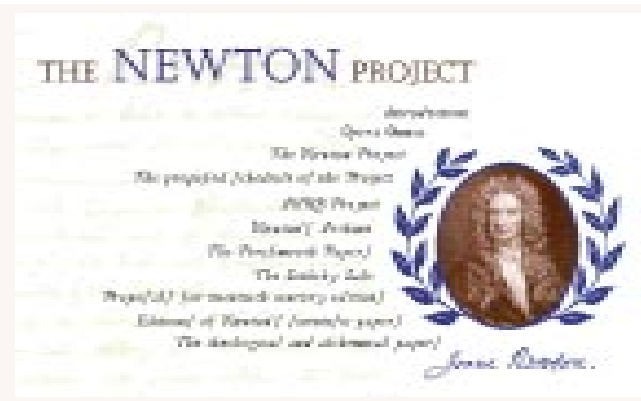
The grand task of understanding Soviet industrialization and modernization, and the exceptionally prominent role scientists played in these movements, still humbles historians. Quantities of materials pertaining to the relationship between Soviet science and industry—from the earliest case of the State Optical Institute in Petrograd/Leningrad through the experience of World War II into the space era—are kept in the State Archive of the Russian Federation, its branches, and many other locations as well. The crucial military aspect of this relationship is harder to investigate since secrecy levels have been maintained rather strictly even for documents from the first half of the 20th century. Yet even here there are more opportunities available than have been utilized. The “official” project on the history of the extremely secretive Soviet atomic project has recently produced its first two volumes of archival documents [4], and the on-going process of declassification should make the materials more accessible to “unofficial” historians as well. Last fall, I worked in the Archive of Military History, which contains an enormously rich—and open—collection of the Imperial Army's files on rocketry, aviation, electrical and radio-communications, etc. The finding aid for the collection of the War Chemical Committee of 1915-1919, which documents the work of chemists, physicists and engineers on chemical warfare and gas masks, lists several thousand titles and is ready for someone to write a major dissertation or book. Opportunities of such caliber should not remain unused.

[1] A.S.Sonin. *“Fizicheskii idealism”*: Istoriiia odnoi ideologicheskoi kampanii (Moscow 1994).

[2] V.P.Vizgin, ed. “U istokov sovetskogo atomnogo proekta: rol' razvedki, 1941-1946 (po materialam arkhiva vneshnei razvedki Rossii),” *Voprosy istorii estestvoznaniia i tekhniki*, No. 3 (1992), 97-134.

[3] V.D.Esakov, ed. *Akademiia Nauk v resheniiakh Politburo TsK RKP(b)-VKP(b), 1922-1952* (Moscow 2000).

[4] L.D.Riabev, ed. *Atomnyi proekt SSSR. I: 1938-1945; II: 1945-1954*. (Moscow-Sarov, 1998-1999).



Newton Project to Publish Papers Displaying a Many-Faceted Mind

The Newton Project, based at Cambridge University and Imperial College, London, was formed in 1998 to produce both electronic and printed editions of Newton's theological, alchemical and Royal Mint administration papers, to complement the scientific papers already published. These editions will shed light on the differences and connections between distinct areas of his work. There are a number of links between different elements in Newton's work, such as theology and natural philosophy. For example, Newton himself thought that his scientific discoveries constituted evidence for the existence of an Omnipotent and mathematically adept Creator. On the other hand, he argued that certain aspects of his scientific approach were incompatible with his work in alchemy and theology. Aside from any connection to his work in natural philosophy, his extraordinary theological and alchemical papers are unquestionably important in their own right.

The project intends to make available online transcripts of all of Newton's writings, including notes and marginalia, along with scholarly editorial apparatus and translations of non-English text. Initially, the staff will place online basic transcripts of Newton's most significant theological treatises, followed by the alchemical and then the Mint papers, obeying the highest standards of contemporary editorial practice. Eventually, a preliminary catalog of known manuscripts (and their present location) will be made available on the Internet.

A number of other electronic editions are being planned for other figures, but the size and nature of Newton's archive means that this is one of the most ambitious projects of its kind. Besides the electronic edition, the project will produce a printed edition of Newton's theological, alchemical and administrative papers. Comprising about twenty volumes, it will stand alongside the already existing editions of Newton's work in physics, mathematics and optics. For more information see <http://www.newtonproject.ic.ac.uk/> The project is located at Imperial College, London SW7 2AZ, UK; e-mail: i.newton@ic.ac.uk.

Recent Publications of Interest

Compiled by Martha Keyes

This is our usual compilation of some (but by no means all) recently published articles on the history of modern physics, astronomy, geophysics, and allied fields. Note that these bibliographies have been posted on our Web site since 1994, and you can search the full text of all of them (along with our annual book bibliography, recent Catalog of Sources entries, exhibit materials, etc.) by clicking on the "Search" icon on our Home page (www.aip.org/history). You can specify to search the entire AIP site or the History Center only.

American Heritage of Invention & Technology, vol. **16**, no. 2 (Fall 2000) includes Robert Zimmerman, "Telstar," 10-17. Vol. **16**, no. 3 (Winter 2001) features T. A. Heppenheimer, "What Edward Teller Did," 34-44.

Annalen der Physik, vol. **9**, no. 8 (2000) includes Yu Shi, "Early Gedanken Experiments Revisited," 637-648. Vol. **9**, nos. 11-12 (2000) is a special issue commemorating the quantum theory centenary. Articles in this issue include M. Cardona, "Phonons: The Second Type of Quantum Excitations Discovered," 865-870; W. Schnell, "Particle Accelerators," 927-935; J. T. Cushing, "The Interpretation of Quantum Mechanics through 1935," 939-950; O. Darrigol, "Continuities and Discontinuities in Planck's *Akt der Verzweiflung*," 951-960; H. Kragh, "Relativity and Quantum Theory from Sommerfeld to Dirac," 961-974; and R. H. Stuewer, "The Compton Effect: Transition to Quantum Mechanics," 975-989.

Annals of Science, vol. **57**, no. 4 (October 2000) includes Helge Kragh, "The Chemistry of the Universe: Historical Roots of Modern Cosmochemistry," 353-368. Vol. **58**, no. 1 (January 2001) features Peter J. Ramberg and Geert J. Somsen, "The Young J. H. van't Hoff: The Background to the Publication of His 1874 Pamphlet on the Tetrahedral Carbon Atom, Together with a New English Translation," 51-74.

Annual Review of Astronomy and Astrophysics, vol. **34** (1996) includes Evry Schatzman, "The Desire to Understand the World," 1-34. Vol. **35** (1997) features Charles H. Townes, "A Physicist Courts Astronomy," xiii-xliv. Vol. **36** (1998) features H. C. van de Hulst, "Roaming Through Astrophysics," 1-16. Vol. **37** (1999) includes A. G. W. Cameron, "Adventures in Cosmogony," 1-36; Brian Robinson, "Frequency Allocation: The First Forty Years," 65-96; K. J. Johnston and Chr. de Veigt, "Reference Frames in Astronomy," 97-125; and Allan Sandage, "The First 50 Years at Palomar: 1949-1999: The Early Years of Stellar Evolution, Cosmology, and High-Energy Astrophysics," 445-486. Vol. **38** (2000) includes Donald E. Osterbrock, "A Fortunate Life in Astronomy," 1-33; and George Wallerstein and J. B. Oke, "The First 50 Years at Palomar, 1949-1999. Another View: Instruments, Spectroscopy and Spectrophotometry," 79-111.

Annual Review of Earth and Planetary Sciences, vol. **25** (1997) features S. Epstein, "The Role of Stable Isotopes in Geochemistries of All Kinds," 1-21. Vol. **27** (1999) includes Carolyn S. Shoemaker, "Ups and Downs in Planetary Science," 1-17.

Annual Review of Nuclear and Particle Science, vol. **46** (1996) includes Sam Treiman, "A Life in Particle Physics," 1-30. Vol. **47** (1997) features J. Steinberger, "Early Particles," xiii-xlii. Vol. **49** (1999) features J. David Jackson, "Snapshots of a Physicist's Life," 1-33. Vol. **50** (2000) includes Vernon W. Hughes, "Various Researches in Physics," i-xxxvii.

Archive for History of Exact Sciences, vol. **54**, no. 4 (2000) includes J. Lacki, "The Early Axiomatizations of Quantum Mechanics: Jordan, von Neumann and the Continuation of Hilbert's Program," 279-318. Vol. **54**, no. 5 (2000) includes A. Hessenbruch, "Rutherford's 1901 Experiment on Radiation Energy and His Creation of a Stable Detector," 403-420. Vol. **55**, no. 1 (2000) features H. Kragh and B. Carazza, "Classical Behavior of Macroscopic Bodies from Quantum Principles: Early Discussions," 43-56.

Astronomy, vol. **28**, no. 11 (November 2000) includes James Trefil, "Putting Stars in Their Place," 62-67. Vol. **29**, no. 1 (January 2001) features James Trefil, "Discovering Cosmic Rays," 36-39.

Astronomy & Geophysics, vol. **41**, no. 5 (October 2000) features Helen Walker, "A Brief History of Infrared Astronomy," 10-13; and Derek Jones, "The Scientific Value of the Carte du Ciel," 16-20.

