

History of Physics

NEWSLETTER

A FORUM OF THE AMERICAN PHYSICAL SOCIETY • VOLUME XII • NO. 1 • FALL 2012

News of the Forum:

Physical Sciences Forum (PSF) established at the History of Science Society (HSS)

By Catherine Westfall

The Physical Sciences Forum (PSF) was recently formed as part of the History of Science Society. The general aim of the PSF is to further scholarship in the history of the physical sciences as broadly understood, including but not limited to: physics; earth, space, and atmospheric science; astronomy; and materials science. It will help forge a more coherent community for those with a core specialty in these sub-fields with a particular emphasis on developing the connections linking these sub-fields and exploring their resonance with wider scholarship.

The PSF met for the first time at the November 2012 HSS meeting in San Diego. Several FHP members were instrumental in seeing the PSF come to life. Catherine Westfall, who was elected chair, and Don Howard helped organize the group, and Peter Pesic was an enthusiastic attendee who helped spread the word about the new group. Westfall appointed a steering committee that includes two other FHP friends—the head of AIP's Center for the History of Physics, Greg Good, and University of Minnesota graduate student Joe Martin, who presented a paper at the Pais Prize session at the 2012 April meeting and organized a panel session at the 2013 March meeting.

At the meeting those assembled laid out three plans for 2013, and identified committees to implement each plan. Greg Good is spearheading the effort for an annual meeting, the first to be held in spring 2013, that will provide an additional forum for early career scholars on the history of the physical sciences. The PSF also plans to host a session at the November 2013 History of Science Society meeting in Boston. Don Howard, Suman Seth, and Amy Fisher will plan this session. The meeting will also feature a distinguished lecture PSF-sponsored by PSF given by Peter Galison. David Kaiser arranged the lecture, with encouragement from Seth and Westfall. For more information on PSF, contact Catherine Westfall, westfa12@msu.edu.

Complementing the Forum will be a new Humanities and Social Sciences Net (H-Net) list, which will serve as a communication channel providing announcements, calls for papers, book reviews, and job postings in addition to promoting discussion about current research and the state of the field. For further information on H-Net, contact Joe Martin, mart1901@umn.edu.



Physical Sciences Forum Chair Catherine Westfall.

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FHP-Sponsored Sessions at the 2013 March and April Meetings

March Meeting FHP Sessions:

Baltimore, Maryland
Monday–Friday, March 18–22

Session B10: Celebrating 100 Years of Physical Review at APS

Chair: Don Howard, University of Notre Dame
Room: 309
Monday, March 18, 2013
11:15am–2:15pm

“In the Beginning...”

Martin Blume

“The American Reception of the Quantum as Seen by the *Physical Review*, 1900–1927”

Robert P. Crease

“Your Most Distinguished Contributor’: Einstein and the *Physical Review*”

Daniel Kennefick

“Bringing the *Physical Review* into the Digital Age”

Mark Doyle

“*Physical Review*: a family of journals”

Gene Sprouse

Session M9: A History of Physics in Industry followed by Panel Discussion

Chair: Joseph Martin, University of Minnesota at Millelapolis
Room: 308
Wednesday, March 20, 2013
8:00–11:00am

“Commercial Scholarship: Spinning Physics Research into a Business Enterprise”

Oroville Butler

“A Place for Materials Science: University of Pennsylvania’s Laboratory for Research on the Structure of Matter”

Brittany Shields

“Dad’s in the Garage: Santa Barbara Physicists in the Long 1970s”

Cyrus Mody

“Industrial Physics—Southern California Style”

Stuart Leslie

Panel Discussion: “Perspectives on the History of Industrial Physics”

Joseph Martin

Session N32: International Physics Programs and History of Physics

Sponsoring Units: FIP FHP
Chair: Gloria Lubkin, *Physics Today*
Editor
Room: 340
Wednesday, March 20, 2013
11:15am–12:25pm

“Fulbright Opportunities in the Physical Sciences”

