

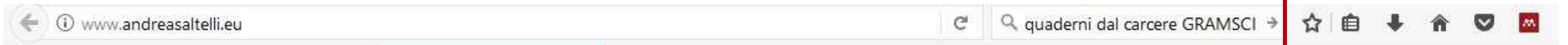
Ethics of quantification

Andrea Saltelli

Centre for the Study of the Sciences and the Humanities, University of Bergen, and Open Evidence Research, Open University of Catalonia

PhD Course: Maintaining Scientific Integrity in Present Day Academic Reality, 5 – 7 November 2018, Faculty of Geosciences, Utrecht University, Ruppert building

Where to find this talk: www.andreasaltelli.eu



Andrea
Saltelli

HOME

ABOUT ME

PUBLICATIONS

NEWS & VIDEOS

RESOURCES

PRESENTATIONS

OTHER RESOURCES

CAETERIS ARE
NEVER PARIBUS

Tweets by @AndreaSalte

andrea saltelli
@AndreaSaltelli

Thoughts on Ioannidis' latest article:
onlinelibrary.wiley.com/doi/10.1111/ec...
theconversation.com/sciences-credi... via
@TC_Africa



Science's credibility crisis: why it will g...
We are observing two new phenomena...
theconversation.com



4h

Andrea
Saltelli

HOME ABOUT ME



= more material on my web site

Your expectations

- I do not know yet, we shall see!
- I expect to learn about ethic issues and **tension fields** between science and practice, privacy and transparency, etc
 - What to do in case of **morally grey** areas in science.
- **Philosophy of science**, strategy in science and ethics in science.
- To what extent **is it ok** to refer to papers from people you know/are colleagues.
- ... I hope that this course might help me **not to be surprised** about these questions of integrity or ethics in the future.
- Guidance on how to deal with **diverging interests** in multi-stakeholder projects
 - Insight in how to act right in situations with conflicts of interest, for example when the decision that you think is right **is not the same as your supervisor's**.
 - How to be a moral/honest researcher.
- how to keep our integrity in doing research and at the same time be able to implement my findings in society.

Techies' fury at being drafted for Trump army

Working for the Pentagon is prompting staff revolts in Silicon Valley

Danny Fortson, San Francisco

November 4 2018, 12:01am, The Sunday Times

“From Amazon to Google, rank-and-file employees are revolting against their employers for taking the powerful tools they helped to build and selling them for unexpected purposes, from apprehending illegal immigrants to supercharging America’s war machine”



The roots of the Cartesian dream



Francis Bacon
(1561–1626)

Magnalia Naturae, in
the New Atlantis
(1627), '*Wonders of
nature, in particular
with respect to human
use*'

We call Cartesian dream the idea
of man as master and possessor
of nature, of prediction and
control, of Bacon's wonders of
science and of Condorcet's
mathematique sociale...



René Descartes
(1596–1650)

Discourse on Method
(1637)



Nicolas de Caritat, marquis de
Condorcet
(1743– 1794)

'Sketch for a Historical Picture of
the Progress of the Human Spirit'



Francis Bacon
(1561–1626)

Magnalia Naturae, in the *New Atlantis* (1627),
‘Wonders of nature, in particular with respect to human use’

The prolongation of life; The restitution of youth in some degree; The retardation of age; The curing of diseases counted incurable; The mitigation of pain; More easy and less loathsome purgings; The increasing of strength and activity; The increasing of ability to suffer torture or pain; The altering of complexions, and fatness and leanness; The altering of statures; The altering of features; The increasing and exalting of the intellectual parts; Versions of bodies into other bodies; Making of new species; Transplanting of one species into another; Instruments of destruction, as of war and poison; Exhilaration of the spirits, and putting them in good disposition; Force of the imagination, either upon another body, or upon the body itself; Acceleration of time in maturations; Acceleration of time in clarifications; Acceleration of putrefaction; Acceleration of decoction; Acceleration of germination; Making rich composts for the earth; Impressions of the air, and raising of tempests; Great alteration; as in induration, emollition, &c; Turning crude and watery substances into oily and unctuous substances; Drawing of new foods out of substances not now in use; Making new threads for apparel ; and new stuffs, such as paper, glass, &c; Natural divinations; Deceptions of the senses; Greater pleasures of the senses; Artificial minerals and cements.