Beamline, vol. **30**, no. 2 (Summer/Fall 2000) is a special issue on the quantum centenary. Articles include Cathryn Carson, "The Origins of the Quantum Theory," 6-19; and Charles H. Townes, "The Light that Shines Straight," 20-28.

Bulletin of the Atomic Scientists, vol. **56**, no. 6 (November/December 2000) is a special issue on government secrecy. Articles include Peter J. Westwick, "In the Beginning," 43-49. Vol. **57**, no. 1 (January/February 2001) includes Richard Moore, "Where Her Majesty's Weapons Were," 58-64.

Cern Courier, vol. **40**, no. 6 (July/August 2000) includes John Bahcall and Raymond Davis, "The Beginning of a New Science [Neutrino Astronomy]," 17-21. Vol. **40**, no. 7 (September 2000) features Maurice Jacob, "Wolfgang Pauli: Never to be Excluded," 30-32. Vol. **40**, no. 9 (November 2000) includes Liz Seubert, "Four Decades in the Proton Stronghold," 29-30.

Historical Studies in the Physical and Biological Sciences, vol. **31**, part 1 (2000) features Seiya Abiko, "Einstein's Kyoto Address: 'How I Created the Theory of Relativity,'" 1-35; Elisabeth Crawford, "German Scientists and Hitler's Vendetta Against the Nobel Prizes," 37-53; and David H. Devorkin, "Who Speaks for Astronomy? How Astronomers Responded to Government Funding After World War II," 55-92.

Irish Astronomical Journal, vol. 27, no. 1 (January 2000) features W. Orchiston, "John Tebbutt of Windsor, New South Wales: A Pioneer Southern Hemisphere Variable Star Observer," 47-54; A. D. Andrews, "Record of a Notable 19th Century Telescope," 55-64; and M. T. Brück, "Bue Island 1851, A Clouded-Out but Unique Eclipse Expedition," 91-94.

Journal for the History of Astronomy, vol. 31, no. 105 (November 2000) includes David H. DeVorkin, "Quantum Physics and the Stars (V): Physicists at Mount Wilson Prior to 1922," 301-321; and Klaus Staubermann, "The Trouble with the Instrument: Zöllner's Photometer," 323-338.

Journal of Astronomical History and Heritage, vol. 3, no. 2 (December 2000) features Ian R. Bartky, "Chicago's Dearborn Observatory: A Study in Survival," 93-114; Hermann A. Brück, "Recollections of Life as a Student and a Young Astronomer in Germany in the 1920s, with an Introduction by M. T. Brück," 115-129; and Patricia S. Whitesell, "Nineteenth-century Longitude Determinations in the Great Lakes Region: Government-University Collaboration," 131-157.

Journal of Mathematical Physics, vol. 41, no. 6 (June 2000) is a special issue on the past and future of mathematical physics. Articles in this issue include Jerrold E. Marsden, Tudor S. Ratiu and Jürgen Scheurle, "Reduction Theory and the Lagrange-Routh Equations," 3379-3429; W. Hunziker and I. M. Sigal, "The Quantum N -body Problem," 3448-3510; Barry Simon, "Schrödinger Operators in the Twentieth Century," 3523-3555; R. F. Streater, "Classical and Quantum Probability," 3556-3603; Detlev Buchholz and Rudolf Haag, "The Quest for Understanding in Relativistic Quantum Physics," 3674-3697; Carlo Rovelli, "The Century of the Incomplete Revolution: Searching for General Relativistic Quantum Field Theory," 3776-3800; Bert Schroer, "Particle Physics and Quantum Field Theory at the Turn of the Century: Old Principles with New Concepts," 3801-3831; Daniel Kastler, "Noncommutative Geometry and Fundamental Physical Interactions: The Lagrangian Level—Historical Sketch and Description of the Present Situation," 3867-3891; Shahn Majid, "Quantum Groups and Noncommutative Geometry," 3892-3942; Pierre C. Sabatier, "Past and Future of Inverse Problems," 4082-4124; and Pierre Cartier and Cécile DeWitt-Morette, "Functional Integration," 4154-4187.

Minerva, vol. 38, no. 3 (2000) includes Lillian Hoddeson and Adrienne W. Kolb, "The Superconducting Super Collider's Frontier Outpost, 1983-1988," 271-310; and Joel Genuth, Ivan Chompalov and Wesley Shrum, "How Experiments Begin: The Formation of Scientific Collaborations," 311-348.

Physics Education, vol. 35, no. 6 (November 2000) includes G. Ireson, "A Brief History of Quantum Phenomena," 381-385; and J. Taylor, "Pioneer Women in Nuclear Physics," 446-450.

Physics in Perspective, vol. 2, no. 3 (September 2000) features R. V. Pound, "Weighing Photons, I," 224-268; S. Hong, "Once Upon a Time in Physics When Both Mathematics and Experi-



Enrico Persico (1900-1969). Amaldi Archives, Dipartimento di Fisica, Università "la Sapienza" Rome. Photo courtesy of AIP Emilio Segrè Visual Archives.

ment Were Helpless: A Strange Life of Voltaic Contact Potential," 269-292; and J. D. Hamblin, "Science in Isolation: American Marine Geophysics Research, 1950-1968," 293-312. Vol. 2, no. 4 (December 2000) includes I. Unna, "The Genesis of Physics at the Hebrew University of Jerusalem," 336-380; H. Kragh, "An Unlikely Connection: Geochemistry and Nuclear Structure," 381-397; and S. D'Agostino, "On the Difficulties of the Transition from Maxwell's and Hertz's Pure-Field Theories to Lorentz's Electron," 398-410.

Physics Today, vol. 53, no. 10 (October 2000) features Valentine L. Telegdi, "Szilard as Inventor: Accelerators and More," 25-28; and José Luis Morán-López, "Physics in Latin America Comes of Age," 38-43. Vol. 53, no. 12 (December 2000) includes Mark F. Moynihan, "The Scientific Community and Intelligence Collection," 51-56. Vol. 54, no. 2 (February 2001) features John F. Waymouth, "Physics for Profit and Fun," 38-42; Karl von Meyenn and Engelbert Schucking, "Wolfgang Pauli," 43-48; and Roy Glauber, "A Remembrance of Pauli in 1950," 49. Vol. 54, no. 3 (March 2001) includes Alfred Bader and Leonard Parker, "Joseph Loschmidt, Physicist and Chemist," 45-50.

Physics–Uspekhi, vol. **43**, no. 6 (June 2000) includes V. L. Ginzburg, “Superconductivity: The Day Before Yesterday—Yesterday—Today—Tomorrow,” 573-583. Vol. **43**, no. 9 (September 2000) features M. Ya. Shchelev, “Femtosecond Photoelectronics—Past, Present, and Future,” 931-946; and Yu. I. Krivonosov, “S. I. Vavilov’s Manuscript Letter to Stalin,” 949-952.

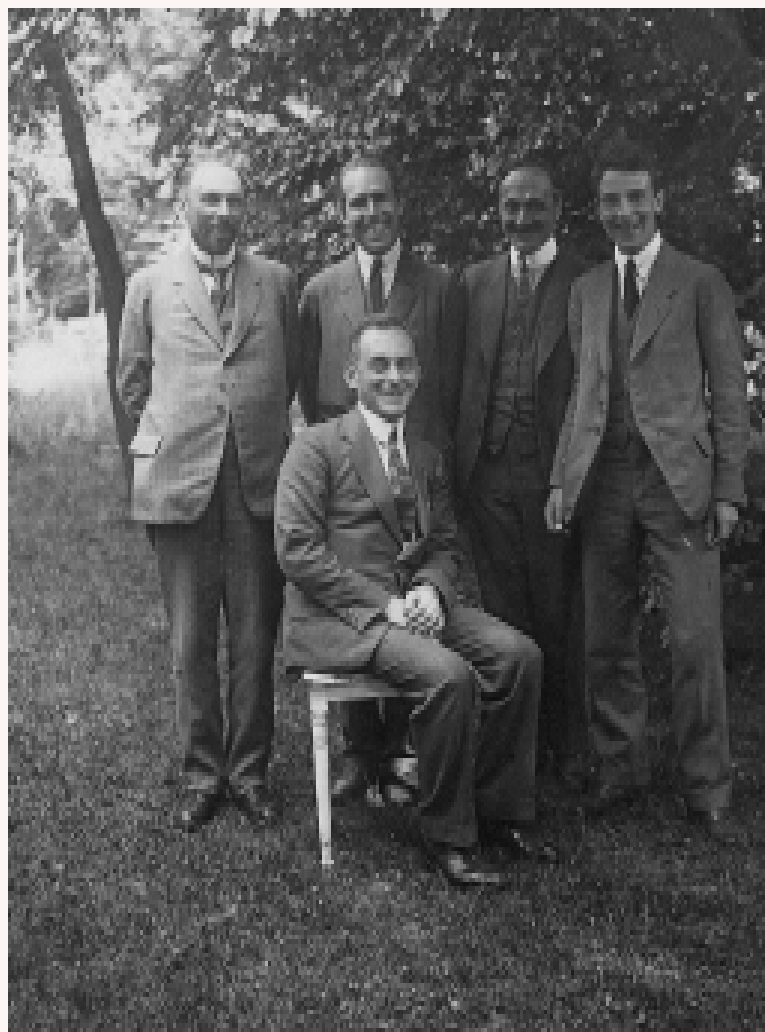
La Recherche, no. **335** (October 2000) features Michel Pinault, “Frédéric Joliot-Curie, chercheur tourmenté,” 56-60; and Etienne Klein, “Ettore Majorana, le génial disparu,” 62-63. No. **338** (January 2001) includes Etienne Klein, “Paul Ehrenfest le Socrate des quanta,” 61-63.

