

Science and the Human Good:

How to Think Philosophically about
the Place of Values in Science

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Department of Philosophy and
Program in History and Philosophy of Science

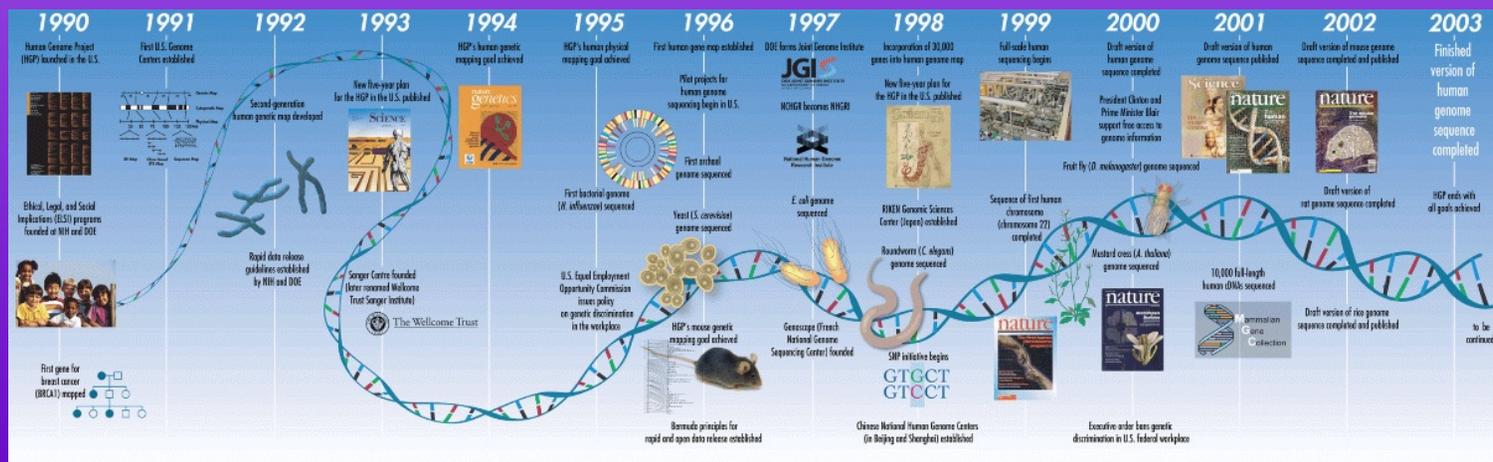
Arthur J. Schmitt Lecture
Center for Ethics and Culture
University of Notre Dame
April 21, 2009



Arthur J. Schmitt (1893-1971)

Science and Values – Five Easy Theses

- Science, like any human practice, lives in an historical, cultural, social, political, and economic context.
- Such contexts affect at least the institutional structures of science, the sociology of scientific communities, and the psychology of the individual scientist.
- Values play an important role in setting research agendas.
- Values play an important role in shaping research methods.
- Values play an important role in steering the application of scientific knowledge.



Timeline of the Human Genome Project

Science and Values – Five Easy Theses

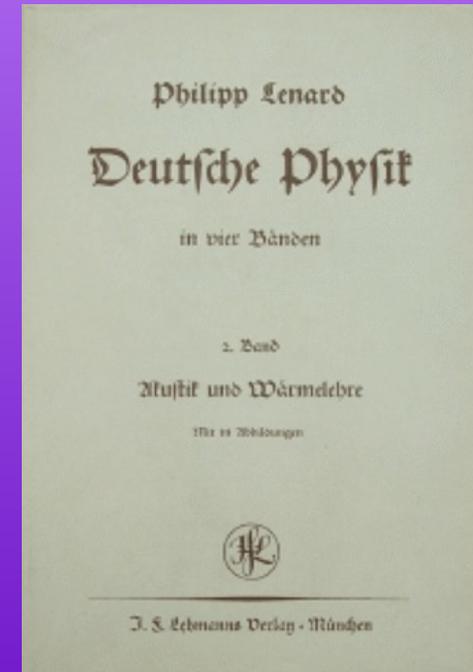
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Galileo Galilei (1564-1642)



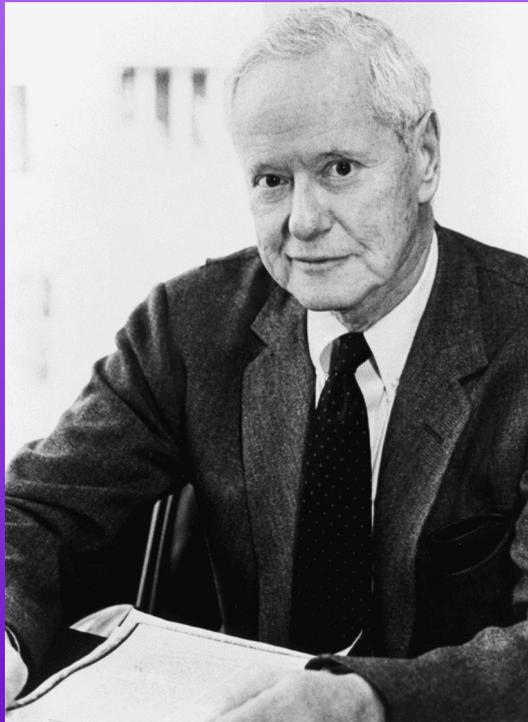
Trofim Lysenko (1898-1976)



Philipp Lenard (1862-1947)

Science and Values – Five Easy Theses

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Robert K. Merton (1910-2003)

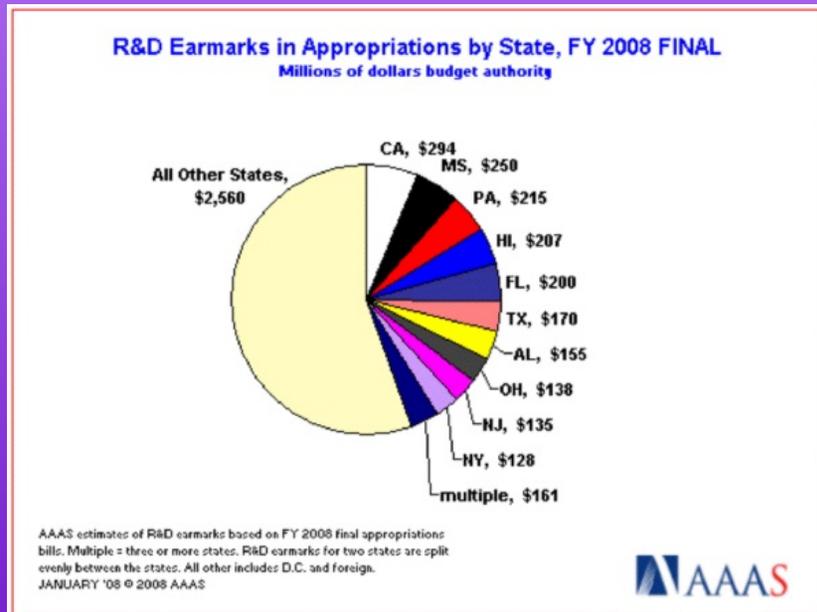
“Science, Technology, and Society in Seventeenth Century England” (1938)

“The Normative Structure of Science” (1942)

- *Communalism* - the common ownership of scientific discoveries,
- *Universalism* - claims evaluated in terms of universal or impersonal criteria
- *Disinterestedness* - scientists rewarded for acting in ways that outwardly appear to be selfless
- *Organized Skepticism* - all ideas tested and subject to rigorous, structured community scrutiny.