Magnalia Naturae, in the *New Atlantis* (1627),
‘Wonders of nature, in particular with respect to human use’

Francis Bacon (1561–1626)

The prolongation of life; The restitution of youth in some degree; The retardation of age; The curing of diseases counted incurable; The mitigation of pain;

[...]

Drawing of new foods out of substances not now in use; Making new threads for apparel; and new stuffs, such as paper, glass, etc.; Natural divinations; Deceptions of the senses; Greater pleasures of the senses; Artificial minerals and cements.

The study of letters leading to “doubts and errors”;

Comparing “disquisitions of the ancient moralists to very towering and magnificent palaces with no better foundation than sand and mud”;

Condemnation of humanities and exaltation of mathematics.



René
Descartes
(1596–1650)

Discourse on
Method (1637)

“I perceived it to be possible to arrive at knowledge highly useful in life; and in room of the Speculative Philosophy [...], to discover a Practical, by means of which, knowing the force and action of fire, water, air, the stars, the heavens, and all the other bodies that surround us, [...]we might also apply them [...], and thus render ourselves the lords and possessors of nature.”

<http://www.bartleby.com/34/1/6.html>



René
Descartes
(1596–1650)

Discourse on
Method (1637)

In the formulation of Condorcet: “All the errors in politics and in morals are founded upon philosophical mistakes, which, themselves, are connected with physical errors” (Ninth Epoch)



Nicolas de Caritat, marquis de
Condorcet
(1743– 1794)

‘Sketch for a Historical Picture of
the Progress of the Human Spirit’

Overpopulation? War due to scarcity of resources? Will not happen because technical progress and ethical progress will go hand in hand. Man will understand that his duty “will consist not in the question of giving existence to a greater number of beings, but happiness.” (Tenth Epoch)



Nicolas de Caritat, marquis de Condorcet
(1743– 1794)

‘Sketch for a Historical Picture of the
Progress of the Human Spirit’

‘Mathématique sociale’: We still use today terms such as ‘Condorcet method’, ‘Condorcet winner’, ‘Condorcet–ranking procedure’



Nicolas de Caritat,
marquis de Condorcet
(1743– 1794)
,

Feldman, J., 2005, Condorcet et la mathématique sociale: enthousiasmes et bemols, *Mathematics and Social Sciences*, 172(4), 7–41, <http://www.ehess.fr/revue-msh/pdf/N172R955.pdf>

Munda G. (2007) – *Social multi-criteria evaluation*, Springer-Verlag, Heidelberg, New York, Economics Series



Condorcet's
algorithms and
Descartes'
Geometry: the
dream always had a
quantification
agenda



Closer to our times the dream was couched in the 'Endless Frontier' metaphor by Vannevar Bush, 1945:

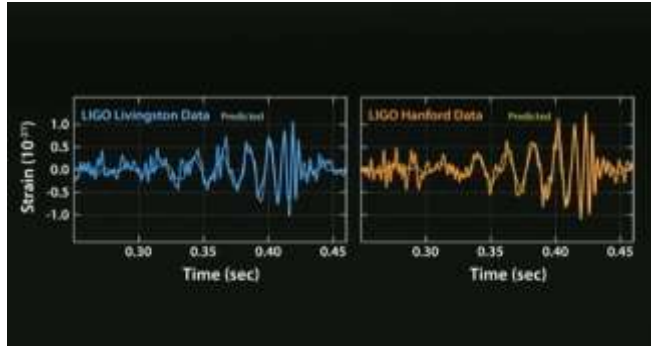
Vannevar Bush
(1890–1974)