Katrin DeWindt

“Revisiting the Bohr Atom 100 Years Later”

Ernst Wall

“A transformational year in physics: 1932”

Charles W. Clark, Joseph Reader

“Discovery and development of x-ray diffraction”

Yeuncheol Jeong, Ming Yin, Timir Datta

“Latest developments on documentary film ‘The State of the Unit: The Kilogram’”

Amy Young

Session S50: A Staged Reading of the Play: *Farm Hall*

Playwright: David C. Cassidy, Hofstra University
Room: Holiday Ballroom 4
Wednesday, March 20, 2013
8:00–9:30pm

April Meeting FHP Sessions:

Denver, Colorado
Saturday–Tuesday, March 13–16

Session C6: Maria Goeppert Mayer: The 50th Anniversary of Her Nobel Prize

Chair: Paul Halpern
Room: Governor’s Square 15
Saturday, April 13, 2013
1:30–3:18pm

“Maria Goeppert Mayer’s Work on Beta-decay and Pairing, and Its Relevance Today”

Stephen Moszkowski

“Maria Goeppert Mayer and the Nobel Prize”

Karen Johnson

“Remembrances of Maria Goeppert Mayer and the Nuclear Shell Model”

Elizabeth Baranger

Session N1: A Staged Reading of the Play: *And the Sun Stood Still: A Play about Nicolaus Copernicus*

Playwright: Dava Sobel
Room: Governor’s Square 15
Sunday, April 13, 2013
7:30–9:00pm

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The Forum on History of Physics of the American Physical Society publishes this Newsletter biannually at <http://www.aps.org/units/fhp/newsletters/index.cfm>. If you wish to receive a printed version of the Newsletter, please contact the editor. Each 3-year volume consists of six issues.

The articles in this issue represent the views of their authors and are not necessarily those of the Forum or APS.

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A Brief Guide to Manhattan Project Literature

by Cameron Reed

The Manhattan Project and its legacies continue to provide fertile ground for analysis by scientists, historians, and cultural observers alike. Recognition of the Project's pivotal role in twentieth-century history is clearly indicated by the fact that in a 1999 Newseum survey, the top-ranked news stories of the century for both the public and journalists were those concerning the atomic bombings of Hiroshima and Nagasaki and the end of World War II.

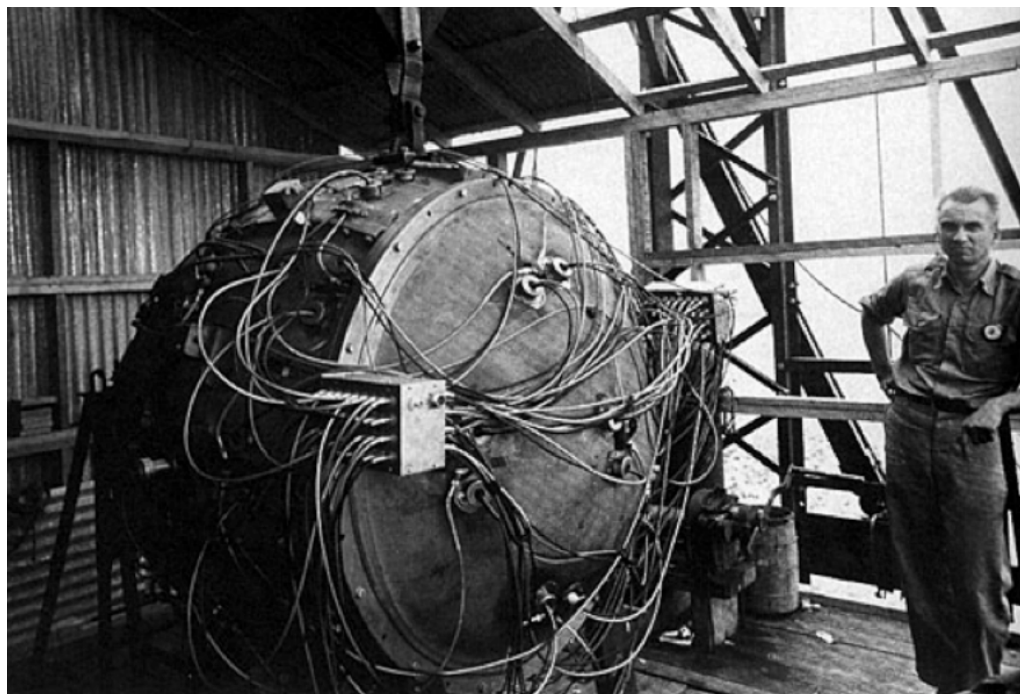
Given the historical significance of the Project it is not surprising that it has spawned a vast literature: a recent Google search using the key phrase "Manhattan Project" returned over 90 million hits. While many of the sources that turn up are accurate and well-prepared, many more are of dubious quality or utterly irrelevant to serious study of the Project. Whether one is a casual reader, a student preparing a class project, a physicist interested in technical details, or a historian researching organizational or sociological issues, it is difficult to know where to begin.