Science in Russia, no. **4** (July/August 2000) includes M. Panasyuk, “Breakthrough Into Outer Space,” 60-66. No. **6** (November/December 2000) features M. Deyev, “Mariner, Explorer [N. N. Zubov],” 80-86.

Social Studies of Science, vol. **30**, no. 4 (August 2000) includes Charles Thorpe and Steven Shapin, “Who Was J. Robert Oppenheimer?,” 545-590. Vol. **30**, no. 5 (October 2000) features W. Patrick McCray, “Large Telescopes and the Moral Economy of Recent Astronomy,” 685-711.

Studies in History and Philosophy of Modern Physics, vol. **31B**, no. 4 (December 2000) is a special issue on theoretical chemistry. Articles include Helge Kragh, “Conceptual Changes in Chemistry: The Notion of a Chemical Element, ca. 1900-1925,” 435-450; B. S. Park, “The Contexts of Simultaneous Discovery: Slater, Pauling, and the Origins of Hybridisation,” 451-474; Mary Jo Nye, “Physical and Biological Modes of Thought in the Chemistry of Linus Pauling,” 475-491; Andreas Karachalios, “On the Making of Quantum Chemistry in Germany,” 493-510; Ana Simões and Kostas Gavroglu, “Quantum Chemistry in Great Britain: Developing a Mathematical Framework for Quantum Chemistry,” 511-548; Jeffry Ramsey, “Of Parameters and Principles: Producing Theory in Twentieth Century Physics and Chemistry,” 549-567; and Valeria Mosini, “A Brief History of the Theory of Resonance and of its Interpretation,” 569-581.

VIET: Voprosy Istorii Estestvoznaniia i Tekhniki [Problems in the History of Science and Technology], Moscow, [*in Russian*] no. **2** (2000) includes I. Reif, “Remarks on the Physicist’s Fate [L. I. Gudzenko],” 18-34; and Iu. I. Krivonosov, “Cosmic Studies and Secrecy (S. I. Vavilov’s Letter to Stalin),” 45-48. No. **3** (2000) features A. V. Kessenikh, “Untypical Representative: Aleksandr Armand in the People’s Commissariat of Heavy Industry, 1933-1937,” 3-15; G. A. Goncharov, “Distorted Drafts of Flerov’s Letters, 1941-1942,” 35-56; and G. M. Idlis, “The Teacher: In Memory of Academician A. D. Aleksandrov (1912-1999),” 82-96.



Standing, left to right, Carl Wilhelm Oseen (1879-1944), Niels Henrik David Bohr (1885-1962), James Franck (1882-1964), Oskar Benjamin Klein (1894-1977), seated, Max Born (1882-1970). Photo courtesy of AIP Emilio Segrè Visual Archives, Kohn Photo Collection.

Others: Eisui Uematsu, Tatsuoki Takeda, and Sigeko Nisio, “History of Nuclear Fusion Research in Japan,” **Historia Scientiarum**, vol. **10**, no. 1 (July 2000): 16-45; David Goodstein, “In Defense of Robert Andrews Millikan,” **American Scientist**, vol. **89**, no. 1 (January/February 2001): 54-60; Thomas Hockey, “Recognizing Jupiter’s Great Red Spot,” **Mercury**, vol. **29**, no. 5 (September/October 2000): 18-25; Helge Kragh, “Max Planck: The Reluctant Revolutionary,” **Physics World**, vol. **13**, no. 12 (December 2000): 31-35; Grace Marmor Spruch, “Nobel Tics,” **The American Scholar**, vol. **69** (Autumn 2000): 97-106; Douglas D. Osheroff, “The Nature of Discovery in Physics,” **American Journal of Physics**, vol. **69**, no.1 (January 2001): 26-37; Max Tegmark and John Archibald Wheeler, “100 Years of Quantum Mysteries,” **Scientific American**, vol. **284**, no. 2 (February 2001): 68-75; and P. Weingart, A. Engels, and P. Pansegrau, “Risks of Communication: Discourses on Climate Change in Science, Politics, and the Mass Media,” **Public Understanding of Science**, vol. **9**, no. 3 (July 2000): 261-283.

The Bakken: Research on Electricity and Magnetism and Their Applications to Life Science and Medicine

by David Rhees, Executive Director



The Bakken Library and Museum significantly enhanced its storage, access and services in 1999 with the addition of a beautiful new reading room and renovation of the existing adjacent library rooms. Together they constitute a quieter, better organized library suite that for the first time permits direct access of researchers to the entire secondary and reference collections. Founded in 1975, the Bakken's focus is on the history of electricity and magnetism and their applications in the life sciences and medicine. Related materials in the collections include mesmerism and animal magnetism, 19th-century ephemera concerning alternative electromedical therapies, miscellaneous scientists' letters, and trade catalogs. The instruments include electrostatic generators, magneto-electric generators, induction coils, physiological instruments, recording devices and accessories. The Bakken offers Visiting Research Fellowships for the purpose of facilitating research in its collection of over 11,000 books, journals, manuscripts, and prints, as well as more than 2,000 scientific instruments.

A catalog of books and manuscripts, as well as information on research fellowships may be found on the Bakken's Web site (<http://www.thebakken.org>) or at no charge by contacting the Librarian. The Bakken is located on the west shore of Lake Calhoun at the intersection of West Calhoun Parkway and 36th Street in Minneapolis. To receive information about conducting research at the Bakken, contact Elizabeth Ihrig, Librarian, at ihrig@thebakken.org or call (612) 926-3878, ext. 227, or by mail to: Elizabeth Ihrig, The Bakken Library and Museum, 3537 Zenith Avenue South, Minneapolis, MN 55416-4623. Appointments are recommended in order to ensure the best service. The Bakken welcomes all researchers, both real and virtual!

Bibliography of Secondary Literature on the History of Electricity and Magnetism in Medicine and the Life Sciences Now Available

The Bakken Library and Museum has compiled a bibliography of 760 works relating to the history of electricity in medicine and the life sciences. One of the most interesting aspects of this field is its highly interdisciplinary character, which crosses the histories of science, technology, and medicine, with occasional forays into the histories of art, music, literature, religion, and other topics. Some of the subjects included in this bibliography are: the history of electrotherapeutics, electrophysiology, electrocardiology, bioelectricity, electrodiagnosis, electro-puncture, galvanosurgery and electroencephalography. The bibliography is organized alphabetically by author within four sections, and is searchable electronically by using the "Find" function under the "Edit" menu of most Web browsers.

The continued growth of the literature on the history of "electricity in life" ensures that this bibliography can only be a work-in-progress. We look forward to regularly updating it. This is not to say that the present bibliography has identified all the sources published to date, of course, and we encourage researchers to kindly alert us to any errors or omissions. Please direct correspondence to David Rhees at rhees@thebakken.org. We hope that this valuable research tool will appear in print in the not-too-distant future; at present it is located at <http://www.thebakken.org/research/bibliography-on-electricity-in-life.htm>

Other News of Interest

MEETINGS

■ A workshop on **Theoretical Physics and Mathematics in Twentieth-century Political Contexts** will be held **May 25-26, 2001**, Milan, Italy. Whilst there is extensive literature on the relationship between experimental physics and politics in the twentieth-century, the interaction between theoretical physics and mathematics with power during the same period still deserves study and discussion. This is true both for the American context where the focus has been on the military-industrial-university complex and for the non-American context, although the latter has received far less attention in historiography. To attend, please

contact Alexis De Greiff, Istituto di Fisica Generale Applicata, Sezione Storia della Fisica, 20121 Milano - Via Brera, 28.
Fax: ++39 02-7200 1600, Tel: ++39 02-8057 309,
E-mail: a.degreiff@ic.ac.uk; aleste69@hotmail.com;
pasquale.tucci@unimi.it

■ The **IEEE History Committee** and the **IEEE History Center at Rutgers University** are organizing a conference on the **history of telecommunications** to be held at Memorial University of Newfoundland in St. John's **July 25-27, 2001**. For more info, contact: IEEE 2001 Conference on the History of Telecommunications, IEEE History Center, Rutgers University,

39 Union Street, New Brunswick, NJ 08901-8538, E-mail: history@ieee.org, www.ieee.org/history_center/cht2001.html. There will also be a student paper competition for IEEE Student Members. Interested IEEE Student Members should contact the Program Co-Chairs above as soon as possible.

