Almost everyone living in a technological society today owns or uses a laser. Compact disc players, supermarket checkout scanners, laser printers, and laser pointers are among the applications we encounter daily. Some specialized laser applications include cauterizing scalpels in surgery, industrial cutters and drills, surveying, artificial guide stars for astronomical observatories, and seismology.

This year, 2010, we celebrate the fiftieth anniversary of the invention of the laser. If you ask people at random, “When were the principles first conceptualized that make lasers possible?”, many guess some date around 1960. That’s correct if you mean the construction of a working laser. But the concept of “stimulated emission” that makes lasers possible was first articulated by Einstein back in 1917! It took four decades for technology and circumstances to catch up with Einstein’s vision.

Einstein’s 1917 paper depended on four facts that were already well known to physicists, but which Einstein put together in an original way. First, the electrons in atoms exist in discrete states with quantized energy levels. Second, electrons make transitions between these states by emitting or absorbing a photon whose energy matches the energy difference between the two levels. Third, Ludwig Boltzmann’s statistical mechanics gave us an expression for the probability that an atom resides in a state of a certain energy when it’s part of matter in thermal equilibrium at a given temperature. Fourth, Max Planck’s statistical physics gave us an expression for the energy distribution in a gas of photons. Einstein’s 1917 paper put these four pieces together.

Meanwhile, scientists and engineers pushed radio techniques to ever shorter wavelengths. In the 1930s some hoped they were on the verge of creating a “death ray” (H.G. Wells’ 1898 novel War of the Worlds, wherein the invading Martians were armed with dreadful death rays that obliterated everything they hit, became well known in the US about this time). That turned out (happily) to be unworkable, but the effort led to something better—radar—thanks to the invention of the magnetron (which later was scaled down to build microwave ovens). By 1940, as World War II began, these ingenious radar devices

**Bright Ideas: From Concept to Hardware in the First Lasers**

Adapted by Dwight E. Neuenschwander, with permission, from Bright Idea: The First Lasers, an online exhibit of the Center for History of Physics and Niels Bohr Library & Archives at the American Institute of Physics, hereafter called “the Exhibit.” [http://www.aip.org/history/exhibits/laser/](http://www.aip.org/history/exhibits/laser/).

(Continued on page 2)
could generate rays with wavelengths of a centimeter or less. They were swiftly pressed into service to detect enemy airplanes.

After WWII, physicists had reason to boast that radar had played a crucial role in winning the war, and the atomic bomb had certainly ended it. What might the physicists create next? As the Cold War got underway, the US government poured ever larger funds into basic and applied research. Scanting not only military but civilian applications, corporations and entrepreneurs heaped their own money on the pile. Industrial and university laboratories proliferated. It was from this fertile soil that the laser would grow.

The Maser: First Step to the Laser

Already in the 1930s scientists could have built a laser. They had the optical techniques and theoretical knowledge—but nothing pushed these together. The push came around 1950 from an unexpected direction. Short-wavelength radio waves, called microwaves, could make a cluster of atoms vibrate in revealing ways (a technique called microwave spectroscopy). Radar equipment left over from World War II was reworked to provide the radiation. Many of the world’s top physicists were thinking about ways to study systems of molecules by bathing them with this radiation.

Charles Townes of Columbia University had studied molecular physics in the 1930s, and during the war had worked on radar as an electronics engineer. The Office of Naval Research pressed him and other physicists to put their heads together and invent a way to make powerful beams of radiation at ever shorter wavelengths. In 1951 he found a solution. Under the right conditions—say, inside a resonating cavity like the ones used to generate radar waves—the right collection of molecules might generate radiation on their own. He was applying an engineer’s insights to a physicist’s atomic systems. Townes gave the problem to Herbert Zeiger, a postdoctoral student, and James P. Gordon, a graduate student. By 1954 they had the device working.

Townes called it a Maser, for “Microwave Amplification by Stimulated Emission of Radiation”. [4]

Townes had predicted a remarkable and useful property for the radiation from the device: it would be at a single frequency, as pure as a note from a tuning fork. And so it was. The high degree of order in such radiation would give the maser, and later the laser, important practical uses.

Townes was not alone in his line of thought. Joseph Weber of the University of Maryland expressed similar ideas independently in 1952. And Robert H. Dicke of Princeton worked toward the same goal along a different path. Neither tried to build a device. In Moscow, A.M. Prokhorov and N.G. Basov were thinking in the same direction, and they built a maser in 1955.

Who Invented the Laser?

Physicists had been working for generations toward controlling ever shorter wavelengths. After radio (meters) and radar/microwave (centimeters, then millimeters), the logical next step would be infrared waves. Masers had been modestly useful, more for scientific research than for military or industrial applications. Only a few scientists thought an infrared maser might be important and pondered how to make one.

Townes thought about the problems intensively. One day in 1957, studying the equations for amplifying radiation, he realized that it would be easier to make it happen with very short waves than with infrared waves. He could leap across the infrared region to the long-familiar techniques for manipulating ordinary light. Townes talked it over with his colleague, friend and brother-in-law Arthur Schawlow. Schawlow found the key—put the atoms you want to stimulate in a long, narrow cavity with mirrors at each end. The waves would shuttle back and forth inside so that there would be more chances for stimulating atoms to radiate. One of the mirrors would be only partly silvered so that some of the rays could leak out. This arrangement (the Fabry-Pérot etalon) was familiar to generations of optics researchers.

The same arrangement meanwhile occurred to Gordon Gould, a graduate student at Columbia University who had discussed the problem with Townes. For his thesis research, Gould had already been working with “pumping” atoms to higher energy states so they would emit light. As Gould elaborated his ideas and speculated about all the things you could do with a concentrated beam of light, he realized that he was onto something far beyond the much-discussed “infrared maser.” In his
notebook he confidently named the yet-to-be-invented device a LASER (for Light Amplification by Stimulated Emission of Radiation). Gould, Schawlow and Townes now understood how to build a laser—in principle. To actually build one would require more ideas and a lot of work. Some of the ideas were already in hand. Other physicists in several countries, aiming to build better masers, had worked out various ingenious schemes to pump energy into atoms and molecules in gases and solid crystals. In a way they too were inventors of the laser. So were many others, clear back to Einstein.

In 1957 Townes talked over some ideas about pumping light energy into atoms with Gould. Worried that he might be scooped, Gould wrote down his ideas for the record. He developed many more ideas of how lasers could be built and used, and in April 1959 he filed patent applications with his employer, the high-tech research firm TRG. Nine months earlier Schawlow and Townes had applied for a patent on behalf of Bell Laboratories, which employed Schawlow on staff and Townes as a consultant. This led to a long-running patent suit between Bell Labs and Gould, which lasted until 1987 (see the Exhibit).

The Race to Build the Laser
When Schawlow and Townes published their ideas in 1958, physicists everywhere realized that an “optical maser” could be built. Teams at half a dozen laboratories set out, each hoping to be the first to succeed. Research groups at Columbia University, TRG Corporation, Westinghouse, IBM, Bell Labs, and Hughes Laboratories were among those whose seminal ideas often ended in useful failures before ultimate success was achieved (see the Exhibit for a fascinating list of approaches). These stories have a wealth of circumstances and personalities, but let’s pick up the story with the investigators at Bell and Hughes Labs.

At Bell Labs, Ali Javan, a former student of Townes, tried gas as the lasing medium. He settled on a combination of helium and neon in a long glass tube. An electric discharge through the gas would energize the helium, and collisions would transfer that energy to the neon. It would have operated in the infrared. Proposed by Javan in mid-1959 and built by Javan, W.R. Bennett Jr., and D.R. Herriott in 1960, it would have been the first continuous wave laser. But they could not get laser action.