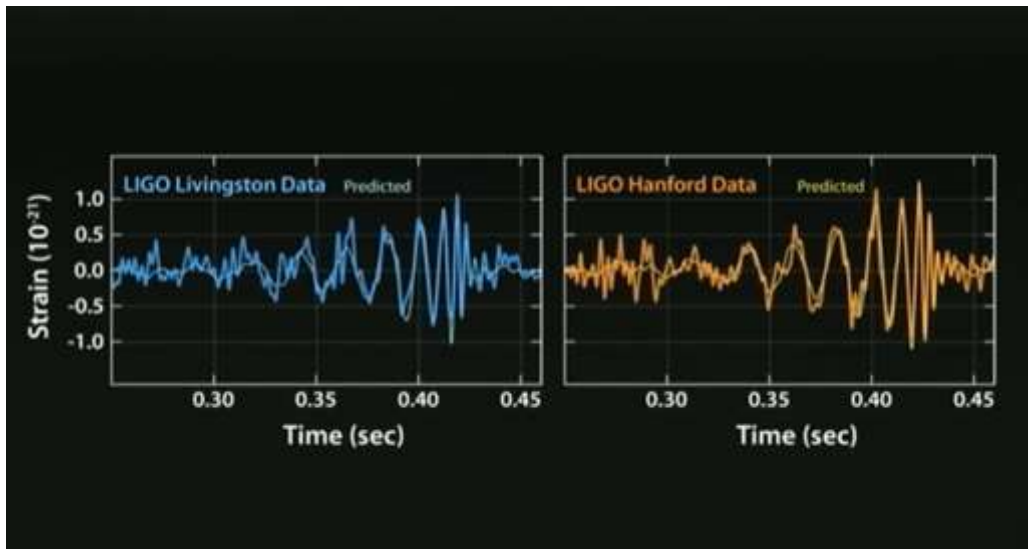
“One of our hopes is that after the war there will be full employment. [...] To create more jobs we must make new and better and cheaper products [...] founded on [...] basic scientific research. [...]the] Government [...] opened the seas to clipper ships and furnished land for pioneers. Although these frontiers have more or less disappeared, the frontier of science remains.”

The success of the
Cartesian dream

The keeping of the promise: Gravitational waves, from J. Weber's cylinder to LIGO



A Madman Dreams of Tuning Machines: The Story of Joseph Weber, the Tragic Hero of Science Who Followed Einstein's Vision and Pioneered the Sound of Space-Time, By Maria Popova, <https://www.brainpickings.org/2016/04/25/black-hole-blues-janna-levin-joseph-weber/>

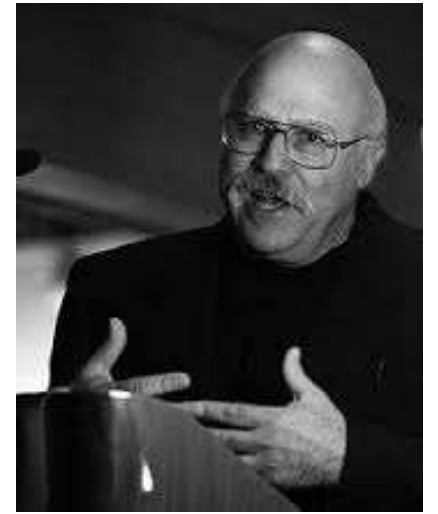


<https://www.brainpickings.org/2016/04/25/black-hole-blues-janna-levin-joseph-weber/>

If you are a natural scientists you were
nourished and trained in the Cartesian dream,
(S. Toulmin: ‘The hidden agenda of
modernity’)

The dream was spectacularly successful, in
all fields of endeavor, leading to what Steven
Shapin calls ‘invisible science’

Steven Shapin, 2016, Invisible Science, The Hedgehog Review: Vol. 18 No. 3 (Fall 2016)
W.B. Arthur, The nature of technology, Free Press, New York, 2009.