In this article I offer a brief survey of sources on the Project. My intent to give a highly-selective list of a few solid starting places under each of four headings: general survey-level works, biographical works, technically-oriented works, and websites. Readers seeking a more extensive listing should consult my annotated bibliographies on the Project which were published in the September 2005 and February 2011 editions of *American Journal of Physics*.

Survey-level sources

The outstanding synoptic survey of the Project is Richard Rhodes' *The Making of the Atomic Bomb*. While it contains some material that is tangential to the main story, Rhodes' descriptions of the physics, people, and places involved are engaging and accurate.

The first official government publication on the Project, Henry Smyth's *Atomic Energy for Military Purposes*,



was issued in August 1945 and is still worth reading. Known as the Smyth Report, it is readily available online. For professional historians, the volumes by Jones and Hewlett & Anderson are still foundational standards, extensively footnoted to original Manhattan Engineer District documents. For a shorter survey, a Department of Energy history of the Project by Frank Gosling can be recommended; do a search on DOE/MA-0002 and it will not take you long to locate a downloadable copy.

Gosling, F. G.: *The Manhattan Project: Making the Atomic Bomb* (U.S. Department of Energy, 2001). DOE/MA-0002.

Hewlett, R. G. and Anderson, O. E.: *A History of the United States Atomic Energy Commission. Vol. 1: The New World, 1939/1946* (Pennsylvania State University Press, 1962).

Jones, V. C.: *United States Army in World War II. Special Studies. Manhattan: The Army and the Atomic Bomb* (Center of Military History, United States Army, Washington, 1985).

Rhodes, R.: *The Making of the Atomic Bomb* (Simon and Schuster, New York, 1986).

Smyth, H. D.: *Atomic Energy for Military Purposes: The Official Report on the Development of the Atomic Bomb under the Auspices of the United States Government, 1940-1945* (Princeton University Press, 1948).

Biographical works

The outstanding personalities of the Project were the physicist J. Robert Oppenheimer and Manhattan Engineer District commander General Leslie R. Groves. Material on Oppenheimer's life abounds. Bird and Sherwin's volume covers Oppenheimer's life in detail and is likely to become the definitive biography. Abraham Pais and Robert Crease appealingly combine physics and personal reminiscences and examine Oppenheimer's post-war service on numerous government committees. David Cassidy integrates Oppenheimer's pre-war physics into the growth of American physics in the 1920's and 1930's, which set the stage for the Project. Robert Norris'

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Manhattan Project Literature

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outstanding biography of Leslie Groves is exhaustive and very readable.

Bird, K., and Sherwin, M. J.: *American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer* (Knopf, 2005).

Cassidy, D.: *J. Robert Oppenheimer and the American Century* (Johns Hopkins, 2009).

Norris, R. S.: *Racing for the Bomb: General Leslie R. Groves, The Manhattan Project's Indispensable Man* (Steerforth Press, 2002).