Theodore Maiman at Hughes Laboratories made calculations and measurements that convinced him the others were wrong who said it was impossible to pump much energy into a ruby crystal, which had earlier been suggested as the lasing medium. Even so, one would need an extraordinarily bright energy source. One day Maiman realized the source did not have to shine continuously, as other ruby proponents were trying. A flash lamp would do. Scouring manufacturers’ catalogs, he found a very bright lamp with a helical shape. Just right, he thought, for fitting a ruby inside. He assembled the components with the aid of an assistant, Irnee d’Haenens, and in May 1960 observed pulses of red light. It was the world’s first laser.[5]

Maiman’s laser consisted of a cylindrical synthetic ruby crystal (Al₂O₃) with 0.05% by weight Cr₂O₃. The ends of the crystal were flat and silvered (one end half-silvered) to form a resonant cavity for the light. The crystal was “pumped” with light from the flashtube. Photons from the flashtube kick electrons in the chromium ions into a very short-lived excited State 3. These electrons almost instantly (~100 ns) drop down to a State 2 that has a long lifetime against spontaneous emission. Enough atoms are hung up in State 2 to produce a population inversion. When one of the atoms emits, the others are stimulated and the chain reaction ensues. The cycle can be repeated in pulses. The light output was a directional, coherent, monochromatic red light of wavelength 694.3 nm.

Other teams moved quickly when they heard of Maiman’s work. Altogether, by the end of 1960 three quite different types of laser—ruby crystals, calcium fluoride crystals, and gas laser—had been demonstrated (see the Exhibit for a wealth of detail).[6]

In 1962, the first visible light, continuously operating helium-neon laser was built by A.D. White and J.D. Rigden at Bell Labs [7, 9]. Their laser operated at a wavelength of 630 nm. It was the first optical oscillator that met the requirements of the demands of optical communication. The YAG laser,

(Continued on next page)
consisting of a yttrium-aluminum-garnet crystal doped with neodymium, was developed in 1964 by J.E. Guesses, H.M. Marcos, and L.G. Van Utter, also of Bell Labs [8, 9]. The YAG was the first high-power laser (hundreds of watts, compared to milliwatts from the He-Ne laser), and brought lasers into machining and drilling applications of heavy industry.

What’s It Good For?
Fifty years after the first laser, there are few people in modern society who have not been affected by the invention. The answers to the question “What’s it good for?” are legion. Lasers have revolutionized communication; improved commerce, industry, and entertainment; offer numerous instances of pain-free surgery; and have become one of the most powerful tools for advancing basic and applied science.

The next time you play a CD or use a laser printer, think about the long road from 1917 to 1960 and these devices we should appreciate and not take for granted.

See the AIP Exhibit[1] for intriguing details of laser history and the wide variety of its applications.

Acknowledgments
The author expresses his gratitude to Greg Good, Director of the Center for History of Physics, American Institute of Physics, for permission to adapt Bright Idea: The First Lasers for this article.


[4] Government largesse also raised serious concerns about who was setting the agenda and values for research. They were eloquently expressed by Melba


Our three-year, NSF-funded study of physics entrepreneurs got off to a fast start in May 2009, and we’ve now completed more than 50 interviews with founders and other physicists at over 30 startups in a wide range of specialties. The interviews average about two hours each and are based on a set of questions that were developed by staff and consultants with input from working scientists. The History of Physics Entrepreneurship (HoPE) Study is a groundbreaking investigation of the role of entrepreneurial physicists in developing new technologies. While we are including a small sample of companies founded before 1990, most of the enterprises were started in the last two decades, all by physicists. (For more information on selection criteria, see “AIP Launches New Study of Physics Entrepreneurs” in the Fall 2009 History Newsletter.)

During the first year we’ve focused on both coasts, conducting site visits and interviews at startups in Boston, the San Francisco Bay Area/Silicon Valley, the Research Triangle, and the Pacific Northwest, along with Tucson and Phoenix in the Southwest. We plan to focus our next series of site visits on the middle of the country, starting in the Chicago area. Before then, however, project staff will concentrate on having the completed interviews transcribed and then coded in Nvivo, the qualitative software that we’re using to analyze the responses. This will give us an opportunity to assess our initial results, fine tune the question sets, and adjust strategies for the remainder of the study. Some tentative findings include:

The importance of lab notebooks
Most of the companies require the use of hard copy lab notebooks in their research, which is in sharp contrast with the large companies in our earlier study of the History of Physics in Industry (HoPI), where less than 50% of scientists use lab notebooks. For some of the companies, failure to use a lab notebook is an offense that can result in termination.

Entrepreneurial background varies
While a few interviewees talked about being raised in an entrepreneurial family environment, most did not, and even those that did varied significantly on what they considered “entrepreneurial.” Most saw entrepreneurship defined in some way to suggest openness to taking risks, but entrepreneurial backgrounds do not appear to be a factor encouraging most to go into business.

Patents vs. trade secrets
While each company had its own measure of determining when to patent, most discussed patent costs as an impediment. Costs of a patent ranged from $10,000 to $60,000. Many interviewees who hold academic appointments were happy to have the university patent the results of their research and then license the intellectual property from the university.

Startups are low risk for academics
Several professors who were founders suggested that starting a company was low risk for them. They were not dependent upon the company for their job and the company, once they were tenured, did not put their academic career at risk. However, some said they had to weave their way through ethics issues relating to their fiduciary relationship with a company that conflicted with their interests as an employee of the university.

R&D cycle
One of the issues we will want to track carefully in future interviews is the appearance of an apparent R&D cycle.

Most interviewees suggested that when they began, they initially did 100% research, slowly shifting to development with research almost or completely disappearing as they brought a product to market.

Absence of siloing/ importance of networking
Another intriguing contrast with our HoPI study was the clear absence of intellectual siloing in the startups. While physicists in large corporations were hard put to name important scientists outside their own company, this came easily to the R&D staff and founders of startups. Part of this undoubtedly reflects the importance of networking for startups.

Funding
Startup funding appears to take a variety of modalities. Some began with venture capital ranging from a few million dollars to over one hundred million. Other start-ups saw venture capital as a danger to be avoided and relied heavily on SBIR (Small Business Innovation Research) contracts to start, and in some cases continue, their business. A third mode involves contracts with larger companies or federal science agencies. Debt financing appears to be less common but also occurs occasionally.

We welcome questions and comments, including suggestions of companies to include in the study. Please contact us at obutler@aip.org or janderso@aip.org.

Associate Historian Orville Butler (right) interviews Shibin Jiang, CEO of AdValue Photonics in Tucson, AZ. Photo courtesy of Joe Anderson.
History on Display
By H. Frederick Dylla, Executive Director and CEO of AIP

In my career as a student, teacher, and practitioner of science, I have always valued the history behind the development of a theory or invention: The historical context adds richness and human drama to the quest for scientific knowledge. For that reason, it is my pleasure to highlight several new resources provided by AIP's Center for History of Physics.

The History Center has been developing web resources for more than 15 years, which have proven to be quite popular based on the download statistics. The online exhibit “Bright Idea: The First Lasers” (see first article) is the latest in a successful series of exhibits that span key developments (from the discovery of the electron and superconductivity to the invention of the transistor) or center on pioneering personalities in physics (such as Albert Einstein, Marie Curie, and Ernest Lawrence).