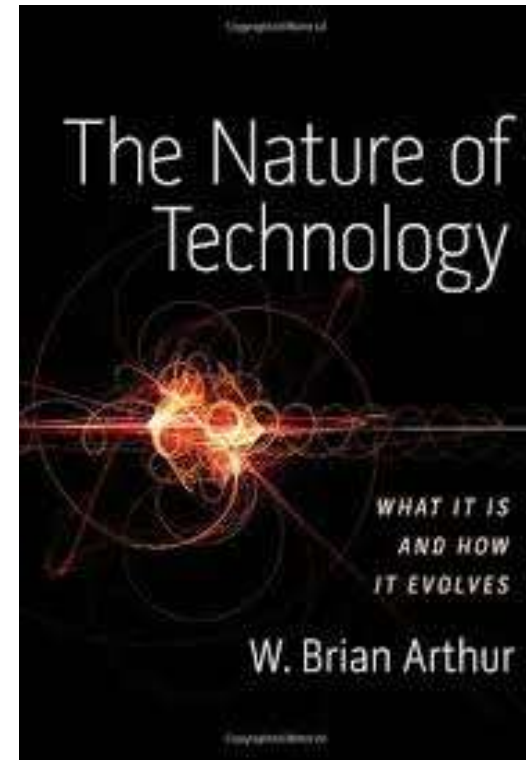


Steven Shapin

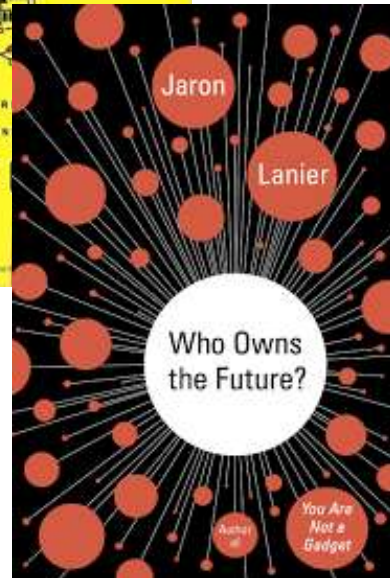
The critique of the Cartesian dream

What do Lyotard, Toulmin, Dewey, Bakunin, and (Fritz) Schumacher have in common?

From post-modern thinkers to pragmatists to anarchists to the fathers of the ecological movement, a common concern about mastering science and technology and its uses, about the dangers of modernity



... to a host of other issues and fears



Irreversible loss of jobs?

Weaponization of big data?

Technology disempowering the individual?