Science and Values – Five Easy Theses

- Values play an important role in setting research agendas.



Science and Values – Five Easy Theses

- Values play an important role in shaping research methods.



Dr. Josef Mengele (1911-1971)



Science and Values – Five Easy Theses

- Values play an important role in steering the application of scientific knowledge.



Hiroshima, August 1945

Yield: 18-20 Kilotons



Castle Bravo Test, March 1, 1954

Yield: 15-22 Megatons

Science and Values – Two Hard Questions

- Do values have a role to play in theory choice and theory testing, and so, in a sense, in determining the content of scientific theories?
- What responsibility does the scientist or engineer bear for the use to which one's work is put?

Science and Values – Hard Question One

- Do values have a role to play in theory choice and theory testing, and so, in a sense, in determining the content of scientific theories?

Otto Neurath –

Underdetermination, Auxiliary Motives, and Pseudorationalism

- 1906 Ph.D. Berlin, Economics
- 1919 President of the Central Economic Office of the short-lived Bavarian Socialist Republic
- 1924 Director of the Social and Economic Museum in Vienna, affiliated with Austrian Social-Democratic Party
- 1929 Co-founder of the Vienna Circle, logical empiricist philosophy of science
- 1934 Exile in the Netherlands after right-wing takeover in Austria; organizes International Unity of Science Movement
- 1940 Flees to England after Germany invades the Netherlands
- 1945 Death in Oxford, England



Otto Neurath (1882-1945)

Science and Values – Hard Question One

Do values have a role to play in theory choice and theory testing, and so, in a sense, in determining the content of scientific theories?

Otto Neurath –

Underdetermination, Auxiliary Motives, and Pseudorationalism

“The Lost Wanderers of Descartes and the
Auxiliary Motive (On the Psychology of
Decision)” (1913)

- No difference in principle between practical and theoretical reason
- Auxiliary motives always play a role in science, especially in the social sciences
- Objectivity best achieved by openness about and honest, critical, empirical assessment of auxiliary motives



Which way out?

Science and Values – Hard Question One

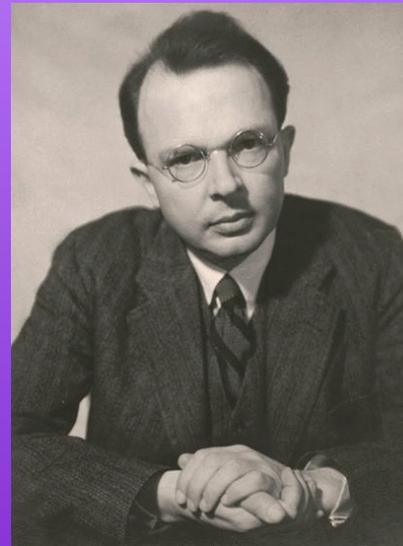
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“The Lost Wanderers of Descartes and the
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Decision)” (1913)

- “Pseudorationalism” – the unconscious or willful and explicit denial of a role for auxiliary motives
- Critique of both Popper’s falsificationism and Carnap’s inductive logic as examples of pseudorationalism
- There is no “induction machine”



Rudolf Carnap (1891-1970)



Karl Popper (1902-1994)

Science and Values – Hard Question One

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Otto Neurath –

Underdetermination, Auxiliary Motives, and Pseudorationalism

“Unified Science and Marxism” (1930)

- Given a choice between empirically equivalent theories, choose the theory more likely to promote progressive social change
- Austro-Marxism, a variety of revisionist Marxism and democratic socialism, had been attacked by Lenin as not rigorously scientific and too idealistic

Lenin, *Materialism and Empirio-Criticism* (1909)



Vladimir Ilyich Lenin (1870-1924)

Science and Values – Hard Question One

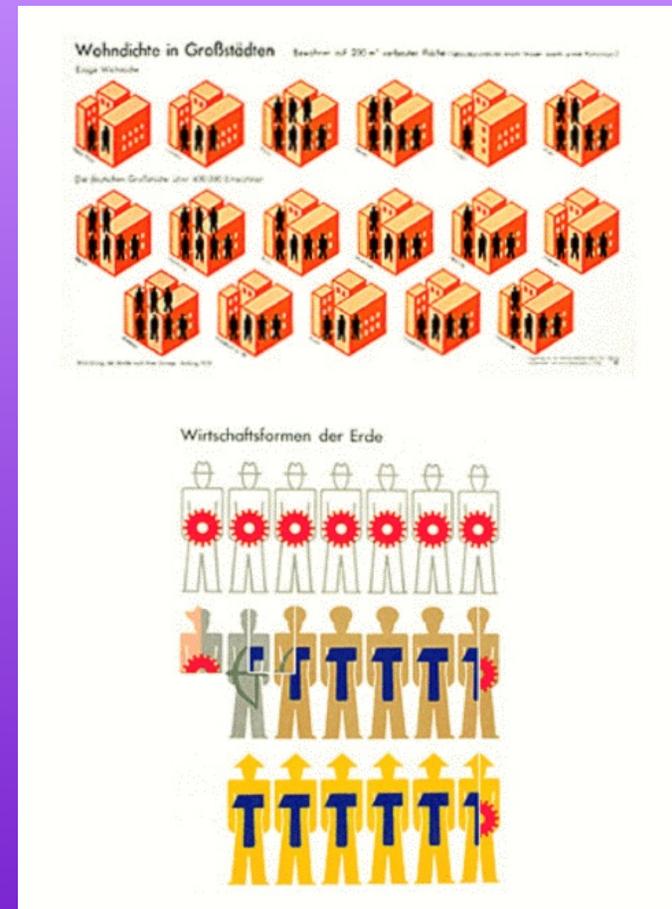
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Otto Neurath –

Underdetermination, Auxiliary Motives, and Pseudorationalism

Neurath as Applied Social Scientist

- 1921-1922 Establishes various institutions to help with Austria's post-war housing crisis: Austrian Settlement and Allotment Garden Association; Public Utility Settlement and Building Material Corporation; Settlement, Housing, and Construction Guild of Austria
- 1924-1934 Establishes and directs the Social and Economic Museum; invents "Isotype," graphical method for presenting social scientific and economic information



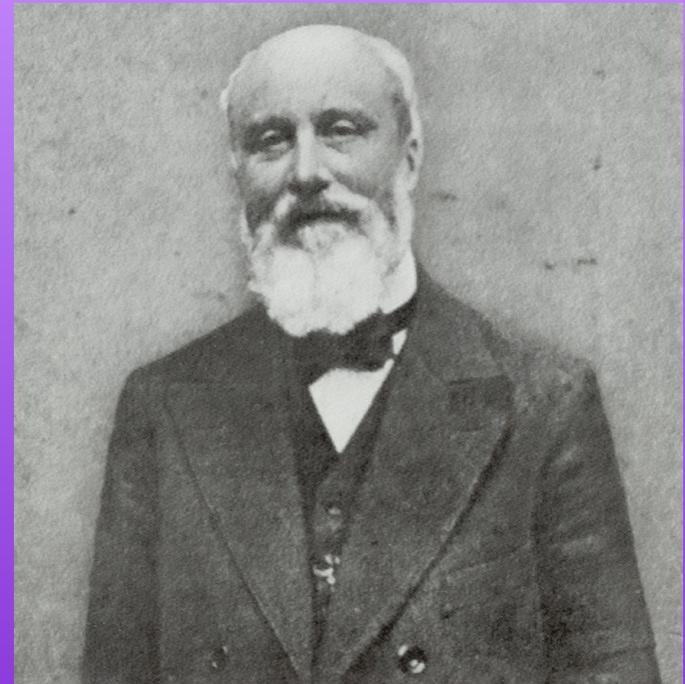
Science and Values – Hard Question One

Do values have a role to play in theory choice and theory testing, and so, in a sense, in determining the content of scientific theories?