These online exhibits draw on the photographs, oral histories, documents, publications, and other sources in the AIP Niels Bohr Library and Archives and many other collections. The five most popular exhibits (out of 14 total) received more than 1,700,000 visits during 2009.

I first took advantage of these marvelous tools when I was working at Jefferson Lab in 1997, preparing a lecture on J. J. Thomson’s discovery of the electron. In honor of the centenary of Thomson’s 1897 discovery, the History Center had prepared one of its first online exhibits, which brought a completeness and coherence to Thomson’s life and work.

Thirteen years later in 2010, the exhibit still trumps Wikipedia’s offerings. As I perused the site and studied the linked references, I became interested in some of the scientific tools that led to his electron discovery, such as the intricate hand-blown glass tubes containing electrodes for exciting discharges in gases, the induction coils for inducing high voltages across the tubes, the early vacuum pumps for evacuating air from the tubes, and the spectrometers to analyze the composition of the excited gases. By good fortune, excellent examples of these early instruments were maintained as part of the Garland Collection of classical physical instruments at Vanderbilt University.

With the help of David Ernst from Vanderbilt, I arranged for the 19th century apparatus related to Thomson’s discovery to be borrowed from Vanderbilt for display at Jefferson Lab. This collection has recently been transferred to the American Center for Physics, where it is now on display (photo above) in the lobby of the Niels Bohr Library and Archives.

Does the Niels Bohr Library & Archives have images of Einstein? How do I get permission to use these images?

There are almost 200 images of Einstein in the Emilio Segrè Visual Archive (ESVA, part of the Niels Bohr Library & Archives). Einstein bequeathed his literary estate to the Hebrew University of Jerusalem, who later secured celebrity rights to his persona. They have authorized Corbis (http://pro.corbis.com/) as their agent in the commercial use of the Albert Einstein persona, which includes the name, voice, signature, photographs, likeness, and image of Albert Einstein. ESVA provides photos of Einstein and other images for non-commercial use only.
In 2006, historians of the Centre for the History of Science (CEHIC) at the Universitat Autònoma de Barcelona, Spain, launched a research project to establish the basis for a history of physics in twentieth-century Spain. Led by historians of physics Xavier Roqué, the project has recently received an extension of its funding by the Spanish Ministry of Science and Innovation, and has also been supported by the Center for History of Physics of the American Institute of Physics.

In brief, the CEHIC project aims at laying the foundations for a systematic study of the History of Physics in Spain in the 20th century through the preservation of scientific archives, the compilation of secondary literature and the support of new case studies based on our pioneering Masters and PhD program in history of science. This is the first history of science program in Spain and has been awarded the so-called Mención de Calidad of the Ministry of Education—a distinction that has allowed the centre to invite up to eight visiting lecturers each year and has helped reinforce the international outlook of the programme. In relation to the preservation of physics’ heritage, the project aims to contribute to the identification of archival sources pertaining to the History of Physics in Spain, to the creation of new sources via oral history, and to the integration of the information gathered in the International Catalog of Sources (ICOS) at the American Institute of Physics.

At the moment, the centre has already catalogued two main collections of archives, the personal archives of physicist Pere Pasqual and the institutional archives of the Synchrotron facilities at the UAB (Universitat Autònoma de Barcelona). In both cases, the catalogues have been integrated into the platform Servei d’Arxius de Ciència (SAC, Science Archives Service), an initiative run by the CEHIC which has the support of three leading institutions in the area of scientific research and heritage in Catalonia: the Department of Culture and Media of the Catalan government, the Institute for Catalan Studies, and the Universitat Autònoma de Barcelona. In relation to the oral sources, members of the centre have performed oral interviews, including physicists Pere Pasqual, Xavier Campi, Oriol Bohigas, Ramon Pascual, Alberto Galindo, Manuel Asorey, Eduard de Rafael, Josep Maria Vidal, Rafael Márquez Delgado, and Piedad de la Cierva. Information about these and other oral history projects is also available through the SAC webpage, http://www.sac.cat/home.php.

A second objective, related to the mapping of research in this domain, aims to establish an online database of literature on twentieth-century physics in Spain, which would be the basis of a guide and review essay on this topic. At the moment, the database counts about 500 references, most of them published in Spanish, and the group foresees making it available to the public in late 2010. Indeed, an essay-review and guide of this literature will be published this same year to provide an assessment of the state-of-the-art of the literature on the history of physics in Spain, to identify gaps in literature and key issues for future research, and, in general, to provide an introduction to new researchers in this topic.

Last, but not least, the project also fosters research among students and scholars on the History of Physics in Spain in the 20th century, dealing with the history of institutions devoted to physics, the interplay between physics and the biomedical sciences, the evolution of physics teaching, or the development of instrumentation. Some examples of this research are: Carles Gámez’ study of Miguel Catalán (1894–1957), a Spanish spectroscopist, recognized regularities in the spectra of complex atoms, in groups of lines he called multiplets. Credit courtesy AIP Emilio Segré Visual Archives, W.F. Meggers Collection.
Since its founding in 1962, the Niels Bohr Library has built an extraordinary collection on the history of modern physics, astronomy, geophysics, and related fields, largely through donations from the scientists who originally collected and prized the books. Like every library, it still has important gaps to fill in its holdings. Recently, I’ve helped the families of two old friends, Bill Kelly and Leonard Jossem, find a good home for their books, while adding missing titles to the Library’s collection.

It happened serendipitously years ago. I was looking for information on Bill Kelly, a member of the American Association of Physics Teachers (AAPT) from Iowa, in the AAPT Membership Directory. A Bill Kelly appeared as living in Silver Spring, a neighboring suburb here in Washington, DC. Within minutes of finding the listing I phoned Bill and we began meeting for lunch on an almost monthly schedule to renew an old friendship.

At about that same time, AIP began planning its 75th Anniversary celebration. Bill helped develop the AIP Department of Education and Manpower in 1961, so I reminded the anniversary organizers that they had local access to an early staff member from the New York headquarters. He became involved in the 75th anniversary planning and appears in the 75th anniversary DVD.

When Bill passed away, I felt that his library would interest AIP’s Niels Bohr Library & Archives. He had a long history in Physics Education at AIP, the National Research Council, and as consultant to AAPT. I arranged for Joe Anderson (Director of the Library) and Greg Good (Director of the History Center) to visit the Kelly home to inspect his collection. The result was a gift of forty-seven books to the Niels Bohr Library & Archives by Bill Kelly’s family. These books will be identified in the Niels Bohr Library’s book catalog and also with bookplates.

Last August, Leonard Jossem passed away. I’d known Len as president of AAPT and because of the work that we both carried out in AAPT and AIP over the years. At a memorial program in the Physics Department at Ohio State University I met Kay Smith, who had responsibility for Len’s library. I informed the History Center and again it is to become the beneficiary of a number of books from the family of Len Jossem. Five boxes of books have arrived and are being cataloged.

Although the Niels Bohr Library & Archive cannot accept all donations, it does carefully consider each book that is offered. Members of AIP member societies and their families should remember this as they ponder what to do with libraries gathered during long careers in science.

For more information, please contact Greg Good (301-209-3174), Joe Anderson (301-209-3183) or send an email to nbl@aip.org.

Please help us contact...

...the individuals listed below or their heirs so we can put their oral history interview transcripts online. The Library’s project to mount the transcripts of our most valuable oral histories on the web is coming to a successful conclusion.