Copyrighted Material

JARON LANIER

TEN ARGUMENTS
FOR DELETING
YOUR SOCIAL
MEDIA ACCOUNTS
RIGHT NOW



Copyrighted Material

FROM THE AUTHOR OF HOMO DEPARADO

Yuval Noah
Harari



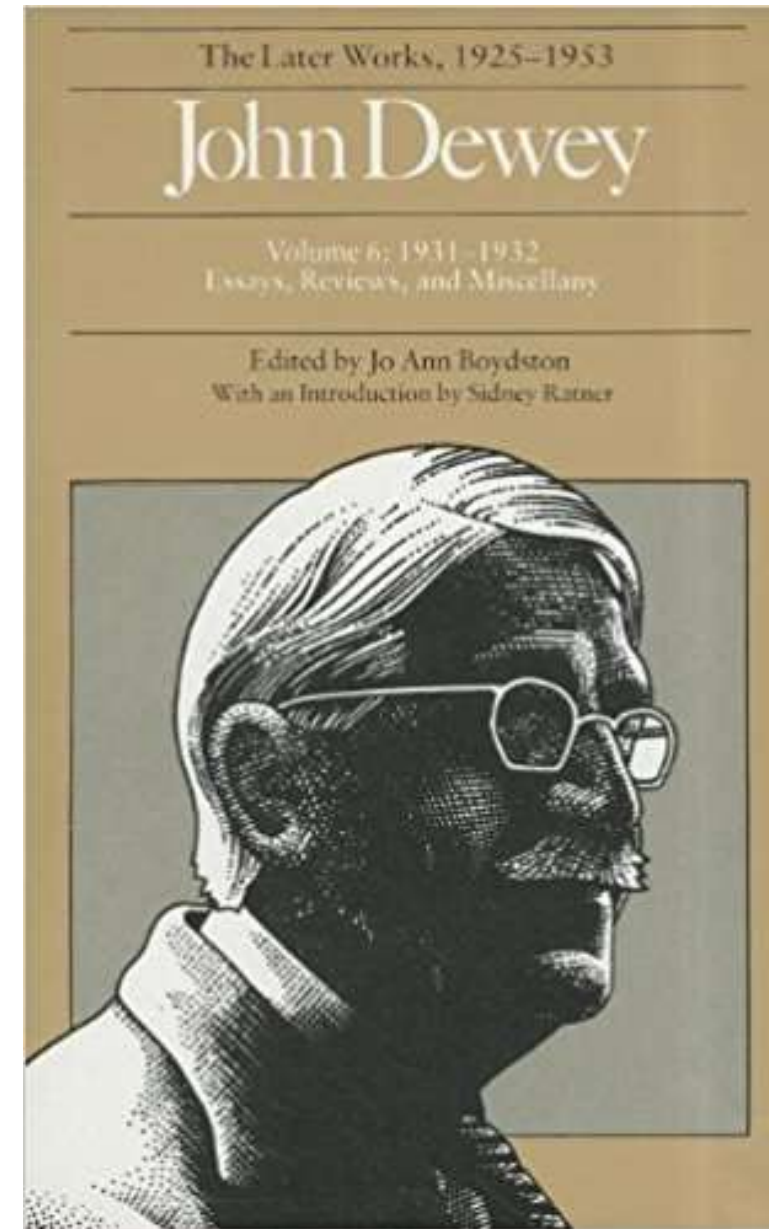
21 Lessons
for the
21st Century

Algorithms poisoning psyche
and democratic life
(including unintendedly)

Mind hacking

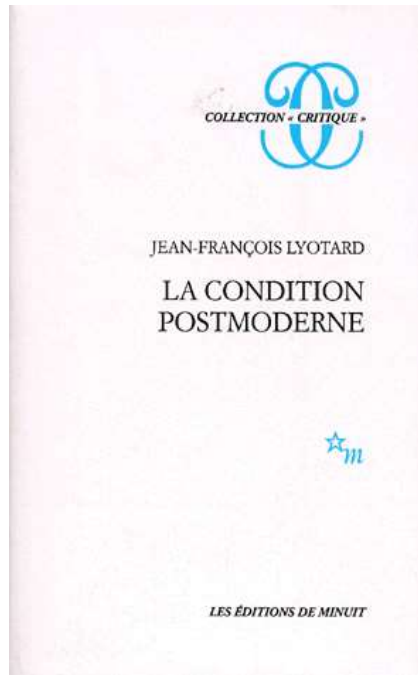
Here lies the heart of our present social problem. Science has hardly been used to modify men's fundamental acts and attitudes in social matters. It has been used to extend enormously the scope and power of interests and values which anteceded its rise. Here is the contradiction in our civilization. The potentiality of science as the most powerful instrument of control which has ever existed puts to mankind its one outstanding present challenge.

From J. Dewey 'Science and Society' in John Dewey: The Later Works, 1925-1953: 1931-1932, Vol. 6-ExLibrary



John Dewey 1859-1952

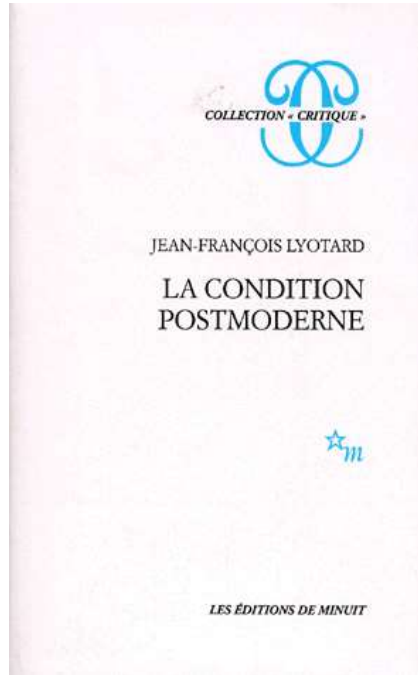
“The question of the legitimacy of science has been indissociably linked to that of the legitimation of the legislator since the time of Plato.”



Jean-François Lyotard

Lyotard, J.-F. 1979. La Condition postmoderne. Rapport sur le savoir, Paris : Minuit.

“From this point of view, the right to decide what is true is not independent of the right to decide what is just, [...] there is a strict interlinkage between the kind of language called science and the kind called ethics and politics ...”