■ The **2001 Joint Atlantic Seminar in the History of the Physical Sciences** will be held **September 28-30, 2001** in Philadelphia. The topic is "Historical Interactions Between the Physical Sciences, Business, and Technology." The conference will focus on the historical interactions between the physical sciences, business, and technology. For more information, contact Thomas C. Lassman, Joint Atlantic Seminar in the History of the Physical Sciences, Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106, www.chemheritage.org

■ A **Second Symposium on the History of Aerosol Science** will be held **October 13-14, 2001** in Portland, Oregon, USA, shortly before the 2001 American Association for Aerosol Research conference. The First Symposium, held in Vienna in 1999, shed much new light on this little-studied historical subject, and resulted in a book of essays (History of Aerosol Science, ed. O. Preining and E. J. Davis, Vienna, Akademie der Wissenschaften, 2000). For registration and other information, see the AAAR Web site, www.aaar.org, or contact them by mail: AAAR History Symposium, P.O. Box 691593, Cincinnati, OH 45269.

■ An **International Symposium on the History of Science** in Rudolphine period organized on the occasion of the 400th anniversary of Tycho Brahe's death. Tycho Brahe and Prague: Crossroads of European Science will be held **October 22-25, 2001** in Prague. For more info, contact the Research Center for the History of Sciences and Humanities, Legerova 61, 120 00 Praha 2, Czech Republic. E-mail: brahe@kav.cas.cz, <http://merope.asu.cas.cz/tycho/tbform.htm>

■ The **Second Conference on the History and Heritage of Scientific and Technical Information Systems** will be held **November 15-17, 2002** in Philadelphia. Emphasis for this conference will be on the period from the Second World War up through the early 1990s, including the infrastructure created by digitization, the Internet, and the World Wide Web. Conference organizers are looking for in-depth historical analyses of these developments and how they have affected the practice of science both nationally and internationally. Scholars from a wide range of disciplines, including library and information science, communications, and history of science and technology, are encouraged to submit abstracts of 500-1000 words based on the themes listed above. Deadline for abstracts: **October 15, 2001**. For more information, contact HHSTIS2 Program Committee, Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106, www.chemheritage.org, HHSTIS2@chemheritage.org.

A preliminary workshop is scheduled **September 15-16** at the University of California, Berkeley (apply by **June 1**). For more info, contact Mary Ellen Bowden at the address above.

GRANTS AND FELLOWSHIPS

■ A complete list of grants can be found on our Web site at <http://www.aip.org/history/grants.htm>.

■ The **AIP Center for History of Physics** has a program of **grants-in-aid for research in the history of modern physics and allied sciences** (such as **astronomy, geophysics, and optics**) and their **social interactions**. Grants can be up to \$2500 each. They can be used only to reimburse direct expenses connected with the work. Preference will be given to those who need funds for travel and subsistence to use the resources of the Center's Niels Bohr Library (near Washington, D.C.), or to microfilm papers or to tape-record oral history interviews with a copy deposited in the Library. Applicants should name the persons they would interview or papers they would microfilm, or the collections at the Library they need to see; you can consult the online catalog at our Web site, www.aip.org/history, and please feel free to make inquiries about the Library's holdings. Applicants should either be working toward a graduate degree in the history of science (in which case they should include a letter of reference from their thesis adviser), or show a record of publication in the field. To apply, send vitae, a letter of no more than two pages describing your research project, and a brief budget showing the expenses for which support is requested to: Spencer Weart, Center for History of Physics, American Institute of Physics, One Physics Ellipse, College Park, MD 20740; phone: 301-209-3174, Fax: 301-209-0882, e-mail: swear@aip.org. Deadlines for receipt of applications are **June 30 and December 31** of each year.

■ U.S. Energy Secretary Bill Richardson has established a new **Energy Department** fellowship that will take a look at more than five decades of nuclear history. The "Glenn T. Seaborg Fellowship in Nuclear History" will focus on the atomic age, from its birth to the present, and is intended to provide quality scholarship for broad public distribution. The Seaborg Fellowship is open to all recent American History majors currently enrolled in a doctorate program in the United States. Fellows will receive stipend reimbursement for round-trip transportation between Washington D.C., and their home or campus. The fellowship is for one academic year. To learn more, please contact Chief Historian Skip Gosling, U.S. Department of Energy, Room 7E-054 Forestall Building, 1000 Independence Ave. SW, Washington, D.C. 20585 (skip.gosling@hq.doe.gov).

The journey back in time reverses the pattern of increasing specialization in science. The high ground of historical perspective helps one to avoid the tunnel vision of the specialist in much the same way that a multidisciplinary approach can foster insight.

—Edward W. Cliver and Ruth P. Liebowitz

Documentation Preserved: Report from the International Catalog of Sources for History of Physics and Allied Sciences

This is our regular survey of archives and other repositories that gives information on materials of interest to historians and others. Many of these are new deposits not yet processed, but we also include collections that were accessioned years ago but not previously reported here. Some have restricted access. Please contact the repository for further information.

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Papers of **Fernando de Souza Barros**. Brazilian physicist. President of the Brazilian Society of Physics, 1983-1985, and member of the Commission of Nuclear Affairs from 1987-1996. Correspondence, reports, law projects, agreements, bulletins, etc. related to the Special Commission in Optics and the commerce of Brazilian quartz, Latin American societies of physics, science and technology policy, nuclear affairs in Brazil and in the world, sites for radioactive wastes, the Brazil-Argentina agreement for control of nuclear material. In Portuguese. 1979-1996. Unprocessed. 1.5 lin. meters.

McMASTER UNIVERSITY. UNIVERSITY LIBRARY. DIVISION OF SPECIAL COLLECTIONS. 1280 MAIN STREET WEST, HAMILTON, ONT L8S 4L6, CANADA (CONTACT: CARL SPADONI)

Papers of **Henry George Thode, 1910-**. Physical chemist; constructed the first mass spectrometer in Canada. Professor Emeritus, McMaster University, 1939-97. During World War II did research for the Canadian Atomic Energy Project; consultant for Atomic Energy Canada Limited, 1945-1951; director and member of AECL Executive Committee, 1966-1981. Organized and hosted the first post-war international conference on nuclear chemistry, held at McMaster in 1947. Consists of nine series: National Research Council/Atomic Energy Canada Limited; McMaster University; Nuclear Reactor and Nuclear Activation Services; experiments and research; correspondence; conferences and lectures; Thode's publications; biographical material and reprints. Includes materials from the papers of Dr. Jan Monster and Dr. C.E. Rees, who worked

closely with Thode. 1932-1996. 9.8 m. of textual records and other materials.

Papers of **Thomas Russell Wilkins, 1891-1940**. Physicist; Ph.D., University of Chicago. In 1926 joined the Physics Department, University of Rochester in New York; appointed director of the Institute of Optics in 1928. Wilkins secured photographic recordings of cosmic rays and the disintegration of radium atoms. Consists of correspondence, scrapbooks containing news clippings about Wilkins, research notes and photographs of experiments, and published articles. Ca. 1922-1940. 12.5 cm. of textual records and photographs.

ACADEMY OF SCIENCES OF THE CZECH REPUBLIC. ARCHIVES. V ZÁMČÍCH 56/57, 181 00 PRAHA 8, CZECH REPUBLIC (CONTACT: ANTONÍN KOSTLÁN)

Records of the **Czechoslovak Academy of Sciences. Czechoslovak Committee for the Research and Peaceful Utilization of Space (INTERKOSMOS)**. The INTERKOSMOS program began in November 1965 when the nature of collaboration over space research and utilization was agreed between the USSR, Czechoslovakia and other countries (Bulgaria, Cuba, Hungary, Mongolia, East Germany, Poland, and Romania). Other states were subsequently invited to take part, e.g., France, India and Sweden, and after 1990, Germany, Great Britain, Austria and Italy. The records principally document the Secretariat of the Czechoslovak Committee for the Research and the Peaceful Utilization of Space involving Czechoslovak research in the INTERKOSMOS program. The records primarily consist of Committee statutes, members' orders, correspondence, minutes and reports from meetings at different levels including those of coordination bodies, record documents for individual tasks, reports on the discussion about specific collaboration of working groups, catalogs of working groups' problems, agreements on aerial photography, and financial material and personnel documents. 1965-1989. Unprocessed. 167 cartons.

MAX-PLANCK-GESELLSCHAFT ZUR FÖRDERUNG DER WISSENSCHAFTEN. ARCHIV ZUR GESCHICHTE DER MAX-PLANCK-GESELLSCHAFT. BOLTZMANNSTR. 14, 14195 BERLIN, GERMANY (CONTACT: MARION KAZEMI)

Records of the **Max-Planck-Institut für Plasmaphysik**. The Max Planck Institute for Plasma Physics is located at Garching near Munich, Germany. Includes files of the leading committees and board of trustees, of the Arbeitsgemeinschaft der Großforschungseinrichtungen (today Helmholtz-Gemeinschaft), of which the institute is a member, and of the experiment INTOR, and publications of the Institute. 1945-1999. 3.5 lin. meters.