Currently, one can read interviews with over 500 physicists and astronomers, including figures like Bohr, Bethe, Chandrasekhar, Gell-Mann, and Rabi, and listen to voice clips of Heisenberg, Gamow, and others, by clicking on the list of names at http://www.aip.org/history/nbl/oralhistory.html. For a full description of the project, which is funded by a grant from the National Endowment for the Humanities, see our Fall 2008 newsletter (http://www.aip.org/history/newsletter/fall2008/oral-history.html).

Contacting interviewees and heirs for permissions is one of the most important and most time consuming parts of the project, and you and other newsletter readers have been of enormous help in the past. We are counting on you now to help us include these important individuals in our new online archive. If you have contact information or other information, please get in touch with Julie Gass at jgass@aip.org or 301-209-3182.

Frank, Sir Charles Law, Margaret E.
Lonardi, Alberto Massevitch, A. C.
McVittie, George C.
Bassani, Franco Frank, Sir Charles Law, Margaret E.
Bogdanov, M. A. Lonardi, Alberto
Bok, Bart Jan Massevitch, A. C.
Chang, Yu-Che McVittie, George C.
Cocke, W. J. Nordheim, Lothar

Oda, Minow
Udintsev, Gleb B.
Wesselink, Adriaan Jan
Accessing major resources in the Niels Bohr Library & Archives has become much easier. Researchers can read many of our oral history interviews, the most used collection in our library, from their own workspaces. We now have over 500 oral history transcripts mounted on the Web, including most of the most used and significant.

We’ve reached this major milestone with a grant from the National Endowment for the Humanities and thanks to the hard work of the project team. The grant-funded work ended in December 2009, and we’re continuing to digitize additional oral histories, albeit at a slower pace.

The oral history collection at the Niels Bohr Library & Archives is rich in the history of modern physics, astronomy, geophysics, and allied sciences. Interviewing projects done by the Center for History of Physics have concentrated on multiple aspects of physics. Therefore, the oral history collection in its entirety covers a wide breadth of physics-related sciences, while the projects that comprise the collection provide in-depth knowledge of the individual disciplines themselves.

We concentrated on digitizing these projects so that users have a broad range of materials to access and because they include a number of the most important physicists in modern history. For instance, some of the oldest oral histories belong to the Archive for the History of Quantum Physics project. These interviews include many of the most well-known faces of 20th century physics. Niels Bohr, Hans Bethe and Werner Heisenberg are just a few of the physicists that researchers can find in this collection. We also digitized many of the oral histories included in the Sources for the History of Modern Astrophysics, which features interviews with leading astronomers and astrophysicists. Also digitized are projects based on history of the laser, solid state physics and industrial physics.

Researchers can access these oral history interviews several ways. You can go to our digitization project’s home page at http://www.aip.org/history/nbl/ohiproject.html and read about the project as well as listen to compelling excerpts from 24 interviews. There, you can also find a link to an alphabetical list of physicists whose digitized interviews are online. A click on the name will take you directly to the interview. Links are also provided in results from searches done in the library’s International Catalog of Sources http://www.aip.org/history/icos.

The library’s catalog records are also indexed by major search engines such as Google and Yahoo, so performing a search on a physicist will often yield results from our catalog.

The digital oral histories will facilitate research around the world, since researchers are only several mouse clicks away from reading these materials. In fact, they already have. In 2009 the digital oral histories received over 37,000 web hits, and we expect that the number will increase as we continue in our endeavor to mount the entire collection online.

As always, we at the Niels Bohr Library & Archives look forward to hearing from our users and appreciate any feedback. If you have any questions or comments please contact us at nbl@aip.org.

What in the world is PHFAWS?

PHFAWS is a great idea with an opaque name. The acronym stands for “Physics History Finding Aids Website.” This is a part of the Niels Bohr Library & Archives web site, and it provides a powerful tool for finding what is in archival collections at AIP and at other repositories around the world related to history of physical sciences. Go to http://www.aip.org/history/nbl/findingaids.html and enter a search term. For example, the phrase “status of women” returns two finding aids. Professional librarians and archivists write the descriptions of collections in finding aids, with an eye toward the needs of researchers.
Grants-in-Aid Awarded in Fall 2009

Roberto Lalli, Ph.D. Candidate, Università degli Studi di Milano, Italy, Dipartimento di Fisica. “Some Controversial Experiments in the Reception of Relativity Theory. Case Studies of the Sagnac Effect, Dayton C. Miller’s Experiments at Mt. Wilson, and the Work of Herbert E. Ives.” For research conducted at the Niels Bohr Library & Archives.

Stuart W. Leslie, Ph.D., Professor, Johns Hopkins University, Department of History, Science, and Technology. To conduct oral history interview with Dr. William Livingston, longtime astronomer at the McMath-Pierce Solar Telescope, Kitt Peak, Arizona.

Martin Underwood, D.Phil. Physics (Oxford University), Visiting Scholar, Department of History and Philosophy of Science, University of Cambridge. To conduct archival research on Joseph Rotblat in the Niels Bohr Archives, Copenhagen, Denmark. Rotblat worked with James Chadwick, at Los Alamos, and helped found the Pugwash movement.

Catherine Westfall, Ph.D., Visiting Associate Professor, Lyman Briggs School of Science, Michigan State University. To conduct oral history interview with Dr. John Schiffer, nuclear physicist at the Argonne National Laboratory and the University of Chicago.

A note to former Grant-in-Aid awardees and other scholars who have researched in the Niels Bohr Library & Archives or conducted oral history interviews for us: Please consider writing a short overview of your research. We will gladly consider articles up to 1000 words for the next issue of the newsletter.

How Scientific Societies Support the Histories of Their Sciences

By Greg Good

Many scientific societies provide support for historians and other people who are investigating the histories of their respective sciences. The American Institute of Physics (AIP) led the way for supporting history of science with the establishment of the Niels Bohr Library & Archives and the Center for History of Physics decades ago.

The History Center’s Grants-in-Aid program has supported scores of historians over the years, in their visits to archives, to the Niels Bohr Library, and for conducting oral history interviews. Researchers are supported with up to $2,500 to reimburse the costs of their research. The Grants-to-Archives program that we oversee has helped archives in many countries to preserve and make accessible the manuscripts of many important physicists. These grants vary up to $10,000 for a worthy project.

Since AIP is a ‘federation’ of physical societies—something that might be imperfectly understood by some readers—each of those societies may of course support the history of its science in its own way. (See the next article, “A Federation of History-Minded Scientists and Science-Minded Historians and Archivists”, pp. 11–13, for details.)

The Center for History of Physics supports all these endeavors to encourage the history of science. If you or anyone you know has information on other programs please email the information to me at ggood@aip.org. I will update readers on these programs.

“A note to former Grant-in-Aid awardees and other scholars who have researched in the Niels Bohr Library & Archives or conducted oral history interviews for us: Please consider writing a short overview of your research. We will gladly consider articles up to 1000 words for the next issue of the newsletter.”

“It is important that students bring a certain ragamuffin, barefoot irreverence to their studies; they are not here to worship what is known, but to question it.”

Jacob Bronowski
The Ascent of Man
This is a complicated situation. We have scientists interested in history and historians interested in science. We have volunteers (those same scientists and historians) who serve on history committees for the different societies and staff members of those societies who take their history seriously. Then we also have a few professional historians, librarians, and archivists who are in fact educated and paid to help everyone else preserve and make known those histories. I am one of the paid historians and Joe Anderson is one of the paid librarian-archivists, and we are the first to admit that we could not do our jobs without all of the others.