Pierre Duhem –

Underdetermination, Holism, Bon Sens, and Faith

- 1887 Lecturer in Physics at Lille
- 1888 Ph.D., Sorbonne, Mathematics
- 1893 Moves to Rennes
- 1894 Moves to Bordeaux
- 1880s to early 1890s works mainly on physical chemistry; defender of “energeticism”
- 1890s onward, work on history of science, especially medieval mechanics and cosmology, also philosophy of science
- 1893 Declines new chair in history of science at the Collège de France
- 1913 Non-resident member of the Académie des Sciences
- 1916 Death in Bordeaux



Pierre Duhem (1861-1916)

Science and Values – Hard Question One

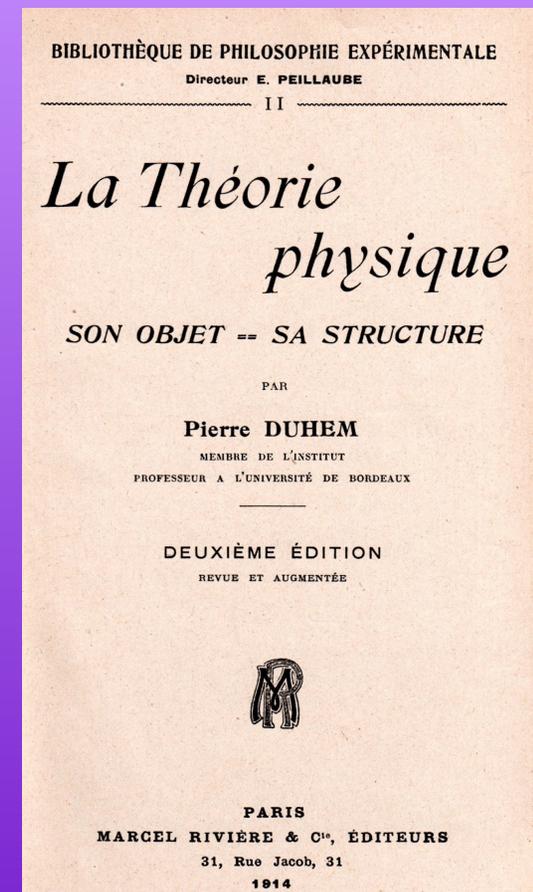
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Underdetermination, Holism, Bon Sens, and Faith

The Aim and Structure of Physical Theory (1906)

- Theories always tested only as wholes; individual hypotheses never tested in isolation
- Theory choice always underdetermined by logic and empirical evidence
- Bon sens – educated good sense or common sense – is trusted to lead us to the “natural classification”



Science and Values – Hard Question One

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The Aim and Structure of Physical Theory (1906)

H – hypothesis

C_1, C_2, C_3 , etc. – auxiliary conditions

O – observation report

Simple (-minded?) Falsification

$$\begin{array}{l} H \Rightarrow O \\ \sim O \\ \hline \therefore \sim H \end{array}$$

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Assuming a More Realistic Model of Theory Testing

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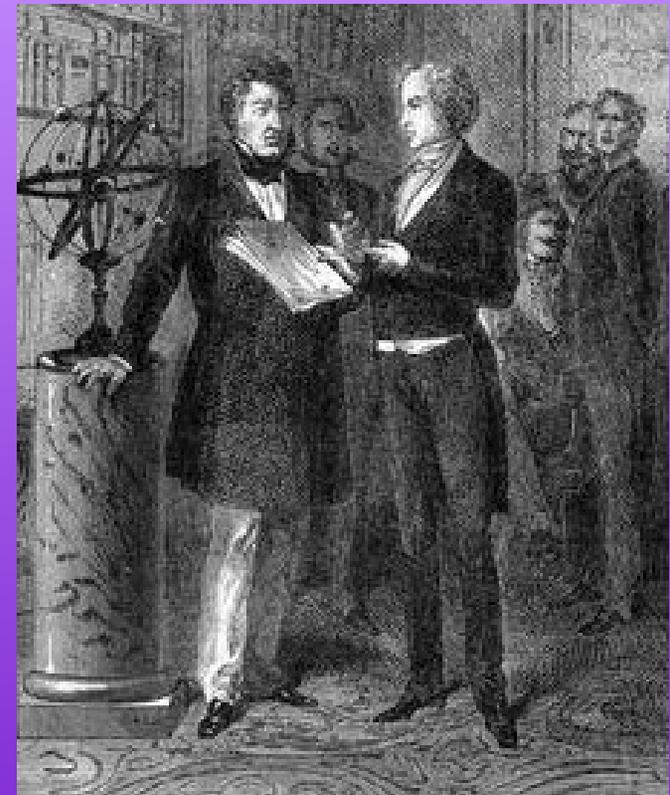
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Urbain Le Verrier (1811-1877) Explaining
the Discovery of Neptune to King Louis
Philippe, 1846

Science and Values – Hard Question One

Do values have a role to play in theory choice
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Underdetermination, Holism, Bon Sens,
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The Aim and Structure of Physical Theory (1906)

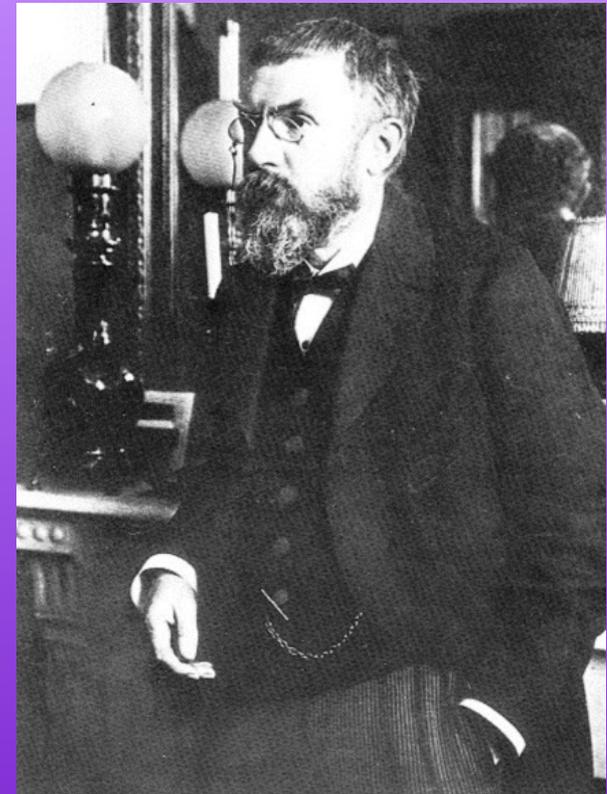
Assuming a More Realistic Model of Theory Testing

$$\frac{H \ \& \ C_1, C_2, C_3, \dots \Rightarrow O}{\sim O} \\ \therefore \sim H \vee \sim C_1 \vee \sim C_2 \vee \sim C_3 \vee \dots$$

There will always be a multiplicity of equally well
confirmed total theories:

- T1: $\sim H \ \& \ C_1 \ \& \ C_2 \ \& \ C_3 \ \vee \dots$
- T2: $H \ \& \ \sim C_1 \ \& \ C_2 \ \& \ C_3 \ \vee \dots$
- T3: $H \ \& \ C_1 \ \& \ \sim C_2 \ \& \ C_3 \ \vee \dots$
- T4: $H \ \& \ C_1 \ \& \ C_2 \ \& \ \sim C_3 \ \vee \dots$
- T5: $H \ \& \ \sim C_1 \ \& \ \sim C_2 \ \& \ C_3 \ \vee \dots$
- etc.