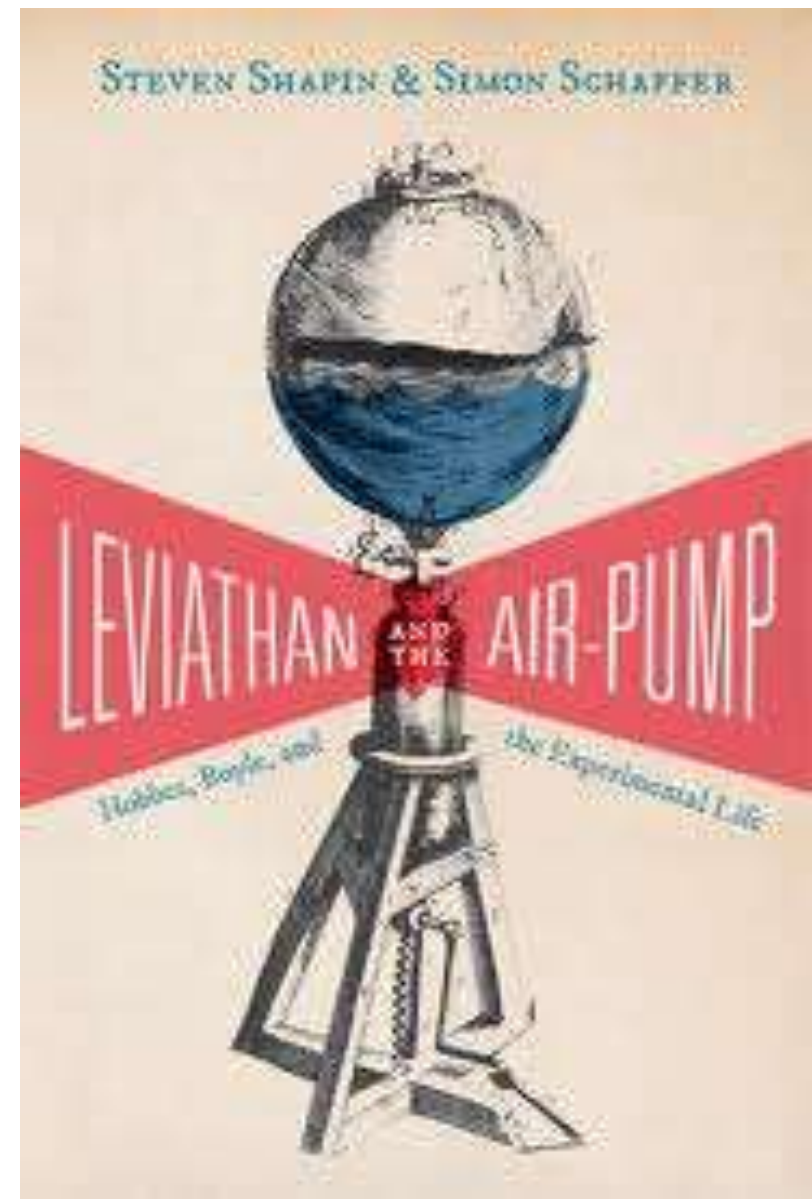


Jean-François Lyotard

Lyotard, J.-F. 1979. La Condition postmoderne. Rapport sur le savoir, Paris : Minuit.

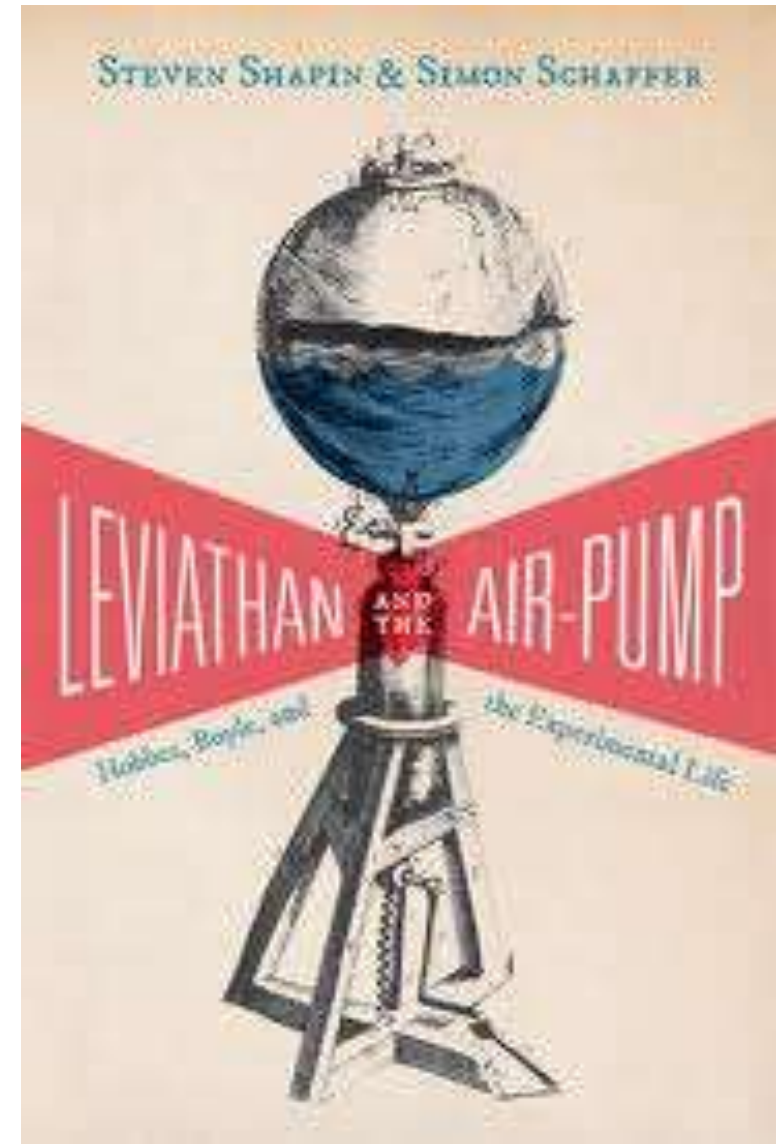
“Solutions to the problem of knowledge are solutions to the problem of social order.