In the fall of 2009 the History Center and the Niels Bohr Library & Archives sponsored a gathering of people from AIP’s member societies, affiliated societies, and a few other allies with a similar interest in history. Altogether, over 25 people participated, representing (I’ll use acronyms here) AAS, AAPT, ACA, AGU, APS, AVS, and OSA (member societies); AMS, ASME, MSA, and SPS/∑Π∑ (affiliates); Chemical Heritage Foundation, IEEE, Microbeam Analysis Society, Mineralogical Society of America, NOAA Library, and the University of Maryland History Department (good friends and colleagues). Did I forget anyone?

The purpose of the meeting was communication. Some of the societies have big historical enterprises. The Forum for History of Physics (APS) is quite large! (See “Building the Community” in this issue.) Interest at the AGU in the history of geophysics is growing. The Historical Astronomy Division of the AAS, the History of Geology Division of the GSA, IEEE’s History Center, and the Chemical Heritage Foundation are also quite large and active in promoting history of the physical sciences and engineering. The last two (IEEE and CHF) are like our operation at AIP, paid professionals who focus all their time on history and heritage. Many other efforts are smaller, and status varies from a single interested retired scientist/engineer to a single society staff member who shoehorns history in alongside membership duties, etc. In short, there was a lot of diversity in the room.

The society reps around the table spoke about their societies’ projects and activities. They also spoke of challenges they face. Many sponsor historical sessions at their annual meetings. Some record the talks. Some encourage oral history interviews, some preserve their societies’ archival records. Some commemorate historic sites. Some make prestigious awards to senior scholars, while others provide fellowships for doctoral dissertation writers in their respective areas of history of science and technology. A few also work hard to recruit young scientists into their historically minded ranks. A few award travel grants to students who want to present a paper or poster at the annual meeting.

Below I will highlight the activities of a few of our member and affiliated societies. I don’t mean to slight anyone else. In fact, I encourage readers who represent a cognate group to submit a short report of a few hundred words for the Winter 2010 History Newsletter. This newsletter should indeed provide an “umbrella” function for everyone interested in the history of physics and allied sciences. The Center and the Niels Bohr Library look forward to a follow-up to this meeting in 2011, but we should continue communicating and collaborating in between!

**History at the Member Societies**

*Acoustical Society of America* maintains a web page on the history of the society. [http://asa.aip.org/history.html](http://asa.aip.org/history.html).

The American Association of Physics Teachers’ Committee on the History and Philosophy of Physics sponsors sessions at annual meetings, including a popular “living history” workshop by Benjamin Franklin (Robert A. Morse). [http://www.aapt.org/aboutaapt/organization/history.cfm](http://www.aapt.org/aboutaapt/organization/history.cfm).

One notable part of the committee’s mission is to deepen a “historical perspective in physics education at all levels.” The association’s staff has also worked with us to preserve its archival records.

*(Continued on next page)*

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*Sightseeing inside the Kremlin walls before proceeding to Kiev. Henry Kendall (extreme left) and Arthur Wightman (back to camera) greeting Valentine Telegedi, with the great bell in the background, July 1959. Credit: Photograph by J.D. Jackson, courtesy AIP Emilio Segré Visual Archives, Jackson Collection.*
American Astronomical Society’s Historical Astronomy Division (HAD) meets at least annually. It usually meets alongside the AAS annual meeting, but it sometimes meets separately or with another AAS division. The division sponsors very popular historical sessions and has also held a Cultural Astronomy Summer School, a two-day workshop. It publishes a newsletter and maintains an extensive web site. The division awards the prestigious Leroy E. Doggett Prize for Historical Astronomy every second year. In 2010, it presented the award to Michael J. Crowe, known for decades of publishing on history of mathematics, history of astronomy, the astronomer John Herschel, and especially on the ‘plurality of worlds debate’. Crowe is Professor Emeritus, Notre Dame University. HAD will award its first HAD Book Prize for Historical Astronomy in 2011. http://www.aas.org/had/. The society’s staff has worked with us to preserve its archival records.

American Crystallographic Association is developing a web page on its history and is seeking to locate and transfer older materials to the Niels Bohr Library and Archives at AIP.

American Geophysical Union’s History of Geophysics Committee raised $15,000 toward supporting its Doctoral Dissertation Fellowship. The award—$5,000—will be given annually, starting in 2011. The AGU’s staff and History Committee have worked with us to preserve its archival records. The Committee and AIP’s History Center are planning a major re-survey of AGU Fellows.

American Physical Society’s Forum for History of Physics awarded the Abraham Pais Prize ($10,000) for 2010 to Russell McCormmach, Professor Emeritus, Oregon State University, “For the study of German science in the 19th and 20th centuries and a major biography of Henry Cavendish (with Christa Jungnickel, his late wife), and for founding the journal Historical Studies in the Physical Sciences.” The Pais Prize was awarded to Stephen G. Brush, Professor Emeritus, University of Maryland, in 2009 “For his pioneering, in-depth studies in the history of nineteenth and twentieth century physics.” The Forum also sponsors very popular historical sessions at APS meetings. http://www.aps.org/units/hfp/. The society’s staff has worked with us to preserve its archival records. George Zimmerman, an FHP volunteer, has been especially effective in promoting departmental histories and web posting of conference talks.

AVS: Science and Technology of Materials, Interfaces, and Processing has a History Committee charged with preserving books, photos, and instruments related to their history. They are developing a virtual museum of artifacts and capturing the knowledge and reminiscences of experts and characters. The volunteer committee at AVS has been notably active in helping preserve the records of the society. The society’s staff has worked with us to preserve its archival records.

Optical Society of America has a “100 Year History Project” under way, in preparation for its 2016 centenary. The project’s mission includes the creation of a historical record of OSA members and activities. OSA is working with History Associates, Inc. to produce a book on this history. It is also encouraging audio and video recordings and intends to launch a historical website in 2010. http://www.osa.org/aboutosa/History/default.aspx OSA has a History Advisory Committee. OSA and APS were two founding partners of this year’s LaserFest http://www.laserfest.org/. The society’s staff has worked with us to preserve its archival records.

American Association of Physicians in Medicine History Committee is actively interviewing prominent physicists in medicine and has placed about 20 of these video interviews on the web, at their history web page http://www.aapm.org/history/. A selection of historical documents and historical essays are available there, too. And like other member societies above, AAPM staff has worked with us to preserve records, including oral history interviews from earlier years.

History at Selected Affiliated Societies

American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) has digitized its Transactions (1871–1970) and 107 technical volumes. The institute has also digitized important historical and corporate documents. It presents annual awards for history and promotes the organization’s history. It maintains a web site http://www.aimehq.org/history.cfm and participates in the National Inventors Hall of Fame.

John Wheeler and his wife Janette Wheeler outdoors at their summer home in High Island, Maine, Summer 1984. Credit: AIP Emilio Segré Visual Archives, Spicer Collection.
American Meteorological Society offers a Graduate Student Fellowship in the History of Science annually, worth $15,000. The purpose is to complete a dissertation on the history of the atmospheric, or related oceanic or hydrologic sciences. More information is at http://www.ametsoc.org/amstudentinfo/schofielddocs/gradfellowshipscience.html. The society also sponsors annual symposia, an oral history program, and digital history projects.

American Society of Civil Engineers’ History and Heritage Committee sponsors a landmark program and maintains a large web site, with descriptions of landmarks, biographies of notable civil engineers, history timelines, and ASCE history. This currently is almost a completely volunteer program. http://content.asce.org/history/. The committee also gives the Civil Engineering History and Heritage Award. In 2009 the award went to Ronald C. Cox and Howard H. Newlon, Jr.