Choice among these is sometimes a matter of convention



Henri Poincaré (1854-1912)

Science and Values – Hard Question One

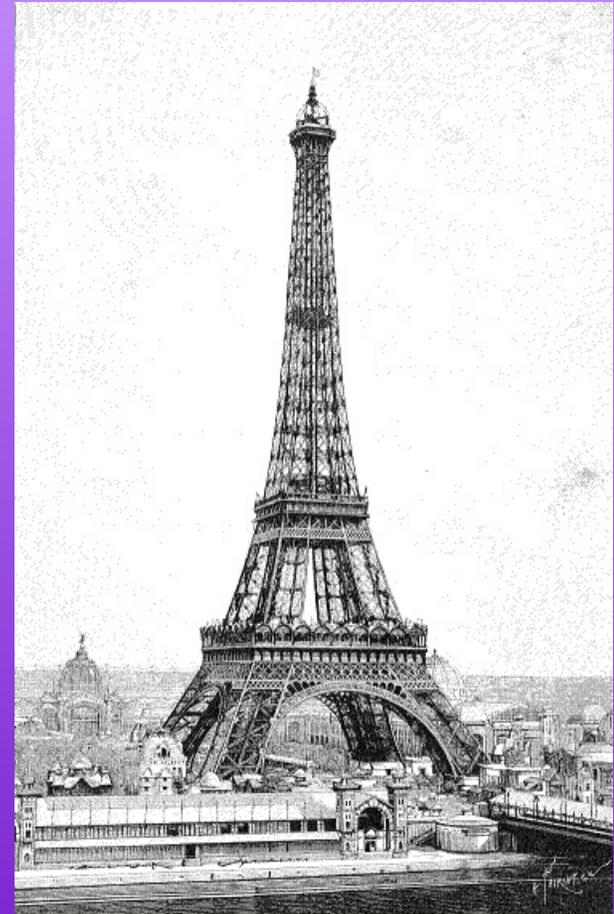
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Pierre Duhem –

Underdetermination, Holism, Bon Sens, and Faith

“Physique de croyant” [“Physics of a Believer”],
Annales de philosophie chrétienne (1905)

- Conventionalism circumscribing the limits of science
- The challenge to a Catholic philosopher-scientist in highly secularized, third republic France, rebuilding itself after the Franco-Prussian War (1870-1871) on a high-tech foundation of science and engineering



Eiffel Tower, 1889

Science and Values – Hard Question One

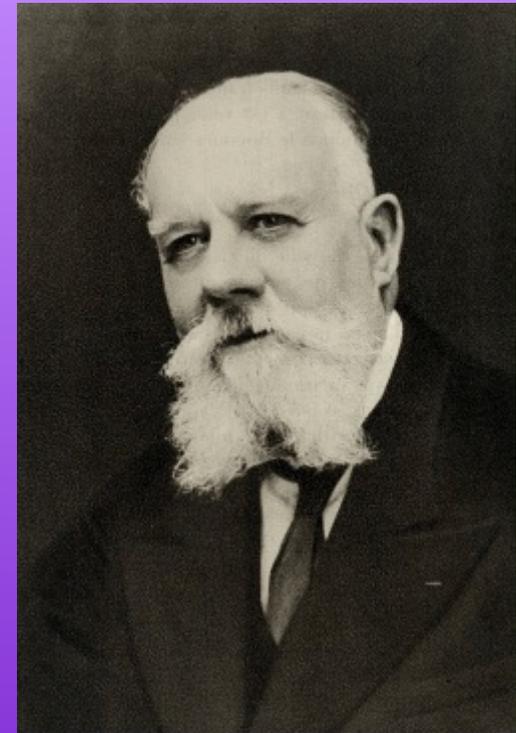
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Édouard Le Roy –

Conventionalism, Science, and Faith

“Essai sur la notion du miracle” [“Essay on the Notion of a miracle”], *Annales de philosophie chrétienne* (1906)

- Conventionalism circumscribing the limits of science
- Natural law does not express a necessity inherent in the nature of things; science reveals only a “diffuse necessity penetrated by a great deal of contingency”
- “If physical reality influences moral reality, the reverse is also true”
- Bergson’s successor at the Collège de France, 1922
- Académie française, 1945



Édouard Le Roy (1870-1954)

Science and Values – Hard Question One

Do values have a role to play in theory choice and theory testing, and so, in a sense, in determining the content of scientific theories?

Underdetermination, Science, and Values

- Logic and experience do not uniquely determine theory choice
- Within the “domain of underdetermination,” values do and should play a role in theory choice, especially in those areas where theory choice is more seriously underdetermined and where the human good is more directly affected
- Failure to acknowledge the role of values in theory choice means only that the work done by values will escape critical scrutiny
- Example: global climate modeling

Science and Values – Hard Question One

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Later Twentieth-Century Defenders of the View that Empirical Evidence Underdetermines Theory Choice

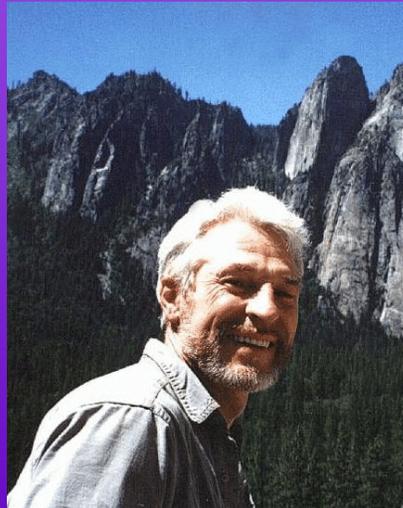
- Quine, “Two Dogmas of Empiricism” (1951)
- van Fraassen, *The Scientific Image* (1980)
- Longino, *Science as Social Knowledge: Values and Objectivity in Scientific Knowledge* (1990)



W. V. O. Quine
(1908-200)



Helen Longino



Bas van Fraassen

Science and Values – Hard Question One

Do values have a role to play in theory choice and theory testing, and so, in a sense, in determining the content of scientific theories?

Later Twentieth-Century Critics of the View that Empirical Evidence Underdetermines Theory Choice

- McMullin, “Values in Science” (1982)

Epistemic versus non-epistemic values

- Kitcher, *Science, Truth, and Democracy* (2000)

Permanent versus transient underdetermination



Philip Kitcher



Father Ernan McMullin

Science and Values – Hard Question One

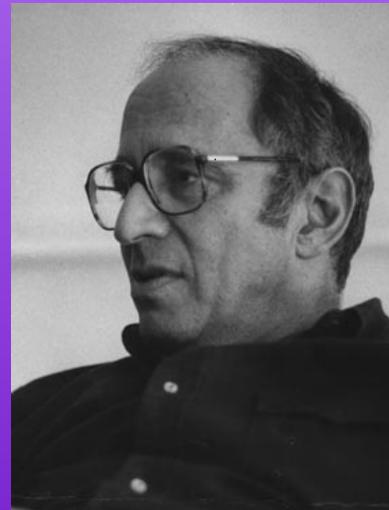
Do values have a role to play in theory choice and theory testing, and so, in a sense, in determining the content of scientific theories?