Papers of **Karl-Heinz Schmitter, 1920-1999**. Member of the directorate (from 1964) and scientific member (1968-1985) of the Max Planck Institute for Plasma Physics, Garching near Munich; leading engineer at the Max Planck Institute for Phys-

ics and Astrophysics in Munich since 1959. Papers include biographical materials, correspondence and notes from his time at CERN (Geneva) and the Max Planck Institute, manuscripts and work papers especially relating to nuclear fusion and the energy problem. 1945-1999. 11 lin. meters.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, 1200 NEW YORK AVE., NW, WASHINGTON, DC 20005, USA (CONTACT: AMY CRUMPTON)

Editor's files of **Philip Hauge Abelson**. Scientist and editor. Served as editor of *Science* magazine from 1962 to 1984. Collaborated in the discovery of neptunium (element 93), devised a method for large-scale synthesis of enriched uranium for use as a power source in submarines, and was director of the Carnegie Institution of Washington's Geophysical Laboratory from 1953 to 1971. Records include correspondence, memos, editorials and minutes of editorial board meetings. A number of Abelson's personal papers, including speeches and other materials not related to his work as editor of *Science*, were given to the Library of Congress in early 2001. 1962-1984. 46.25 ft.

Program files of the **American Association for the Advancement of Science, Climate Program**. This program of the AAAS organized conferences and issued publications on the interaction of climatic and direct biological effects of rising atmospheric carbon dioxide on water, plants, animals, and humans. Records document efforts by the scientific community to debate and define the threats of global climate change. Includes 1979 Annapolis workshop on climate change, AAAS Committee on Climate, correspondence with Department of Energy and other institutions, background papers, symposia and hearings. 1975-1989. 46.25 ft.

Records of the **American Association for the Advancement of Science, Committee on Science, Arms Control, and National Security**. In the early 1980s, the AAAS Council issued several resolutions calling for the U.S. to limit and reduce its reliance upon weapons of mass destruction. In 1981, the AAAS Board of Directors established a Committee on Science, Arms Control, and National Security. The program aimed to enhance public and expert understanding of issues related to the threat of nuclear war and to reduce that threat. Activities included a verification project, an annual colloquium on science and security, congressional seminars, publications and fellowships. 1981-1991. 68.75 ft.

Records of the **American Association for the Advancement of Science, Science and Human Rights Program**. The AAAS Science and Human Rights program has taken action on behalf of 3,000 scientists, engineers and health professionals in over 70 countries who have been detained, persecuted, imprisoned and/or tortured. The program conducts its actions through letters, petitions, and fact-finding missions. The program has supported use of forensic science in Argentina, Guatemala and Haiti, as well as the use of statistical applications to document human rights abuses in South Africa and Kosovo. 1954-1994.

52.5 ft. Cases containing sensitive and graphic information may be restricted. Researchers must obtain access permission from Science and Human Rights staff.

Administrative records of **Forest Ray Moulton, 1872-1952**. Scientist and administrator. Astronomer from the University of Chicago known for the planetesimal theory of planet formation; served as AAAS Permanent Secretary and then Administrative Secretary, 1937 to 1948. These records document AAAS's activities in the first half of the twentieth century. Materials include correspondence, memos, financial records, and meetings and membership publicity. 1922-1947. 27.5 ft.

Administrative files of *Science 80/86*. An extensive set of records from among several popular science magazines that sprang up in the early 1980s. *Science 80/86*, published by the American Association for the Advancement of Science, achieved a circulation of nearly 700,000 and received numerous awards, including three National Magazine Awards. However, the magazine fell victim to economics and was sold to Time, Inc. in 1986. Collection includes editor's files, reporters' story files, advertising and business files, and research files. 1980-1986. 111.25 ft.

BROOKHAVEN NATIONAL LABORATORY. RESEARCH LIBRARY. UPTON, NY 11973, USA (CONTACT: TIMOTHY GREEN)

The **Brookhaven Graphite Research Reactor Document Archives**. Brookhaven National Laboratory was established in 1947 by a consortium of nine universities (Associated Universities, Inc.), to develop a government-owned university-operated laboratory for the peaceful research of nuclear science. The first major project was to design and build a research reactor that would be accessible for multiple scientific disciplines. The Brookhaven Graphite Research Reactor came online in 1950 and operated until 1968. The collection documents the research conducted at the BGRR which resulted in a basic understanding of the atom, new isotopes for medicine, understanding the effects of radiation, and the development of new materials. 1950-1968. Unprocessed. 730 cu. ft.

CALIFORNIA INSTITUTE OF TECHNOLOGY. INSTITUTE ARCHIVES. 1201 EAST CALIFORNIA BLVD. (MAIL CODE 015A-74), PASADENA, CA 91125, USA (CONTACT: JUDITH GOODSTEIN OR SHELLEY ERWIN)

Papers of **Don L. Anderson**. Geophysicist; Professor of Geophysics, Caltech 1963-present. The papers are dated from the period of Anderson's directorship of the Caltech Seismological Laboratory and concern the Lab directly. Included are personal and administrative correspondence, and papers concerning the relationship between the Lab and the U.S. Geological Survey. 1968-1994. 2 boxes, 1 lin. ft.

Oral history interview with **Marshall Harris Cohen, 1926-**. Astronomer. Oral history interview conducted by Shelley Erwin. Transcript: 158 pp.

Oral history interview with **Hiroo Kanamori, 1936-**. Seismologist. Oral history interview conducted by Shirley K. Cohen. Transcript: 61 pp.

Records of the **Keck Telescope**. Records on the planning and installation of the 10-meter Keck Telescope on Mauna Kea, Hawaii. 1980-1990. 0.75 lin. ft.

Papers of **Charles Francis Richter, 1900-1985**. Physicist (geophysics, seismology) best known as the seismologist who developed the magnitude scale that bears his name; received his Ph. D. in physics from Caltech, where he remained as a member of the faculty until 1970. Papers include correspondence, mainly relating to professional organizations and publications; manuscript material, scientific but also poetry and science fiction; course notes and lecture notes; technical notes and data; personal and biographical information including diaries (1948-1957, 1960, 1969-1979), notes and personal correspondence. Also included is Richter's collection of science fiction publications (35 boxes) including numerous titles from 1926 through the early 1950s, such as *Amazing Stories*, *Amazing Stories Quarterly*, *Astounding Science Fiction* and *Astounding Stories*. Supplement includes diplomas, diary, memorabilia. 1913-1984. 71 boxes +0.5 lin. ft.

Oral history interview with **Thomas Anthony Tombrello, 1936-**. Physicist. Oral history interview conducted by Shirley K. Cohen. Transcript: 31 pp.

Oral history interview with **Robert Lee Walker, 1919-**. Physicist. Oral history interview conducted by Shirley K. Cohen. Transcript: 64 pp.

CLARK UNIVERSITY. DEPARTMENT OF RARE BOOKS AND SPECIAL COLLECTIONS. UNIVERSITY ARCHIVES. GODDARD LIBRARY, 950 MAIN STREET, WORCESTER, MA 01610, USA (CONTACT: GWEN ARTHUR)

Visual materials in the **Robert Hutchings Goddard (1882-1945) Collection**. Physicist and rocketry pioneer; Professor of Physics, Clark University, 1915-1943. Includes more than 5000 different photographs, and close to nine hours of 16 mm film footage of Dr. Goddard's rocket launches. 1914-1945. Unprocessed. 5000 photographs; 9 hrs. 16 mm film footage.

DARTMOUTH COLLEGE. RAUNER SPECIAL COLLECTIONS LIBRARY. HANOVER, NH 03755, USA (CONTACT: PHILIP CRONENWETT)

Papers of **Sanborn Conner Brown, 1913-**. Physicist (plasma physics, physics education, history of science). Professor at MIT; Associate Dean of the Graduate School. Papers cover four areas: Brown's research in plasma physics and its relation to thermonuclear fusion, his commitment to teaching, international activities, and his studies in the history of science. Of particular interest is correspondence with other scientists concerning plasma physics and its application to nuclear energy.



Enrico Fermi (1901-1954), circa 1923. Credit: Amaldi Archives, Dipartimento di Fisica, Università "la Sapienza" Rome. Photo courtesy of AIP Emilio Segrè Visual Archives.

The collection also documents his relationship with other physicists around the world who did research in plasma physics. 1945-1975. Unprocessed. 25 lin. ft.

GEORGIA INSTITUTE OF TECHNOLOGY. LIBRARY AND INFORMATION CENTER, ATLANTA, GEORGIA 30332-0900, USA (CONTACT: ANNE SALTER)

Papers of **Joseph Ford, 1927-1995**. Physicist (chaotic dynamics). Professor of physics, Georgia Institute of Technology, 1961-1995. Papers provide insight into Ford's research priorities in chaotic dynamics and information on his work at disseminating information to a global scholarly community. Included are correspondence, class notes, professional publications, photographs, and a computer hard drive with files. 1961-1995. 10.6 lin. ft.