Pais, A., and Crease, R. P.: *J. Robert Oppenheimer: A Life* (Oxford, 2006).

Technical works

The starting point for readers who wish to immerse themselves in the science of the Project is Robert Serber's 1943 *Los Alamos Primer*. This report is considered a founding technical document of the Project; it was distributed to newly-arriving scientists at Los Alamos and summarizes what was known at the time of the genesis of the laboratory. David Hawkins offers an extensive qualitative technical and administrative history of Los Alamos from its inception through December 1946. The detailed technical history of Los Alamos by Hoddson et al. is appropriate for a readers with some background in physics and chemistry. A popularly-accessible and well-written treatment of the essential features of nuclear weapons can be found in Jeremy Bernstein's work. For physicists who wish to dig into the technical details, this author humbly recommends his own text. The work of Los Alamos culminated in the Trinity test, and test director Kenneth Bainbridge's 1946 report on that event is makes for fascinating reading (search under LA-6300-H).

Bainbridge, K. T.: *Trinity Los Alamos report LA-6300-H*.

Bernstein, J.: *Nuclear Weapons: What You Need to Know* (Cambridge, 2008).

Hawkins, D.: *Project Y, the Los Alamos Story* (Tomash, 1983). Originally published as Los Alamos report LAMS-2532.

Hoddson, L., Henriksen, P. W., Meade, R. A., and Westfall, C.: *Critical Assembly: A Technical History of Los Alamos during the Oppenheimer Years, 1943-1945* (Cambridge, 1993).

Reed, B. C.: *The Physics of the Manhattan Project* (Springer, 2010).

Serber, R.: *The Los Alamos Primer: The First Lectures on How To Build An Atomic Bomb* (University of California, 1992).

Websites

The Los Alamos National Laboratory maintains a website about the history of the facility:

<http://www.lanl.gov/history/index.shtml>

The NSF Digital Library on the Atomic Bomb contains material on the history and science of the bomb and includes links to the Smyth Report and Bainbridge's Trinity report:

www.atomicarchive.com

The homepage of the Manhattan Project Heritage Preservation Association provides links to thousands of photographs, documents, personal memoirs, frequently-asked-questions and little-known facts:

<http://www.mphpa.org/classic/index.htm>

The Federation of American Scientists maintains a website containing copies of hundreds of Los Alamos technical publications:

<http://www.fas.org/sgp/othergov/doe/lanl/index1.html>

FHP Sessions

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After the staged reading there will be a discussion of the play with the playwright.

Session P1: Plenary Session II: The Quantum 100 Years Ago, the Quantum Today, and the Quantum Tomorrow

Chair: Edward Kolb
Room: Plaza ABC
Monday, April 15
8:30–9:06am

"Bohr's Creation of his Quantum Atom"

John Heilbron

Session Q6: Pais Prize Lecture: Relations between Physics and History of Physics

Chair: Don Howard
Room: Governor's Square 15
Monday, April 15
10:45am–12:33pm

"Pais Prize Lecture: The Joy of History"

Roger Stuewer

"How History Helped Einstein in Special Relativity"

Al Martinez

"How to Make Judicious Use of Current Physics in Reconstructing Its History"

Michel Janssen

Session X7: 100 Years of the Bohr Atom

Chair: Peter Pesic
Room: Governor's Square 16
Tuesday, April 16
10:45am–12:33pm

"Niels Bohr and the Third Quantum Revolution"

Alfred Goldhaber

"Memories of Crisis: Bohr, Kuhn, and the Quantum Mechanical 'Revolution'"

Suman Seth

"What Is Complementarity?"