Other Twentieth Century Skeptics about a Theory-Choice Algorithm or an “Induction Machine”

- Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (1958)
- Hanson, *Patterns of Discovery: An Inquiry into the Conceptual Foundations of Science* (1958)
- Kuhn, *The Structure of Scientific Revolutions* (1962)



Norwood Russell Hanson (1924-1967)
[In his famous Grumman F8F-2 Bearcat]



Thomas Kuhn (1922-1996)



Michael Polanyi (1891-1976)

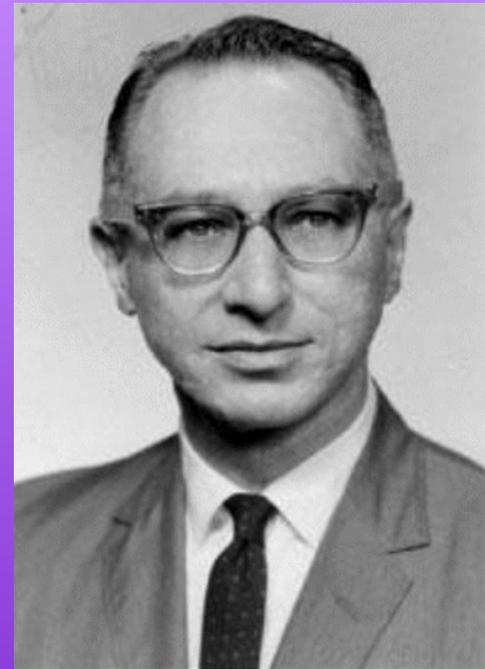
Science and Values – Hard Question One

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Another Perspective on How Values Affect Theory Choice

“The Scientist qua Scientist Makes Value Judgments” (1953)

- The evidential threshold for the acceptance of a scientific hypothesis is a function of the social, ethical, legal, and human risk of error – the greater the risk from wrongly accepting a hypothesis as true, the greater must be the strength of the evidence required for acceptance
- Example: drug safety testing



Richard Rudner (1921-1979)

Science and Values – Hard Question One

Do values have a role to play in theory choice and theory testing, and so, in a sense, in determining the content of scientific theories?

Science and Values – Hard Question Two

- What responsibility does the scientist or engineer bear for the use to which one's work is put?

The Franck Report

“The scientists on this project do not presume to speak authoritatively on problems of national and international policy. However, we found ourselves, by the force of events, during the last five years, in the position of a small group of citizens cognizant of a grave danger for the safety of this country as well as for the future of all the other nations, of which the rest of mankind was unaware. We therefore felt it is *our duty* to urge that the political problems, arising from the mastering of nuclear power, be recognized in all their gravity, and that appropriate steps be taken for their study and the preparation of necessary decisions. . . . We believe that our acquaintance with the scientific elements of the situation and prolonged preoccupation with its world-wide political implications, imposes on us the *obligation* to offer . . . some suggestions as to the possible solution of these grave problems.”

Metallurgical Laboratory, University of Chicago,
June 11, 1945



James Franck (1882-1964)

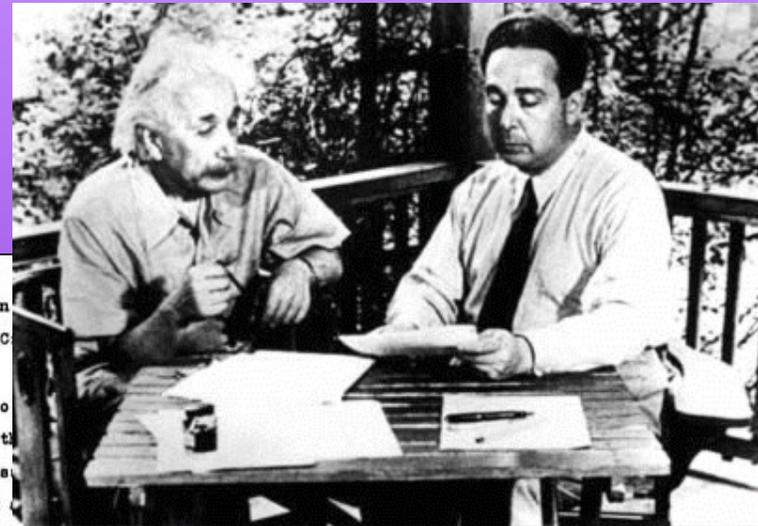


Eugene Rabinowitch
(1901-1973)

Science and Values – Hard Question Two

What responsibility does the scientist or engineer bear for the use to which one's work is put?

Einstein's Letter to Roosevelt, August 1939, which led to the creation of the Manhattan Project



Albert Einstein
Old Grove Rd.
Nassau Point
Peconic, Long Island

August 2nd, 1939

F.D. Roosevelt,
President of the United States,
White House
Washington, D.C.

Sir:

Some recent work by E. Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. I believe therefore that it is my duty to bring to your attention the following facts and recommendations:

In the course of the last four months it has been made probable - through the work of Joliot in France as well as Fermi and Szilard in America - that it may become possible to set up a nuclear chain reaction in a large mass of uranium, by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

This new phenomenon would also lead to the construction of bombs, and it is conceivable - though much less certain - that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove to be too heavy for transportation by air.

ores of uranium in
la and the former C
is Belgian Congo.
link it desirable to
Administration and t
in America. One pos
ist with this task
aps serve in an inofficial
wingt
), keep them informed of the
endations for Government action,
of securing a supply of uran-
which is at present being car-
University laboratories, by
, through his contacts with
atributions for this cause,
tion of industrial laboratories
ly stopped the sale of uranium
as taken over. That she should
be understood on the ground
of State, von Weizsäcker, is
Berlin where some of the
ated.

Yours very truly,
A. Einstein
(Albert Einstein)

Albert Einstein (1879-1955)
and
Leo Szilard (1898-1964)

A Different Perspective on the Scientist's Responsibilities to Society

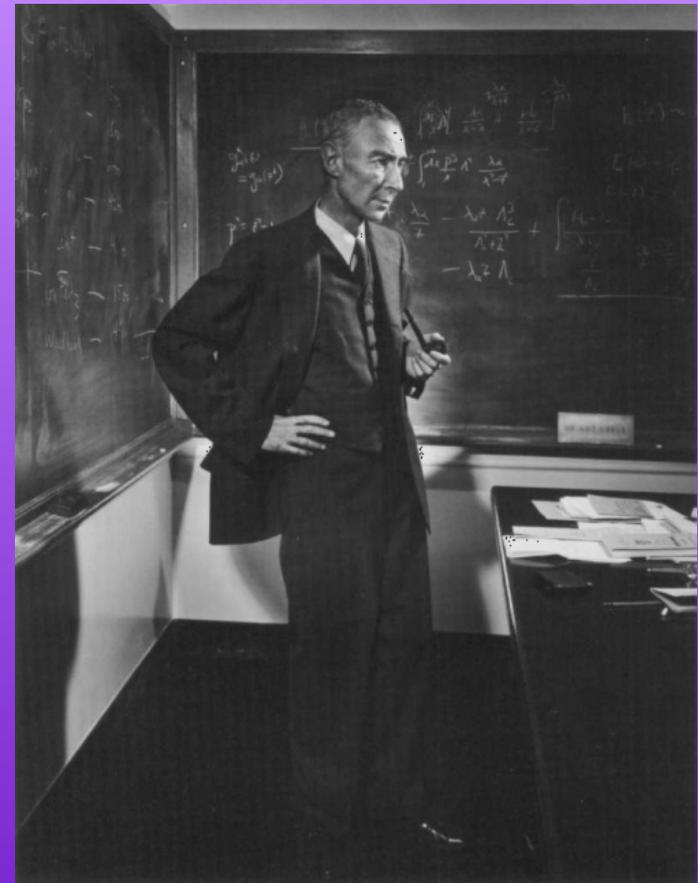
Oppenheimer on the Interim Committee's discussion of the Franck Report on June 16, 1945

“We didn't think that being scientists especially qualified us as to how to answer this question of how the bombs should be used or not.”