IEEE HISTORY CENTER. RUTGERS UNIVERSITY. 39 UNION STREET, NEW BRUNSWICK, NJ 08901, USA (CONTACT: ARCHIVIST)

Oral history interview with **Kenneth Tompkins Bainbridge, 1904-1996**. Nuclear physicist. Professor of physics, Harvard University from 1934. Member of the Radiation Laboratory at Massachusetts Institute of Technology from 1940-1945. Description of his research at General Electric, Cavendish Laboratories, and Harvard University before Rad Lab; his introduction



Circa late 1930s, possibly Zürich. L-R: Julius G. Baron, physician and radiologist, a boyhood friend and schoolmate of Pólya, with whom he maintained a lifelong friendship; George Pólya, Hungarian-born mathematician well known for his contributions in analysis, number theory, probability and other fields, who taught at the E. T. H. in Zürich and since World War II at Stanford University; Wolfgang Pauli; and Erich Hecke, a German-born mathematician. Information provided by Andrew Lenard, Indiana University. Photo courtesy of AIP Emilio Segrè Visual Archives. Donated by Andrew Lenard, 1999, from the estate of Julius G. Baron.

to radar and the early planning stages of Rad Lab; roles of Vannevar Bush, Edward Bowles, I. I. Rabi, Lee DuBridge, and Wheeler Loomis in the organization of the program. Bainbridge explains his involvement as a session chairman of the Applied Nuclear Physics Conference in October 1940, his work on the SM, MEW, ASM and details of his assignment as a British liaison. He discusses the communications between Rad Lab and various branches of the military, the magnetron and its role in radar development, his working relationship with John Cockcroft, E. G. "Taffy" Bowen, and ultimately, his transition to Los Alamos in 1943. Interview conducted by John Bryant on June 10, 1991. Transcript: 13 pages.

Oral history interview with **Edward Leonard Ginzton, 1915-**. Electrical engineer. Professor of physics and electrical engineering, Stanford University, 1947-1968; founding director of Varian Associates in 1948; in 1959 he became its CEO. The interview describes Ginzton's pioneering career in postwar electronics research, as well as his relationship with figures such as William Hansen, William Hewlett, Sigurd and Russell Varian, Oswald "Mike" Villard, and William Rambo. Ginzton recalls Frederick Terman's vital relationship to Stanford's EE department, Microwave Lab, and postwar scientific research; discusses Stanford's relationship with the defense industry, and its classified work with the high-powered klystron. Ginzton then surveys the development of California's electronics industry and credits William Shockley with the creation of what is now known as

Silicon Valley. Interview conducted by A. Michal McMahon on November 26, 1984. Transcript: 10 pp.

Oral history interview with **William R. Hewlett**. Engineer; founder of Hewlett-Packard Co. This interview focuses on Hewlett's connections with Stanford University, his relationship with Fred Terman, and Hewlett-Packard's interest in educational programs stressing theoretical training in the engineering field. The interview begins with Hewlett's educational experiences at Stanford and MIT and his early involvement with Terman. Hewlett analyzes Terman's position within the engineering and educational fields and then discusses his activities during World War II, when he was attached to the office of the Chief Signal Officer for most of the war. He discusses HP personnel, Noel Eldridge, Noel Porter, and Barney Oliver; and HP during the late 1940s and 1950s and the rise of Stanford's engineering school during this period. The last section deals with HP's transition from a small technical firm to a large, diversified publicly-owned corporation by the late 1960s. The interview concludes with a brief historical overview of the intellectual engineering community based at Stanford and the rise of the semiconductor industry in the area as well as HP's response to semiconductor technology. Interview conducted by A. Michal McMahon on November 27, 1984. Transcript: 12 pp.

The **MIT Radiation Laboratory oral history collection of the IEEE History Center**. A collection of oral histories con-

ducted in 1991 by the staff of the Institute of Electrical and Electronics Engineers History Center at Rutgers University on the fiftieth anniversary of the Radiation Laboratory at Massachusetts Institute of Technology. The Rad Lab was in operation from Nov. 1940 until the end of 1945. It made great contributions to radar techniques and microwave theory, and many of its alumni went on to careers in industry and academia and profoundly affected industrial research and technical education in America. Among the 40 interviewees (separately cataloged in ICOS) are: Kenneth T. Bainbridge, Edward M. Purcell, Norman F. Ramsey, Denis M. Robinson, H. Guyford Stever, Jerome B. Wiesner. Most of the interviews were conducted by John Bryant in 1991. 40 Transcripts.

Oral history interview with **Edward M. Purcell, 1912-1997**. Purcell reflects on his work on counter-mortar radar and K-band experimental radar. He also takes the opportunity to clear Rabi's name in the controversy around K-band wavelength choice by describing how that decision was made and taking full responsibility for the problems they encountered. He describes the Rad Lab atmosphere, the challenge of learning by doing and his impressions of DuBridge, Loomis, and Rabi. Interview conducted by John Bryant on June 10, 1991. Transcript: 11 pages.

Oral history interview with **Norman F. Ramsey, 1915-**. Physicist. Served as a member of the Radiation Laboratory from 1940-1943. Relocated to Los Alamos in 1943. Ramsey describes his early educational background, his transition from engineering to science, and his recruitment to the Radiation Laboratory. He recalls the errors and successes of the early planning committees at Rad Lab, and the laboratory's interactions with both private industry and the military. He recounts the stages of design and improvements in microwave technology within his group at Rad Lab, the transfer of technology between Britain and the United States and the information exchange that occurred within the Rad Lab itself, and his working relationship with many colleagues at Rad Lab and Los Alamos, particularly Oliphant, Rabi, and Oppenheimer. He also discusses the effect of Rad Lab on his later career at Fermilab, Brookhaven, and Harvard. Interview conducted by John Bryant on June 20, 1991. Transcript: 17 pages.

Oral history interview with **Denis Morrell Robinson, 1907-**. Robinson served at the Radiation Laboratory under a courtesy appointment from 1941 to 1945. He was British Air Commission and Royal Air Force representative. Robinson describes his receiver work with W.B. Skinner at Telecommunications Research Establishment (TRE) before joining the Rad Lab, his contract to work on the magnetron with M. L. Oliphant, his assignment at Dundee to prepare a receiver for the magnetron, and later developments that contributed to the development of the magnetron. He speaks about his position with TRE, his role in the communications between the British and American Rad Lab units, his involvement with the Committee on Valve Development, his demonstration of the B-24 to top British government officials and his role in the design, production, and promotion of the microwave ASA equipment. Other topics include the Tizard Mission and the Rad Lab's William Hansen lectures. In an addendum to this

interview, Robinson describes in detail the leadership abilities and styles of Robert Watson-Watt, A. P. Rowe, Lee DuBridge, and W. B. Lewis. Interview conducted by John Bryant on June 10, 1991. Transcript: 16 pages.

Oral history interview with **Horton Guyford Stever**. Aeronautical engineer. Stever began his four-year tenure at the Radiation Laboratory in June 1941. He was a member of the modulator group, the Harbor Building-Barrow School, the receiver group, the Office of Scientific Research (OSRD) and Development, the British Branch Radiation Laboratory (BBRL), and the Director's office. Stever discusses his work within the modulator group, his teaching position at the Harbour Building and his appointment to the OSRD. He recounts his role and responsibilities in the British radar operations and in the organization of the BBRL. The interaction between the Rad Lab and military personnel is described, as well as the Rad Lab's effect upon post-war engineering education. Interview conducted by John Bryant on March 17, 1993. Transcript: 8 pages.

Oral history interview with **Jerome Bert Wiesner, 1915-**. Electrical engineer. Professor of electrical engineering at M.I.T., 1946-1961; president of M.I.T., 1964-1980. He was associated with the Radiation Laboratory from 1942-1945. Wiesner discusses his working relationship with Jerrold Zacharias and the various components projects he completed under his direction. He describes his work on K-band sets of magnetrons, klystrons, transmitters and receivers and, ultimately, his direction of Project Cadillac. He examines the importance of his interaction with the military, especially the Navy. He describes the function of the Rad Lab Steering Committee and his personal role as a member. Interview conducted by Frederik Nebeker on June 12, 1991. Transcript: 8 pages.

JOHNS HOPKINS UNIVERSITY. SPECIAL COLLECTIONS, MILTON S. EISENHOWER LIBRARY. 3400 N. CHARLES ST., BALTIMORE, MD 21218, USA (CONTACT: MARGARET BURRI)

Space telescope history project records of **Robert William Smith, 1952-**. Compiled while writing his book *The Space Telescope: A Study of NASA, Science, Technology and Politics* (1989). The book was one of the main goals of the Space Telescope History Project and was the result of the efforts of historians from Johns Hopkins University and the National Air and Space Museum. The purpose of the project was to provide a history of the Space Telescope Project from its origins to the time when the telescope was placed in orbit. The project also developed a large body of historical resource files and oral history tapes. The oral histories and many of the files are housed at the National Air and Space Museum. This collection is a portion of these working resource files. In April 1990, the completed Hubble Space Telescope was launched into orbit. The collection contains correspondence files, scientific plans, reports, publications, administrative records and subject files from various NASA centers, universities, re-

search groups and contractors who were active in the development of the Hubble Space Telescope and the Space Telescope Science Institute. Because this record group is an artificial collection, the documents it contains have been gathered from a variety of sources. The records do not provide complete documentation of either the Space Telescope or the agencies who contributed to its development. 1952-1991 (bulk 1970-1989). 17 cu. ft.