American Society of Mechanical Engineers’ Committee on History and Heritage sponsors a Historical Mechanical Engineering Landmarks program and maintains a web site with historical resources at http://www.asme.org/communities/history/. They also recognize outstanding published works with the annual Engineer-Historian Award. The 2009 award went to Graham White for his histories of aircraft piston engines.

American Microscope Society has one active professional, retired volunteer who preserves the society’s archives, which run from 1942 to the present, about 100 classic books, and over 100 video oral histories produced in the 1980s. www.microscopy.org.

Society of Physics Students and Sigma Pi Sigma are “linked but distinct” organizations for undergraduate students. The first is for undergraduates interested in physics but not necessarily majors. The second is a lifelong honorary society. Both societies have preserved much of their archival material and are preparing it for long-term preservation. These societies can provide useful advice for societies seeking to reach out to a dispersed membership via social media on the web. Their web posts and newsletters often include historical articles.

Like-Minded Organizations

American Microbeam Society has one active professional volunteer working to preserve the society’s archives and to conduct oral history interviews with the founders.

Chemical Heritage Foundation has an independent research library, a museum, and a center for scholars. The Othmer Library of Chemical History includes books, archives, photos, and more. The Roy Eddleman Institute for Interpretation and Education focuses on outreach. The Center for Contemporary History and Policy offers historically grounded perspectives on issues related to the molecular sciences and technologies. The Beckman Center for the History of Chemistry hosts visiting scholars. http://www.chemheritage.org/.

IEEE History Committee/IEEE History Center has as its purview the history of all areas of electrical, electronic, computing, and information technologies. This clearly intersects with the history of physics. The History Center has a team of historians and related professionals and it employs Rutgers University graduate students in history. It also employs interns at several levels. http://www.ieee.org/history_center. The Center has emphasized its wiki-based site http://www.ieeechn.org. IEEE Global History Network, as a way to leverage the knowledge of IEEE’s 400,000 members.

Geological Society of America’s History of Geology Division sponsors historical sessions at annual GSA meetings. The division makes two awards per year, the Mary C. Rabbitt History of Geology Award and the Friedman History of Geology Distinguished Service Award. The Rabbitt Award went to Davis Young in 2009 for his work on the history of petrology, including a book on Norman Bowen of the Carnegie Institution’s Geophysical Lab. The web site is http://www.geosociety.org/awards/09speeches/rabbitt.htm. The division also awards a $500 stipend for a student to present a historical paper or poster at its annual meeting.

L–R: David Pines, Christopher Pethick, Lev Pitaevski, Valery Shikin, Sergei Anisimov, and William McMillan at the Loomis Laboratory of Physics, University of Illinois at Urbana-Champaign, October 24, 1976. Credit: Department of Physics, University of Illinois at Urbana-Champaign, courtesy AIP Emilio Segré Visual Archives.
The Array of Contemporary American Physicists is Online
By Will Thomas

The AIP History Center’s newest initiative, the Array of Contemporary American Physicists (ACAP), is now public, and can be found at http://www.aip.org/history/acap. ACAP gathers together and interlinks career data on over 800 physicists who have worked in the United States between 1945 and the present.

If a physicist is in ACAP, in almost all cases you can find out where that person was and when, and for many major American institutions, you can find out who was there and when. Biographical entries are also connected to chronological lists of major prize winners.

ACAP presents only a bare-bones view of the physics profession, but through links and references to physicists’ home pages, memoirs, obituaries, oral histories, online videos, and other historical resources, a fuller, multifaceted picture of physics can emerge. To aid this process, we have begun putting together “topic guides” that will help organize physicists according to the work they have done rather than just the places they have worked. At the moment, these topic guides cover only a very small time frame and a small fraction of the scientists in the ACAP project, but we expect their scope and number to expand.

We also expect the scope of ACAP itself to expand with time to cover additional physicists, including those from prior eras and other countries.

We believe that ACAP will serve the needs of a variety of users. In addition to being a reference for professional historians, we anticipate that its easy and intuitive navigation will stimulate ideas for new historical topics to write about.

We also hope that ACAP’s coverage of the present as well as the past will make it interesting to physicists working today and will provide them a broader understanding of what the “history” of physics consists of, including their own connection to it. We hope this will stimulate additional interest in historical preservation and in helping us keep the Emilio Segré Visual Archives growing.

In addition, as a means of organizing some of the holdings of the Niels Bohr Library and Archives in a more historically coherent way, we hope to improve the usefulness and awareness of our collections.

The Array of Contemporary American Physicists is two years in the making, and it will not stop changing and growing now that it is finally public. To help us build it up in the most useful ways, we would greatly appreciate any feedback users might be able to offer.
Community organization is an important function of the Center for History of Physics. Forty or fifty years ago, when history of physics played a much larger role within history of science, coordination and communication among concerned scholars was rather easier. As the numbers of historians of science increased, however, and as more scholars migrated off to new topics like the Cold War, the national security state, or areas in biophysics and geophysics, holding the community together has become a distinct challenge. The spread of history of science beyond a handful of European and US institutions has multiplied this challenge.

Traditional ways of sustaining a community will continue at AIP. We will continue to publish this newsletter and to provide grants-in-aid to bring scholars to the Niels Bohr Library & Archives. Staff members will continue to research and write. We realize, however, that more steps are needed. Toward this end, the Center is hybridizing new and old approaches to increase communication and interaction among historians of physics and allied sciences.

First, we are building a list-serve of all known, publishing historians of physics, geophysics, astrophysics, etc. The edges of this list are rather fuzzy, of course, but its center is robust. Later this summer, all the people on this list will receive an email inviting them to register on a secure part of the Center’s website to produce a directory of historians of the physical sciences. If you want to make sure that you are on this email list and later in the directory, send me a note at ggood@aip.org. It is perhaps a little surprising that such a directory does not already exist. There is one for historians of geology and another for historians of meteorology and climatology. How has this never happened for historians of physics?

I see a rustling of hands at the back of the room. No, I am not forgetting the Forum for the History of Physics of the American Physical Society. This group is an essential and very lively part of the community. The Forum includes about 3,700 members, representing a very healthy interest in history of physics. The members of the Forum, however, are joined by many like-minded people in the American Association of Physics Teachers’ Committee on History and Philosophy of Physics, the over 1,700 members of the American Geophysical Union who have donated to a scholarship fund to support Ph.D. students researching dissertations in the history of geophysics, the many members of the Historical Astronomy Division of the American Astronomical Society, as well as those in AVS, IEEE, and other societies. Nearly all of the AIP member societies support history of physics in some way. (See “History of Physics at AIP Member and Affiliated Societies”)

Maybe the lack of a directory is partly due to this diversity of interests. The Center for History of Physics intends to provide means for these various scholars to find common ground. Our future,

(Continued on next page)
(Community, continued from previous page)

password-protected web page is only one tool for this. The Center is now experimenting with two Facebook pages—The New Atlanteans (aimed mainly at students in history of science) and an eponymous Center fan page aimed at a broader audience. We also now have a Twitter account @HistoryPhysics, which aims at a broader audience yet.

We are under no illusions. Some serious historians and scientists of a certain age or demeanor likely will never register with Facebook, Twitter, or even on our website. We will continue to reach these people via the newsletter, mail, telephone, and regular email. But if history of physics is to have a future, we must reach out to younger scholars and use every innovative means at our disposal to do so.