Don Howard

On the Cucumber Tree: Scenes from the Life of an Itinerant Jobbing Scientist

By Peter Day, Glasgow: The Grimsay Press, 2012, 236 pp., \$19.95 (paperback)

Reviewed by Robert P. Crease

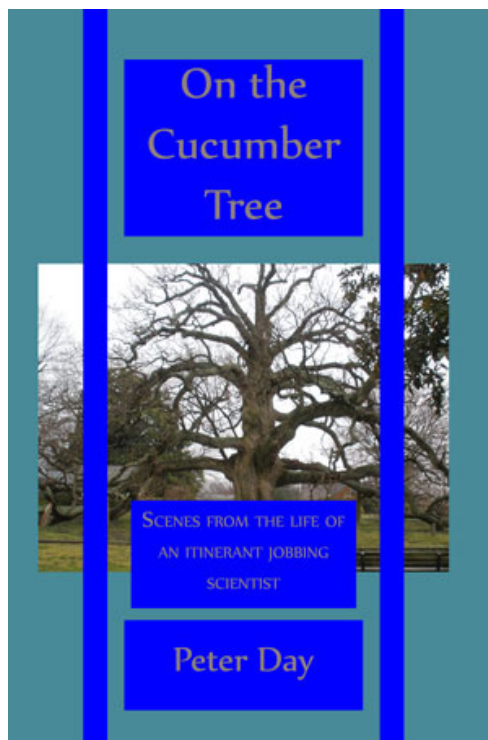
This is the kind of book—an unassuming, informative, and entertaining memoir that ranges over personal, scientific, and administrative matters—that I think more of you should be writing.

Day's research, which is officially classified as chemistry though it has a strong physics component, included pioneering the study of mixed-valence compounds. His administration included directorship of the Institut Laue-Langevin (ILL; 1989-91) and directorship of the Royal Institution (1991-1998).

The curious title refers to the Hungarian expression *az uborkafan*, which was used by H. S. Hoff, another British science administrator—under the pen name William Cooper—in the novel *Memoirs of a New Man*. Hoff translated the expression literally as “on the make” or “on the climb,” characterizing it as an image “of lasting poetry for a human occupation equally lasting and poetic.”

Day appropriates the image for his own street-level perspective on what it was like to pursue a scientific career. In truth, he wound up in several interconnected cucumber trees. One was the Oxford academic community of the 1960s and 1970s, another the international, interdisciplinary scientific community, and yet a third consisted of a network of scientific institutions and the administrators who run them.

Day's writing is disarmingly casual. In early chapters he tells us what it was like to be a teenager, for whom “all the world looks fascinating,” who was initially attracted to physics. “[T]he sweep of its intellectual ambitions” seemed



overwhelming, Day writes, especially since “first things and last things are, after all, the bedrock of adolescent angst.” Assigned to explain an optical spectroscope to a distinguished visitor (Neville Mott), Day became captivated by the instrument, and his interests then veered towards chemistry.

Day ended up at Wadham College, Oxford, as an undergraduate, and remained there for graduate work. He provides often compelling descriptions of its rituals and personalities, not only of the strong but also of the weak ones: “[S]o wrapped up were they in the fine detail of their expertise that they were quite unable to imagine themselves in

the situation of someone who wanted, even yearned, to have that door opened but needed help in lifting the latch”.

Here's Day on what it's like to pick a good research topic: “[P]retty much like picking an opponent your own size in a boxing match. Too lightweight and the game is soon over but the win trivial; too weighty and you risk retiring hurt after a lot of effort and little to show for it.”

He relates his growing attraction to mixed valence compounds, and his 1966 visit to Bell Labs in Murray Hill to work with Melvin Robin. That collaboration culminated in an important contribution, the Robin-Day classification of mixed valence compounds. But Day also writes of hurt feelings on Robin's part over credit for that work, and relates that the two ended up no longer communicating.

Day became Assistant Director of the ILL in 1988, then Director the following year; that part of the climb involved him in things like negotiating with the union and with “events;” defects in the reactor requiring its shutdown. From there he moved on to become Director of the Royal Institution.

The chapters are mostly short, the anecdotes mostly interesting, and the book has numerous black and white pictures. The book costs less than \$20, and can be read on a long train trip. A historian will find many details about the grain of today's scientific life that are usually passed over in more formal or ambitious histories and biographies. We could use many more tales from the cucumber tree like this one.

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