“What was expected of this committee of experts was primarily a technical opinion on new questions.”

The scientific members of the Interim Committee:

Vannevar Bush, Karl T. Compton, James B. Conant, J. Robert Oppenheimer, Enrico Fermi, Arthur H. Compton, and Ernest O. Lawrence



J. Robert Oppenheimer (1904-1967)

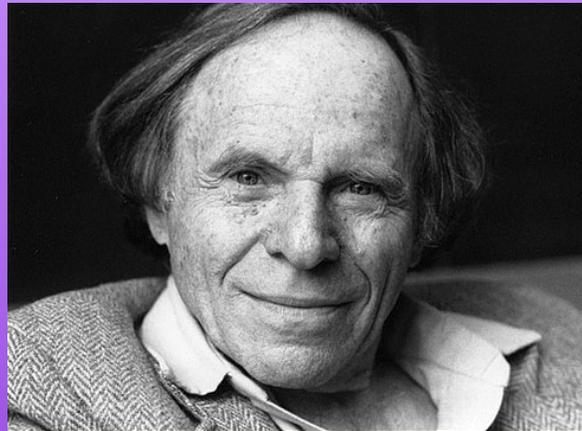
Science and Values – Hard Question Two

What responsibility does the scientist or engineer bear for the use to which one's work is put?

The Federation of Atomic Scientists

Founded November 1945 by
Manhattan Project scientists

such as Leo Szilard and Philip
Morrison



Philip Morrison (1915-2005)



Leo Szilard (1898-1964)

Federation of Atomic Scientists

The following statement has been prepared regarding the aims of the newly formed Federation of Atomic Scientists:

We, the undersigned representatives of the Associations of Scientists who have worked on the atomic bomb, hereby agree to form a united group, to be known as "The Federation of Atomic Scientists," in order to carry out more effectively the common aims of the separate organizations.

Each of the six Associations shall retain its identity and independence of action. The Federation will provide a central office and staff for the purpose of aiding and coordinating the activities of the several member Associations.

The component organizations were founded to achieve the following aims:

- (1) To study the implications to our nation and to the world of the liberation of nuclear energy.
- (2) To create a realization of the dangers that this nation and all civilization will face if the tremendous destructive potential of nuclear energy is misused.
- (3) To help establish an atmosphere of world security in which the beneficial possibilities of nuclear energy may be developed.
- (4) To study the relation between national legislation and the establishment of an adequate international policy.

... and to give all possible publicity to the following convictions:

- (1) That a continuing monopoly of the atomic bomb by the United States is impossible.
- (2) That there can be no specific defenses against the destructive effects of the atomic bomb.

- (3) That in view of the existence of the atomic bomb, no nation can, in this new age, feel secure until the problem of the control of atomic power is solved on a world level.

The council of the Federation will consist of those delegates of the component associations who are in Washington at any given time. It is intended that one such member from each association should be present in Washington at all times and two will frequently be present. There will be a central office which will act primarily as headquarters for the Associations. It will also serve as an information and speakers' bureau and will handle contacts with other groups which hold views similar to our own.

The Washington office shall be made available to all scientists' organizations in America which find it necessary to have the same information that we are to supply to the Associations. Many of these newly formed groups have the same aims and purposes as our own organization.

Signed by representatives from:

Association of Oak Ridge Scientists at Clinton Laboratories
The Atomic Scientists of Chicago
The Association of Los Alamos Scientists
The Association of Manhattan Project Scientists, New York City Area
The Atomic Production Scientists, Oak Ridge
The Atomic Engineers, Oak Ridge

The Federation of Atomic Scientists may be reached by calling National 5818, Washington, D. C. Its street address is 1621 K Street, N.W., Washington 6, D. C.

Science and Values – Hard Question Two

What responsibility does the scientist or engineer bear for the use to which one's work is put?

Reorganized as the Federation of American Scientists a short time after its founding, FAS still thrives today

FAS
FEDERATION of AMERICAN SCIENTISTS

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Membership and Donations

- » Support FAS
- » Special Offer

Strategic Security

- » US Chain of Command
- » Arms Trade
- » Biological and Chemical Weapons
- » Government Secrecy
- » Intelligence
 - » Nuclear Weapons
 - » China, People's Republic of
 - » Dirty Bombs
 - » Documents
 - » New Nuclear Weapons & Bunker Busters
 - » Non-Proliferation and Verification
 - » Nuclear Information Project
 - » Nuclear Missions & Forces
 - » Nuclear Testing
 - » Resources
 - » Statements
 - » Take Action
 - » Tutorials
 - » Nuclear Fuel Cycle
 - » Terrorism
 - » US Weapons Systems
 - » Munitions
 - » Foreign Weapon Systems
 - » Weapons in Space
 - » Policy

Information Technology for Learning and Research

- » Biomedical Computing Requirements
- » Digital Human
- » Learning Federation
- » Technology for Training Against Terror

Nuclear Weapons in the 21st Century

Nuclear weapons have been a focus of FAS work since its founding in 1945 by scientists concerned about control of the awesome new technology they had helped create.

Today we are often asked to speak on the dangers of radiological weapons known as **dirty bombs**. We inform on the dangers of nuclear weapons **proliferation** by individuals, non-state terrorists, or states. We follow **next generation nuclear weapons** development including proposed "**bunker busters**."

We stay on top of the debate over resuming nuclear weapons **testing**. We track **Administration** policy and hard-to-find reports for Congress.

In January 2005 FAS released a study that asked: **What missions remain for US nuclear weapons** now, 15 years after the end of the Cold War? What rationales justify our keeping 6,000 deployed warheads, plus missiles, bombers and other support, at a cost of <\$8 billion taxpayer dollars per year? Why does Russia try to keep <5,000 warheads officially deployed, though they are daily more prone to accidental launch against?

In **Missions for Nuclear Weapons after the Cold War** FAS Strategic Studies Project Director Ivan Oelrich finds that, of 15 missions claimed for US nuclear forces, only one justifies their present size and structure: a first strike against Russia's vast nuclear arsenal. Our continued ability to execute such an attack, makes Russia keep its large force to deter us. The two nations stay locked in Cold War military postures, even though no stakes between us justify such holocaust.

"The US and Russian arsenals are the elephant in the living room that no one wants to talk about," Oelrich says. "Yet millions of Americans could be killed after the launch of even part of the Russian force. By comparison, a dirty bomb attack most likely would kill hundreds of thousands."

--

Try our NEW **Bomb-A-City Calculator**. Pick an American city. Pick the size of the bomb you wish to detonate virtually (1 kt to 4 MT). Choose your method of delivery (aircraft or automobile/suitcase). Then see the radius within which most buildings would be destroyed.

What can we do?

"November 2005 will mark the 15th anniversary of the fall of the Berlin Wall. This is the year to downsize and restructure both sides' nuclear forces more drastically than is required by 2012 by the Moscow Treaty," Oelrich said in **releasing his report**. How low should we go? Oelrich did the numbers in a **paper** published by the Institute for Defense Analyses in 2001.