LIBRARY OF CONGRESS. MANUSCRIPT DIVISION. JAMES MADISON MEMORIAL BUILDING, FIRST STREET AND INDEPENDENCE AVENUE, S. E., WASHINGTON, DC 20540, USA (CONTACT: LEONARD BRUNO)

Papers of **Benjamin S. Loeb, 1914-**. Author, economist and government official who collaborated with Glenn T. Seaborg to produce three books on the U.S. Atomic Energy Commission. Research files containing correspondence, journal excerpts, reports, minutes, speeches, writings, transcripts of interviews, and printed matter compiled by Loeb relating to Glenn Theodore Seaborg's chairmanship of the AEC (1961-1971) and to Loeb's assistance to Seaborg in writing books on his chairmanship and efforts to promote arms control and peaceful uses of nuclear power. Includes Loeb's correspondence and interviews with McGeorge Bundy, W. Averill Harriman, Dean Rusk, W. W. Rostow, and Theodore C. Sorenson. Includes material on the



Herbert Friedman (1916-2000). Photo courtesy of AIP Emilio Segrè Visual Archives, Physics Today Collection.

allegations that Zalman M. Shapiro, president of the Nuclear Materials and Equipment Corp., provided Israeli associates with nuclear secrets and enriched uranium in the 1960s. 1945-1999 (bulk 1961-1971). Ca. 6000 items (6.8 lin. ft.)

Additions to the papers of **Charles Hard Townes, 1915-**. Physicist at the University of California, Berkeley. Designed the first maser and was awarded the Nobel Prize for Physics in 1964. Correspondence, subject files and other papers relating chiefly to Townes's career as a physicist at Bell Telephone Laboratories, Murray Hill, NJ; Columbia University, New York, NY; Massachusetts Institute of Technology, Cambridge, MA; and University of California, Berkeley, CA. Includes material concerning his invention of the maser in the 1950s and his work as a member of the President's Science Advisory Committee and with the U.S. Department of Defense during the John F. Kennedy presidential administration. Also includes lectures, notebooks, printed material, photographs and other papers. Addition to collection consisting of outgoing correspondence, 1985-1992; materials pertinent to Townes' involvement with Secretary of Energy Advisory Board, National Academy of Sciences, National Research Council, National Bureau of Standards, National Radio Astronomy Observatory, Institute for Defense Analysis, Department of Energy, and Jet Propulsion Laboratory. Also includes research notebooks, 1948-1965; maser-laser history files and patents; writings, speeches, honors, awards and trip files. 1948-1996. Unprocessed. Ca. 60,000 items. + 40 lin. ft.

NATIONAL ACADEMY OF SCIENCES. 2101 CONSTITUTION AVENUE, N.W., WASHINGTON, DC 20418, USA (CONTACT: JANICE F. GOLDBLUM)

Records of the **American Geophysical Union**. Organized in 1919 to represent the U.S. in the International Research Council's International Union of Geodesy and Geophysics and to serve as the National Research Council Committee on Geophysics. In both of these capacities, the AGU promoted work in the fields of astronomy, geodesy, geology, meteorology, seismology, terrestrial electricity and magnetism, and volcanology. The collection includes correspondence, reports and meeting minutes. 1919-1965. 7 lin. ft.

NAS-NRC International Relations Records Group. Documents the U.S. National Academy of Sciences-National Research Council involvement in international congresses and non-governmental international scientific organizations and unions. The institution's physics-related activities in these areas are well represented. Collection includes correspondence, reports, and meeting minutes. Important topics include: International Council of Scientific Unions (ICSU); International Unions in astronomy, biophysics, geodesy and geophysics, mathematics, physics and radio; and administration of the NAS. 1940-1965. 44 lin. ft.

Records of the **National Academy of Sciences (U.S.), Space Science Board**. Appointed in spring 1958 at the request of the



Julian Seymour Schwinger (1918-1994), October 1973. Photo courtesy of AIP Emilio Segrè Visual Archives, Segrè Collection.

Executive Committee of the U.S. National Committee for the International Geophysical Year to survey the scientific aspects of the human exploration of space. The SSB provided advice on the continuation and expansion of the IGY's rocket and satellite programs, and later advised NASA, the Dept. of Defense, and the National Science Foundation on aspects of interplanetary probes and space stations, potential problems of manned spaceflight, the exploration of Venus and Mars, & other matters related to space. Collection includes correspondence, reports and meeting minutes. Important topics include: Atmospheric sciences, Committee on Space Research (COSPAR), extraterrestrial contamination, International Council on Scientific Unions (ICSU), International Geophysical Year (IGY), lunar exploration, National Aeronautics and Space Administration (NASA), administration of the National Academy of Sciences (U.S.), National Research Council (U.S.), planetary atmospheres, planetary exploration, rocketry, satellites, solar-terrestrial physics. 1958-1974. 20 lin. ft.

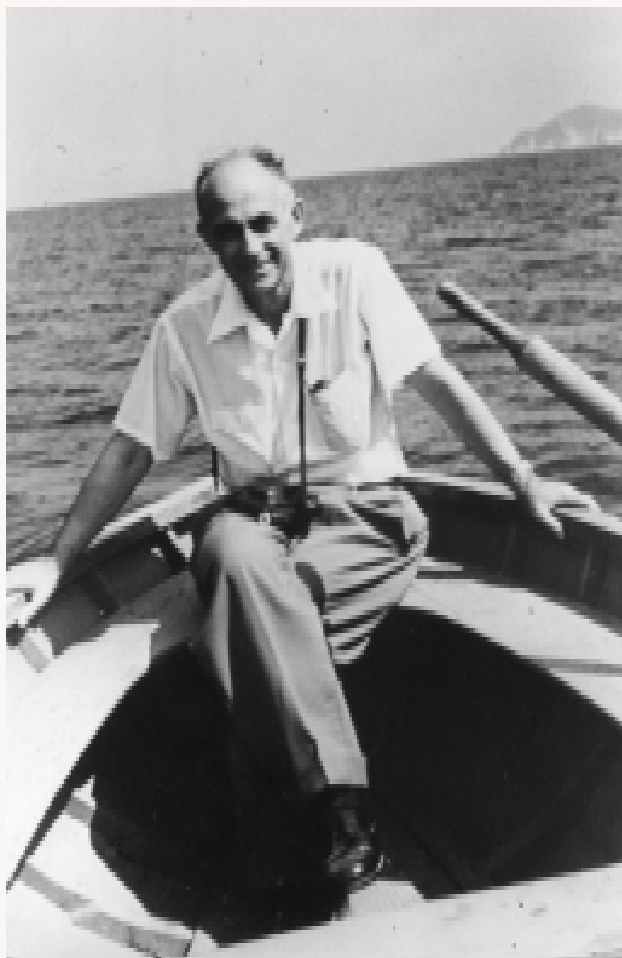
Records of the **National Research Council (U.S.), Committee on Polar Research**. Established in early 1958, the extradivisional Committee on Polar Research grew out of the Academy's U.S. National Committee for the International Geophysical Year.

Following up on the USNA's direction of IGY activities at the North and South Poles, the Committee developed program recommendations for the NSF regarding scientific research in the Arctic and Antarctic regions. The Committee also served as the U.S. National Committee for ICSU's Special (later, Scientific) Committee on Antarctic Research. In 1975, the Committee was reorganized as the Polar Research Board under the National Research Council's Assembly of Mathematical and Physical Sciences. Collection includes correspondence, reports, and meeting minutes. Important topics: Antarctic research, Arctic research, glaciology, geodesy, geophysics, International Council of Scientific Unions (ICSU), International Geophysical Year (IGY), Scientific Committee on Antarctic Research, Special Committee on Antarctic Research. 1955-1968. 14 lin. ft.

Records of the **National Research Council (U.S.), Division of Physical Sciences**. Established from the NRC Committee on Physics during the 1918 wartime reorganization of the Research Council, Division of Physical Sciences, with Charles E. Mendenhall as its chairman; retained under the Research Council's peacetime reorganization in 1919. After World War I, the Division continued its function of forming research committees in various areas of physics, and publishing reports of their findings. The focus of the postwar Division was on promoting research in physics by conducting and publishing surveys in order to assist investigators and suggest problems. Like the Research Council as a whole, the Division during the postwar years set out to take a more active role of leadership in its field. The Committee on Nuclear Science (the successor after a 1946 reorganization of the Committee on Standards of Radioactivity) addressed a highly diverse set of issues in the field of nuclear science through the 1970s. The Division also turned its attention to the education and training of physicists. Collection includes correspondence, reports and meeting minutes. Important topics include American Institute of Physics, neutron measurements, nuclear constants, nuclear geophysics, nuclear reactors, radioactivity measurements and standards, radiobiology, radiochemistry. 1919-1962. 13 lin. ft.

PURDUE UNIVERSITY. LIBRARIES. SPECIAL COLLECTIONS.
WEST LAFAYETTE, IN 47907, USA (CONTACT:
KATHERINE M. MARKEE)

Papers of **Vivian Annabelle Johnson, 1912-1985**. Physicist, faculty member of Purdue University, researcher in theoretical solid state physics and author of many scientific papers on the transport properties of semiconductors. Her scholarship, leadership and abilities as a teacher were recognized in 1973 by the Standard Oil Foundation Teaching Award and in 1979 by the Helen B. Schleman Gold Medallion Award. Member of Sigma Xi, Sigma Pi Sigma, Indiana Academy of Sciences, Phi Beta Kappa and the American Association of University Professors. Unprocessed.



Enrico Fermi (1901-1954), on boat, Isola d'Elba, 1954. Credit: Amaldi Archives, Dipartimento di Fisica, Università "la Sapienza" Rome. Photo courtesy AIP Emilio Segrè Visual Archives.