A directory of historians of physical science is a tool. Newsletters, Facebook pages, and Twitter feeds are also tools. The most important question is what are the purposes of wielding these tools? First and foremost, historians of physics need to have means to find each other. Once communication is easier, they can discuss collaborative research, conference sessions, and benefit from knowing who is working on which related topics. I have faith that vibrant individuals will undertake interesting projects when communication means are available.

Our community includes trained historians, Ph.D. physicists, science writers, archivists and librarians, and so many more. Not surprisingly, we come to history of physics with different expectations. A critical role of the Center for History of Physics is to bridge these complexities, to connect members of the History of Science Society with those who belong to APS, AGU, AAPT, and the other AIP member and affiliate societies.

The Center also needs to bridge geographical gaps. Groups working in history of physics are active from Berlin and Paris to Barcelona, Oslo, Aarhus, Salvador (Brazil), and numerous universities in the United States and Canada. Other research and educational groups likely exist in other countries around the world. The directory of historians of physics will help us to link these groups together.

This newsletter includes a first step in this direction, an article by Xavier Roqué (CEHIC, Universitat Autònoma de Barcelona) and Néstor Herran (IRIST, Université de Strasbourg) on the current state of history of physics in Spain. The Winter 2010 newsletter will include an article on the Commission on the History of Modern Physics (CHMP), and I look forward to articles on developments in other countries and organizations.

These networking tools will help the Center to effect its mission: To preserve and make known the history of physics and allied sciences. But these tools will only work if scholars embrace them. Please do.

Commission for the History of Modern Physics

The Commission for the History of Modern Physics (CHMP) sponsored active sessions at the meeting of the International Union for History and Philosophy of Science in Budapest in 2009.

A new board was elected in Budapest, with the following officers: Alexei Kojevnikov (President), Olival Freire (Vice President), Christian Forstner (Vice President), and Leonardo Gariboldi (Secretary).

The new board thanks especially Pasquale Tucci and Dieter Hoffmann for their work during the last four years. CHMP will publish a more in-depth article in the Fall Newsletter of the Center for History of Physics.

You will find the detailed coordinates of the new board on the commission’s website: http://www.chmp.physikgeschichte.org/
Documentation Preserved
Compiled by Melanie Brown

Our report of new collections or new finding aids is based on our regular survey of archives and other repositories. Many of the collections are new accessions, which may not be processed, and we also include previously reported collections that now have an online finding aid available.

To learn more about any of the collections listed below, use the International Catalog of Sources for History of Physics and Allied Sciences at www.aip.org/history/icos. You can search in a variety of ways including by author or by repository.

Please contact the repository mentioned for information on restrictions and access to the collections.

NEW COLLECTIONS

California Institute of Technology. Institute Archives. 1201 East California Blvd. (Mail Code 015A-74), Pasadena, CA 91125, USA


Churchill College. Archives Centre. Cambridge CB3 0DS


California Academy of Sciences. 55 Music Concourse Drive, Golden Gate Park, San Francisco, CA 94118 USA


California Institute of Technology. Institute Archives. 1201 East California Blvd. (Mail Code 015A-74), Pasadena, CA 91125, USA


Kanpur Indo-American Program (KIAP) records. Collection Dates: [dates unknown]. Size: 4 linear feet.

Arthur L. Klein papers. Collection Dates: 1928–1974. Size: 1.5 linear feet. Restrictions: Copyright has not been assigned to the California Institute of Technology Archives. All requests for permission to publish or quote from manuscripts must be submitted in writing to the Head of the Archives. Permission for publication is given on behalf of the California Institute of Technology Archives as the owner of the physical items and is not intended to include or imply permission of the copyright holder, which must also be obtained by the reader.


Maarten Schmidt LIGO papers. Collection Dates: [dates unknown]. Size: 0.5 linear feet. Restrictions: Papers are partially closed per Dr. Schmidt’s instructions. Period of closure to be determined.


Clemson University. Libraries. Special Collections. Senator Strom Thurmond Institute Building, Clemson, SC 29634-3001, USA

(Continued on next page)

Maria Goeppert-Mayer, winner of the Nobel Prize in Physics (1963), sitting outdoors with her daughter, Marianne, Summer 1935. Credit: courtesy AIP Emilio Segrè Visual Archives, Maria Stein Collection.

College of William and Mary, Earl Gregg Swem Library. Special Collections Research Center. Williamsburg, VA 23185, USA


College of William and Mary, Department of Physics Records. Collection Dates: 1960–[ongoing]. Size: 0.4 cubic feet.


DePauw University. Archives of DePauw University and Indiana United Methodism. Roy O. West Library. Greencastle, IN 46135, USA

Paul S. Godwin papers. Collection Dates: [dates unknown]. Size: 1 folder.

Francis W. Hanawalt papers. Collection Dates: [dates unknown]. Size: 1 folder.


Harvard University Archives. Pusey Library. Cambridge, MA 02138


IEEE History Center. Rutgers University. 39 Union Street, New Brunswick, NJ 08901


Library of Congress. Manuscript Division. James Madison Memorial Building, First Street and Independence Avenue, S. E., Washington, DC 20540, USA

William R. Bennett papers. Size: circa 52,000 items.

Lawrence E. Glendenin papers. Size: circa 300 items.
Jerome and Isabella Karle papers. Size: 271 records boxes.


Cornell Mayer papers. Size: circa 500 items.

Massachusetts Institute of Technology. Institute Archives and Special Collections. M.I.T. Libraries, Rm. 14N-118, Cambridge, MA 02139, USA


New Jersey Historical Society. Library. 52 Park Place, Newark, NJ 07102, USA


Iowa State University. Parks Library. Department of Special Collections. Ames, IA 50011, USA


University of Illinois at Urbana-Champaign. University Archives. 1408 West Gregory Drive, Urbana, IL 61801, USA


Stanford University. Department of Special Collections and University Archives. Stanford, CA 94305, USA


Stanford University. Department of Special Collections and University Archives. Stanford, CA 94305, USA

Robert B. Vaile professional papers, correspondence, notes, etc. Collection Dates: circa 1941–1967. Size: 0.5 linear feet (1 manuscript box). Restrictions: Collection is open for research, material must be requested at least 24 hours in advance of intended use.


University of California. Los Angeles. University Research Library. Department of Special Collections. Los Angeles, CA 90024-1575 USA


University of Florida. George A. Smathers Libraries. Special and Area Studies Collections. Gainesville, FL USA

A cartoon from 1908 (the 10th anniversary of the Göttinger Vereinigung) showing the cooperation between science and industry. Industry brings money and gains knowledge. The mathematician Felix Klein, who supported such collaboration, is shown as the sun. Credit: courtesy AIP Emilio Segré Visual Archives.

(Continued on next page)
University of Illinois at Urbana-Champaign. University Archives. 1408 West Gregory Drive, Urbana, IL 61801, USA


Department of Physics course notebooks. Collection Dates: 1935–1946. Size: 0.3 cubic feet.

University of Tennessee, Knoxville. Special Collections Library. James D. Hoskins Library, Knoxville, TN 37996, USA


University of Tennessee, Knoxville. Special Collections Library. James D. Hoskins Library, Knoxville, TN 37996, USA.


Yale University Library. Beinecke Rare Book and Manuscript Library. Box 208240, New Haven, CT 06520.

Martin J. Klein papers. Collection Dates: 1951–2004. Size: 8 linear feet. Restrictions: Original audiotape, videotape, and motion picture film, as well as preservation masters and duplicating masters, are restricted. Researchers needing to consult the original materials should refer to the finding aid for policies governing reproduction for access.