[...] Trust in Science and trust in the prevailing social order are linked.”



Shapin, S., Schaffer, S., 1985, Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life, Princeton, 2011 Edition

Establishing ‘matter of facts’
under controlled ‘laboratory’
experiments before
witnesses as a way to
subtract the discourse about
knowledge from religious
squabbles ...

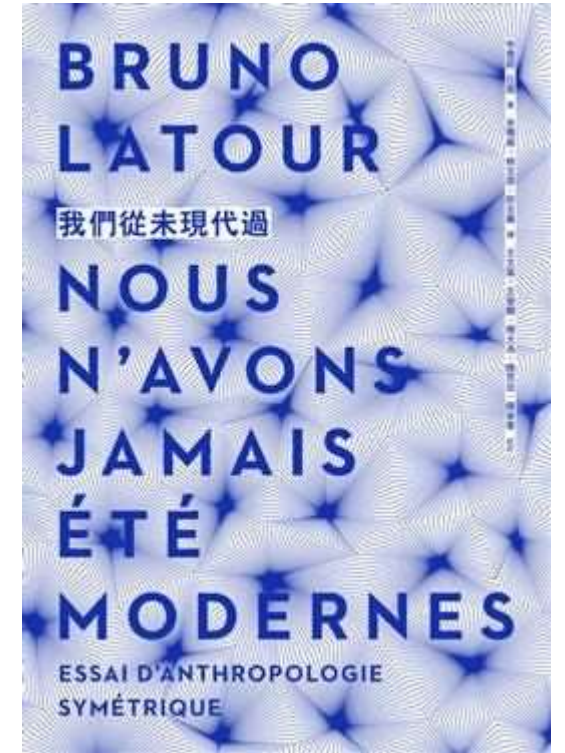


Shapin, S., Schaffer, S., 1985, Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life, Princeton, 2011 Edition

Shapin and Schaffer's book inspired Bruno Latour's 'Nous n'avons jamais été modernes', 1991, and was 'hot' during the 'science wars'.



Bruno Latour

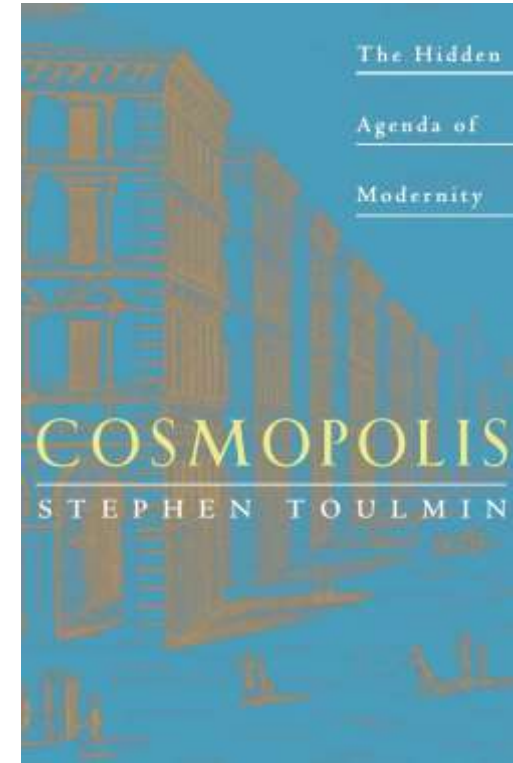


Latour, B., 1991, Nous n'avons jamais été modernes, Editions La découverte, 1993; We Have Never Been Modern. Cambridge, Harvard UP.