Major US cities are hit after Russia launches some of its 5,000 nuclear warheads in error due to its decaying warning system. This graphic opened *Doomsday Machine 1* on History Channel's Modern Marvels in which FAS experts discussed the dangers. Image: History Channel Dec. 28, 2004.

Science and Values – Hard Question Two

What responsibility does the scientist or engineer bear for the use to which one's work is put?

The American Physical Society awards an annual prize in honor of Leo Szilard's commitment to the scientist's citizen involvement

The screenshot shows the APS website with a navigation menu at the top including 'Publications', 'Meetings & Events', 'Programs', 'Membership', 'Policy & Advocacy', 'Careers in Physics', and 'About APS'. The 'Programs' section is expanded to show 'Prizes, Awards & Fellowships', which is further expanded to 'Awards, Medals & Lectureships'. The main content area is titled 'Leo Szilard Lectureship Award' and includes a description of the award, its establishment in 1974, and a list of past recipients from 2000 to 2006. A sidebar on the left contains a search bar and a 'Pages For:' dropdown menu set to 'Physicists/Scientists'. The APS logo and navigation links are visible at the top of the page.

American Physical Society Sites: [APS](#) [Journals](#) [PhysicsCentral](#) [Physical Review Focus](#)

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To recognize outstanding accomplishments by physicists in promoting the use of physics for the benefit of society in such areas as the environment, arms control, and science policy. The lecture format is intended to increase the visibility of those who have promoted the use of physics for the benefit of society. The award consists of \$1,000, a certificate citing the contributions of the recipient, plus \$2,000 travel expenses for lectures given by the recipient at an APS meeting and at two or more educational institutions or research laboratories in the year following the award. The lectures should be especially aimed at physicists early in their careers.

Establishment & Support:

This annual award was established in 1974 by the Forum on Physics and Society as a memorial to [Leo Szilard](#) in recognition of his concern for the social consequences of science. The award was endowed in 1998 by donations from the John D. and Catherine T. MacArthur Foundation, the Energy Foundation, the David and Lucille Packard Foundation and individuals. It was also expanded to a lectureship format to promote awareness of the application of physics to social problems and to increase the visibility of those engaged in such activities.

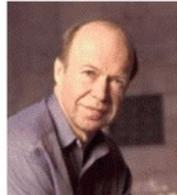
Nomination Deadline:

The deadline for submission of nominations for the 2008 prize is July 1, 2007.

Five (5) copies of nominations and supporting documentation for the 2008 Prize should be sent to the Chair of the 2008 Selection Committee:

Peter D. Zimmerman, Chair
Science and Security Department of War Studies
King's College, London
Strand, London, WC2R 2LS

2007 Leo Szilard Lectureship Award Recipient:
[James E. Hansen](#)
National Aeronautics and Space Administration



Past Recipients:

2006: [Paul G. Richards](#)

2005: [David K. Barton](#), [Roger Falcone](#), [Daniel Kleppner](#), [Frederick K. Lamb](#), [Ming K. Lau](#), [Harvey L. Lynch](#), [David Moncton](#), [David Montague](#), [David E. Mosher](#), [William Priedhorsky](#), [Maury Tigner](#), [David R. Vaughan](#)

2004: [Marc Ross](#)

2003: [Robert Socolow](#)

2002: [Henry C. Kelly](#)

2001: [John Harle](#)

2000: [Jeremiah David Sullivan](#)

Science and Values – Hard Question Two

What responsibility does the scientist or engineer bear for the use to which one's work is put?

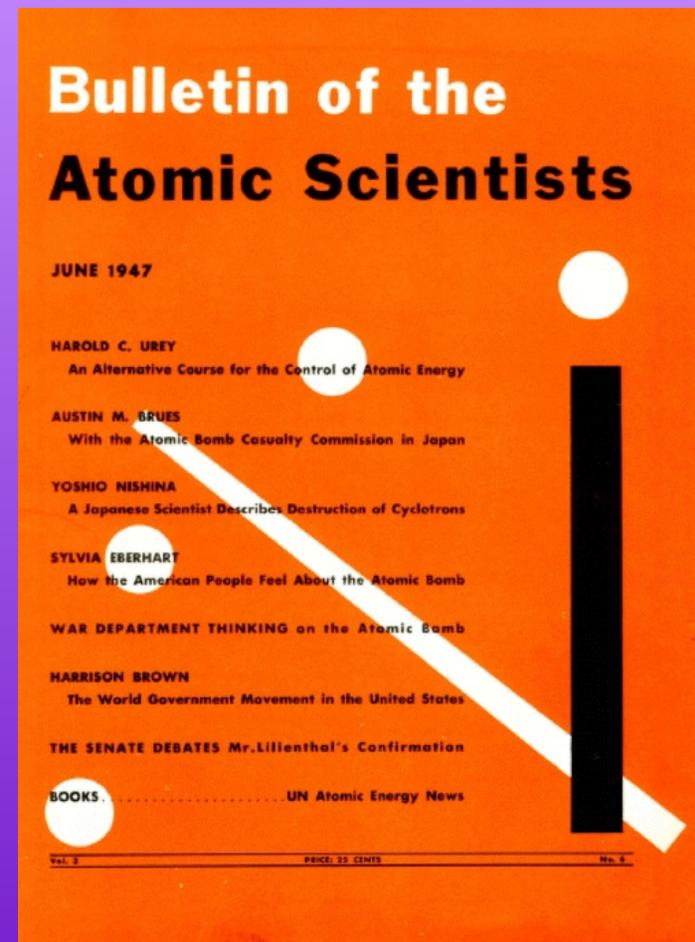
Bulletin of the Atomic Scientists

Founded in the fall of 1945 at about the same time when the Federation of Atomic Scientists was established, the *Bulletin* introduced its famous “doomsday clock” in its June 1947 issue.

The hands were set at eight minutes to midnight.

They were set at three minutes to midnight in 1984, at the height of the debate over US plans to place intermediate-range nuclear missiles in Europe.

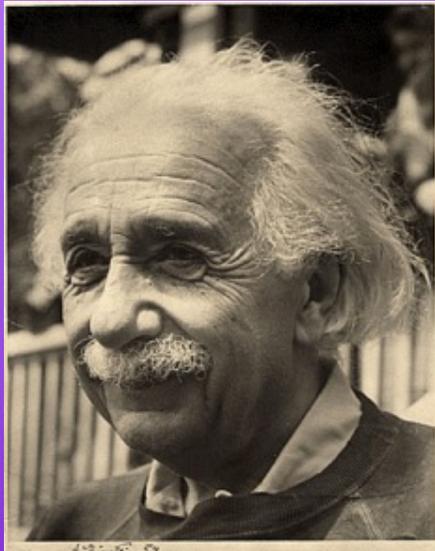
Today, the hands stand at five minutes to midnight.



Science and Values – Hard Question Two

What responsibility does the scientist or engineer bear for the use to which one's work is put?

The Russell-Einstein Manifesto, July 9, 1955



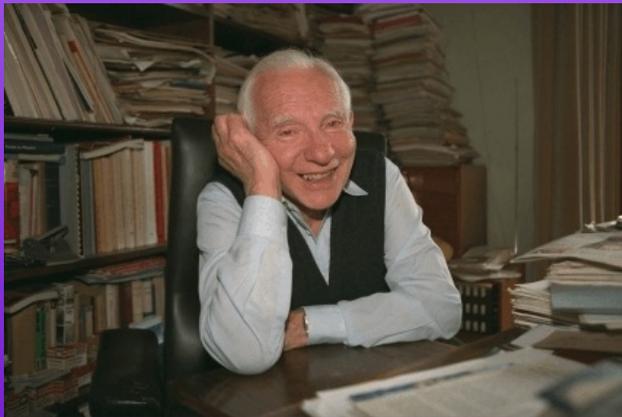
“Here, then, is the problem which we present to you, stark and dreadful and inescapable: Shall we put an end to the human race; or shall mankind renounce war?”