NEW FINDING AIDS

University of California, San Diego. Archives of the Scripps Institution of Oceanography. Mail Code C-075-C. La Jolla, CA 92093-0175, USA


University of North Carolina at Chapel Hill. Library. Manuscripts Department. Southern Historical Collection. Wilson Library CB# 3926, Chapel Hill, NC 27599-3926. USA


University of Rochester. Rush Rhees Library, Dept. of Rare Books, Manuscripts and Archives. Rochester, New York 14627


University of Texas at Austin. Center for American History. Archives of American Mathematics. Austin, TX 78713. USA


…”Research is a way of taking calculated risks to bring about incalculable consequences.”

Celia Green
The Decline and Fall of Science

(Physics in Spain, continued from page 7)

the Interuniversity Group of Theoretical Physics (Grupo Interuniversitario de Física Teórica, GIFT), which had an important role in the growth of this subdiscipline of physics in Spain in the 1960s and 1970s; Alfonso Carpio’s research on the training of Catalan physicists in France during Francoism as part of a program of “brain drain” by the French Ministry of Foreign Affairs and the cooperation of the nuclear establishment; Néstor Herran’s history of the Institute of Radioactivity at the University of Madrid and of the radium industry in Spain in the early 20th century; Xavier Mañes’ research on the introduction of X-ray crystallography in Spain before and after the Spanish Civil War; Miquel Terre’s study of the introduction of electron microscopy in Spain; and Cristina Vergara’s research (in progress) on the Spanish contribution to MAGIC (Major Atmospheric Gamma-ray Imaging Cherenkov), a giant gamma-ray telescope in the Canary Islands.

Some of these studies have been recently published in Spanish or Catalan and will also be published in English to make them available to the international community of historians of science.

The studies produced in the framework of the project tend to stress the close relationship between physics and the cultural, political, industrial, and economic domains, as well as to improve the connection between Spanish developments and trends found in other national contexts.

As it is proving the case, the systematic study of the Spanish case will be of much help to integrate these studies in both the Spanish and the international historiographies and to draw comparative conclusions about the development of physics in the twentieth century.
Give Us Your Dirty Old Books!

The Niels Bohr Library & Archives at the American Institute of Physics is looking for book donations that will help our goal of documenting the history of physics, astronomy and geophysics from the 19th and 20th centuries.

What type of books do we collect?

- Textbooks
- Laboratory manuals and other instructional materials
- Physical science monographs
- Conference proceedings
- Instrument catalogs
- Published correspondence
- Biographies and history of science monographs

What subjects does the collection cover?

- The history of physics and its allied sciences (astronomy, optics, acoustics, geophysics, vacuum science, rheology, crystallography and physics in medicine.)
- Biography, institutional history and social aspects of the scientific community

Successive editions of texts and conference proceedings are particularly important to us.

Through collecting books that document the history of science, the Niels Bohr Library & Archives aims to preserve this valuable information for future generations and to provide access for researchers who wish to study it.

We appreciate your help in preserving historical documentation and we will reimburse shipping costs.

Please contact Greg Good at ggood@aip.org or Joe Anderson at janderson@aip.org if you have any questions or books you wish to donate. Fax: 301-209-0882.

Niels Bohr Library & Archives
American Institute of Physics
One Physics Ellipse
College Park, MD 20740 USA
Our pictures are worth a thousand words...
And you’ll pay less than $100 to use them.

Find photos of history’s greatest scientists at AIP’s Emilio Segrè Visual Archives

http://photos.aip.org
Recent Publications of Interest
Compiled by Will Thomas

This is our usual compilation of some (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 using the “Search” icon on our site index: www.aip.org/history/s-index.htm.

To restrict your search to the bibliographies, enter in the box: [your text term(s)] and “recent publications”

Physics in Perspective


Studies in History and Philosophy of Modern Physics


Studies in History and Philosophy of Science, Part A

Vol. 41, No. 1: Steffen Ducheyne, “Whewell’s Tidal Researches: Scientific Practice and Philosophical Transformations”.

(Continued on next page)

Historical Studies in the Natural Sciences


British Journal for the History of Science

Vol. 42, No. 4: Paolo Palmieri, “A Phenomenology of Galileo’s Experiments with Pendulums”.


Vol. 22, No. 4: Helge Kragh, “Continual Fascination: The Oscillating Universe in Modern Cosmology”.

Vol. 23, No. 1: Steinar Thorvaldsen, “Early Numerical Analysis in Kepler’s Astronomy”.


Perspectives on Science


Vol. 18, No. 1 is a special issue on Marin Mersenne, which includes: Antoni Malet and Daniele Cozzoli, “Mersenne and Mixed Mathematics”; Daniele Cozzoli, “The Development of Mersenne’s Optics”; Carla Rita Palmerino, “Experiments, Mathematics, Physical Causes: How Mersenne Came to Doubt the Validity of Galileo’s Law of Free Fall”; additional articles address Mersenne’s theology and music theory.

Annals of Science

Vol. 66, No. 4: Helge Kragh, “Contemporary History of Cosmology and the Controversy over the Multiverse”.


Notes and Records of the Royal Society

Vol. 64, No. 1: J. S. Rowlinson, “James Joule, William Thomson and the Concept of a Perfect Gas”.

Journal for the History of Astronomy


Physics Today


Vol. 62, No. 11: Graham Farmelo, “Paul Dirac, a Man Apart”.


American Journal of Physics
Vol. 77, No. 10: Gerd Kortemeyer and Catherine Westfall, “History of Physics: Outing the Hidden Curriculum?”


Foundations of Physics

CERN Courier


Physics World
Vol. 22, No. 8: Gordon Fraser, “A Tale of Two Minds” on Abdus Salam and Srinivasa Ramanujan.


Outreach at the Center for History of Physics and the Niels Bohr Library & Archives
By Greg Good

Outreach is as important for non-profits as it is for other organizations. The Center for History of Physics and the Niels Bohr Library & Archives mostly thrive through collegial collaboration with other organizations and individual researchers. While from one perspective we provide an information service, more than that we work with co-equals to reach common goals: to preserve and make known the heritage of physics and allied sciences.

One way we reach out is through presenting posters and talks at scientific and scholarly meetings. Our poster at the American Geophysical Union meeting in December 2009 in San Francisco alerted people in geoscience education (whose session we were in) to our many resources. Greg Good, director of the Center, presented a talk on January 10th to a workshop of historians of oceanography and biology. Some participants were surprised to learn how much is on our web site and in our collections— and that oceanography, biophysics, and medical physics are well represented.

Call it marketing, call it outreach, call it what you will. We all need to communicate what we do. We need to tell our stories to many different publics, both internal and external to AIP. When we know what others do, we can more easily find how we can help each other—how we can collaborate.
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American Association of Physics Teachers, Committee on History and Philosophy of Physics, annual reports
http://www.aapt.org/aboutaapt/organization/history.cfm

American Astronomical Society, Historical Astronomy Division
http://www.aas.org/had/hadnews/

American Physical Society, Forum on the History of Physics, Newsletter
http://www.aps.org/units/fhp/newsletters/index.cfm

Chemical Heritage Foundation, Transmutations
http://www.chemheritage.org/help/transmutations.html

Geological Society of America, History of Geology Division, Newsletter
http://gsahist.org/v34n01/v34n01_feb10.pdf

IEEE, History Center, Newsletters
http://www.ieee.org/web/about/history_center/about/newsletters.html

NASA, History Division, News and Notes
http://history.nasa.gov/histnews.htm

Society for the History of Technology, SHOT Newsletter
http://www.historyoftechnology.org/newsletter.html
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