DAVID SARNOFF RESEARCH CENTER. DAVID SARNOFF LIBRARY. PRINCETON, NJ 08543-5300, USA (CONTACT: ALEXANDER B. MAGOUN)

Papers of **David Sarnoff, 1891-1971**. Worked for Radio Corporation of America (1919-), as president (1929-1930) and as director (1930-). Material on technical and commercial activities, letters, public statements and speeches, spanning Sarnoff's entire career. Photos and other documents, including his memorandum on a radio music box, relate to his proposals for the uses of wireless, his ideas on the broad applications of wireless technology and electronics, and the wide range of his public services and interests. Among the topics covered are television, RCA, and NBC. 1941-1985. 700 vols. (310 lin. ft.) Access restricted.

SMITHSONIAN INSTITUTION. NATIONAL MUSEUM OF AMERICAN HISTORY (U.S.). ARCHIVES CENTER. MRC 601, 12TH STREET AND CONSTITUTION AVENUE, N. W., WASHINGTON, D. C. 20560, USA (CONTACT: ALISON OSWALD)

Oral history interview of **Charles H. Townes, 1915-**. Graduated from Furman University (1935), Duke University (1936), and the

California Institute of Technology (Ph.D., 1939). Appointed to faculty of Columbia University, 1948, where he conceived the idea for the maser. Received Nobel Prize for physics for advances in quantum electronics, 1964. 0.5 cu. ft. : 3 boxes; 4 videotapes. Contact institution for restrictions.

UNION COLLEGE. SCHAFFER LIBRARY. SPECIAL COLLECTIONS. SCHENECTADY, NEW YORK 12308, NY, USA (CONTACT: ELLEN FLADGER)

Papers of **Ralph A. Alpher**. Astrophysicist (B.Sc. 1943 and Ph.D. 1948, George Washington University) whose work with George Gamow on nucleosynthesis in the early universe and with Robert Herman on the existence of primordial background radiation are landmarks in the development of the Big Bang theory. Alpher worked at the Applied Physics Laboratory of the Johns Hopkins University (1945-1955); General Electric Research and Development Laboratory (1955-1986), and since 1986 has been a research professor at Union College and administrator of the Dudley Observatory. Collection consists of personal and scientific papers and includes research notes, letter books, research, reprints and other material related to his work. 1940s-present. Unprocessed. 40 lin. ft.

Papers of **Robert Herman, 1914-1997**. Theoretical physicist (B.S., M.S., and Ph.D. from Princeton University) who worked at the Applied Physics Laboratory of the Johns Hopkins University (1942-1955). He made fundamental contributions to the theory of high energy electron scattering, and worked with George Gamow and Ralph Alpher on developing the Big Bang theory, exploring such topics as the formation of elements in the Big Bang, and production of microwave background radiation produced in the early stages of the evolution of the universe and still detectable today. From 1956-1988 Herman was head of the Theoretical Physics Research Lab of the General Motors Research Lab. His work there included pioneering theoretical analyses of vehicle traffic flow, work that provided a basis of modern theories of traffic analysis. In 1988 he became professor of Civil Engineering at the University of Texas. Collection represents only part of Herman's work, most likely the work he did with Ralph Alpher. 1940s-present. Unprocessed. 3 lin. ft.

UNIVERSITY OF COLORADO. LIBRARIES. WESTERN HISTORICAL COLLECTIONS. CAMPUS BOX 184, BOULDER, CO 80302-0184, USA (CONTACT: BRUCE MONTGOMERY)

Papers of **Albert Allen Bartlett, 1923-**. Emeritus professor of the Department of Physics at the University of Colorado, Boulder. Contains personal files and records related to his service as an officer or active member of boards, commissions and committees. An avid historian of the University, Dr. Bartlett kept files on University history and researched the history of the physics department. 1969-1997. 13 boxes, 215 slides.

Papers of **Edward Uhler Condon, 1902-1974**. Physicist who served as director of the National Bureau of Standards (1945-1951). He also was the director of research and development

(1951-1954) and consulting physicist (1954-1974) at Corning Glass Works. He was professor of physics and astrophysics and fellow of the Joint Institute of Laboratory Astrophysics (JILA) at the University of Colorado and conducted a study of unidentified flying objects (UFOs) for the U.S. Air Force in the mid-1960s. Included in the collection are transcripts from Gemini space flights, microfilm of UFO publications and reports, plus books, pamphlets, journals and other material. Also included is material on the "Bevetron" (BEV Proton Accelerator) study led by Condon. The majority of Condon's papers are housed at the American Philosophical Society in Philadelphia. 1960s. 11 boxes, 21 volumes.

Papers of **William Duane, 1872-1935**. Renowned for research on radioactivity and X-rays; worked with Pierre and Marie Curie at the University of Paris, 1907-1912. He was the first professor and head of the Dept. of Physics at the University of Colorado from 1898 to 1907, and Professor Emeritus of Biophysics at Harvard University from 1913-1935. Duane Physical Laboratories on the C.U. campus were dedicated on March 11, 1972 in his honor. Includes certificates, correspondence, photographs and a family scrapbook of clippings. 1898-1935. 1 small box, 1 oversize.

Papers of **Bernhard Haurwitz, 1905-1986**. Born in Germany and received Ph.D. in meteorology and geophysics from the University of Leipzig in 1927. Having accepted a short appointment at MIT in 1932, Haurwitz chose not to return to Germany following Hitler's rise to power. He conducted meteorology research at MIT and Harvard (1932-1935). He served at University of Toronto (1935-1941) as a Fellow and Lecturer, MIT (1941-1947) as a member, an Associate of Woods Hole Oceanographic Institute (1947-1955) and NYU (1947-1959) as chairman of Meteorology. He came West to UCB (1959-1964), Alaska (1964-1973) and NCAR (1964-1973) on split year appointments, and CSU (1973-1983). The collection includes his library of scientific publications including a card index, and tape recordings with printed transcripts of his 1983 oral history interviews by George Platzman. 1920s-1986. 6 boxes.

Papers of **Oliver Clarence Lester, 1873-1951**. Came to the University of Colorado as Head of the Department of Physics in 1907. He became Dean of the Graduate School in 1919 and Vice-President of the University in 1931. Lester retired in 1947, revered as the "elder statesman" of the University. The collection includes 10 handwritten letters to Miss Kaufman, a former student. 1937-1951. 1 small box.

UNIVERSITY OF MINNESOTA. UNIVERSITY ARCHIVES. 10 WALTER LIBRARY, 117 PLEASANT ST. S.E., MINNEAPOLIS, MN 55455, USA (CONTACT: PENELOPE KROSCH)

Papers of **Phyllis S. Freier, 1921-1992**. Spent her entire academic life at the University of Minnesota. As a graduate student she was the first person to see tracks in nuclear emulsions which proved that there were energetic heavy nuclei in cosmic radiation. Freier was unable to advance academically at the Univ. of

Minn. because her husband, George Freier, was also a member of the Physics Dept. faculty. In 1970, nepotism rules were relaxed and Freier rapidly moved through ranks in recognition of her research and teaching. She was recognized internationally for her work as a cosmic ray physicist and administered one of the major nuclear emulsion laboratories in the world. She was the recipient of several teaching awards from the Univ. of Minn. and was an active member in the American Physical Society. Unprocessed. 3 lin. ft.

Papers of **Edward Purdy Ney, 1920-**. Astrophysicist. Received all his degrees from the University of Minnesota. During World War II, Ney worked on the Manhattan Project where his research centered on the separation of uranium isotopes. After the war, Ney returned to Univ. of Minn. and concentrated on astrophysics. He continued research initiated by Jean Piccard using high altitude balloons to study incoming high energy particles. Ney and Phyllis Freier collaborated on cosmic ray research. Ney's research includes experiments involving the Gemini launches during the 1960s. His most recent research was an investigation of radioactive background radiation on the earth's surface. Collection includes research data and related material reflecting Ney's research on cosmic physics. Unprocessed. 45 lin. ft.

WOODS HOLE OCEANOGRAPHIC INSTITUTION. ARCHIVES. MAIL STOP 8, WOODS HOLE, MA 02543-1539, USA (CONTACT: MARGOT BROWN GARRITT)

Papers of **William Stelling Von Arx, 1916-1999**. Known variously as a meteorologist, geologist, astronomer, physicist, oceanographer and teacher. Von Arx worked at WHOI from 1945-1978. He also served as a professor of oceanography at MIT from 1959 onward. Von Arx spent his early years at WHOI working on war-related grants and contracts and ocean dynamics. His principal scientific interests included the primary circulation of oceans and atmosphere, heat and balance of the earth, and physical geodesy of ocean areas. His correspondence from the mid-to-late 1950s reflects his work and involvement with other scientists. The collection documents his early years at the Institute as a physical oceanographer. Materials consist of correspondence, manuscripts, photographs, data and logbooks. 1950s. 4 lin. ft.

Instead of marching onward with perfect vision, science stumbles along... In hindsight, the path taken may look straight, running from ignorance to profound insight, but only because our memory for dead ends is so much worse than that of a rat in a maze.

—Frans de Waal

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