Science and Values – Hard Question Two

What responsibility does the scientist or engineer bear for the use to which one’s work is put?

First Pugwash Conference, Pugwash, Nova Scotia, July 8-11, 1957

The 1995 Nobel Peace Prize was awarded jointly to the Pugwash Conferences and to their leading figure, the physicist Joseph Rotblat.



Joseph Rotblat (1908-2005)



Left to right: Iwao Ogawa, Chou Pei-Yuan, Vladimir P. Pavlichenko, Shinichiro Tomonaga, Cecil F. Powell, Antoine M. B. Lacassagne, Alexander V. Topchiev, Alexander M. Kuzin, Eugene Rabinowitch, George Brock Chisholm, Dmitri V. Skobelzyn, John S. Foster, Cyrus S. Eaton, Hermann J. Muller, Joseph Rotblat, Hans Thirring, Leo Szilard, Walter Selove, Eric H. S. Burhop, Mark L. E. Oliphant, and Marian Danysz. David F. Cavers, Paul Doty, Victor F. Weisskopf, and Hideki Yukawa were absent when this photograph was taken.

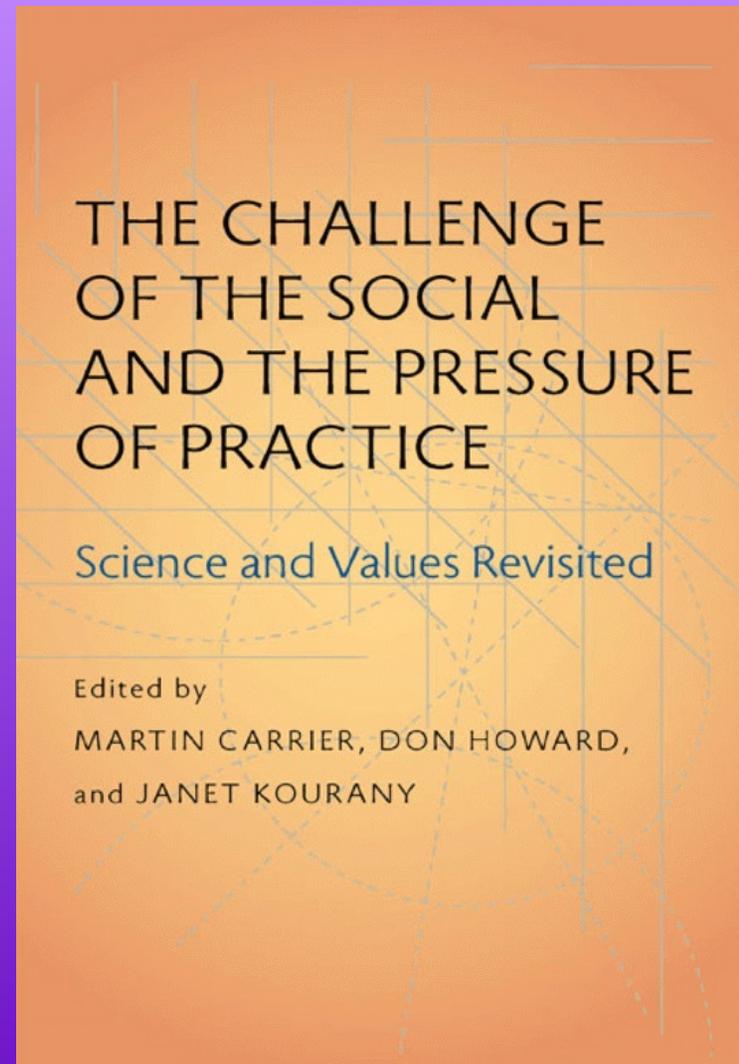
Science and Values – Hard Question Two

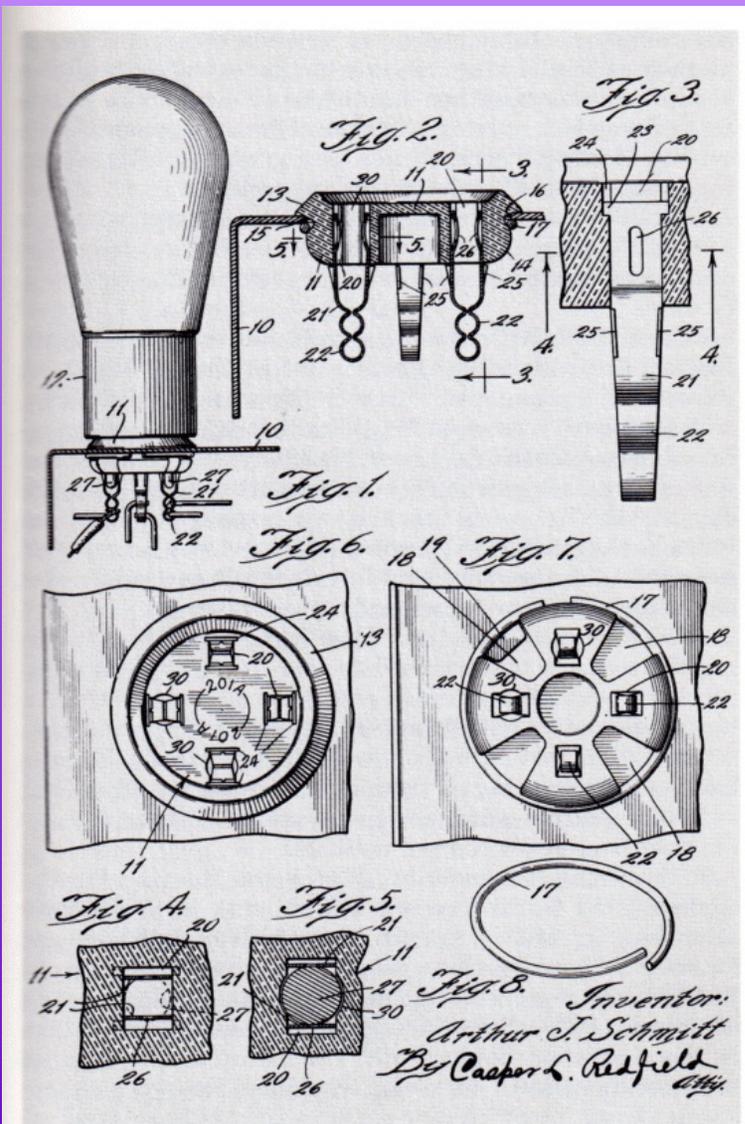
What responsibility does the scientist or engineer bear for the use to which one's work is put?

A Shameless Plug

The Challenge of the Social and the Pressure of Practice: Science and Values Revisited.

Martin Carrier, Don Howard, and Janet Kourany, eds. University of Pittsburgh Press, 2008





Arthur Schmitt's first invention, a molded radio socket



"There was a magnetism about the man"

But let's let Arthur Schmitt – entrepreneur, educational innovator, and man of conscience and conviction – have the last word:

“There are just too many people who, to put it plainly, simply don't give a damn.”

(Founder's Day Dinner, Fournier Institute of Technology, September 1948)