Stephen Toulmin: Modernity as a counter-Renaissance;
Descartes versus Montaigne; the delusion of a Newtonian view of
society

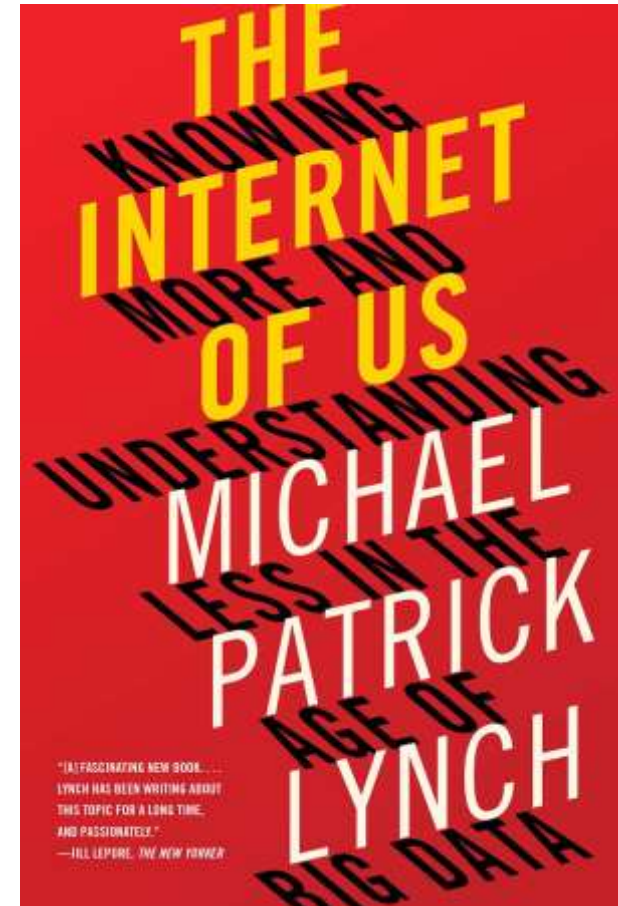
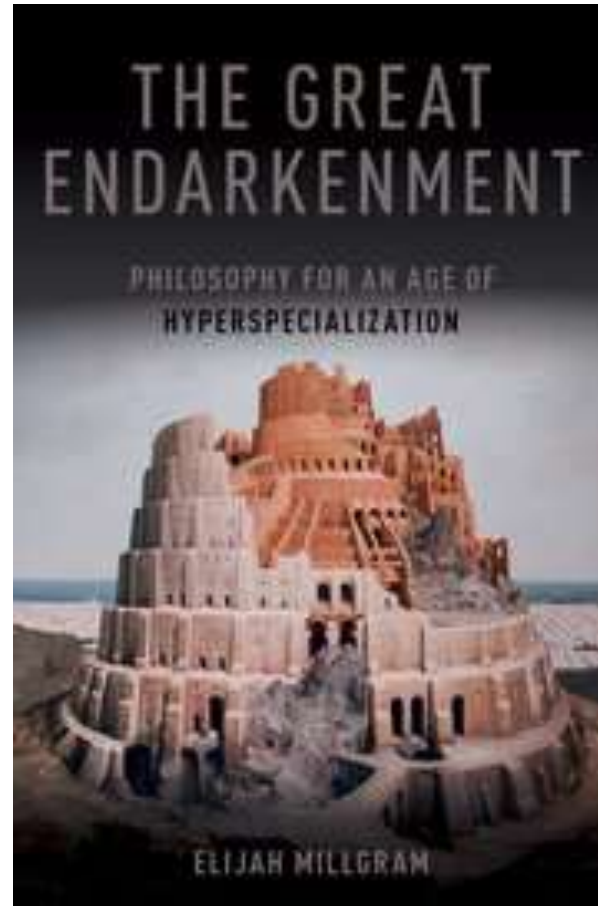
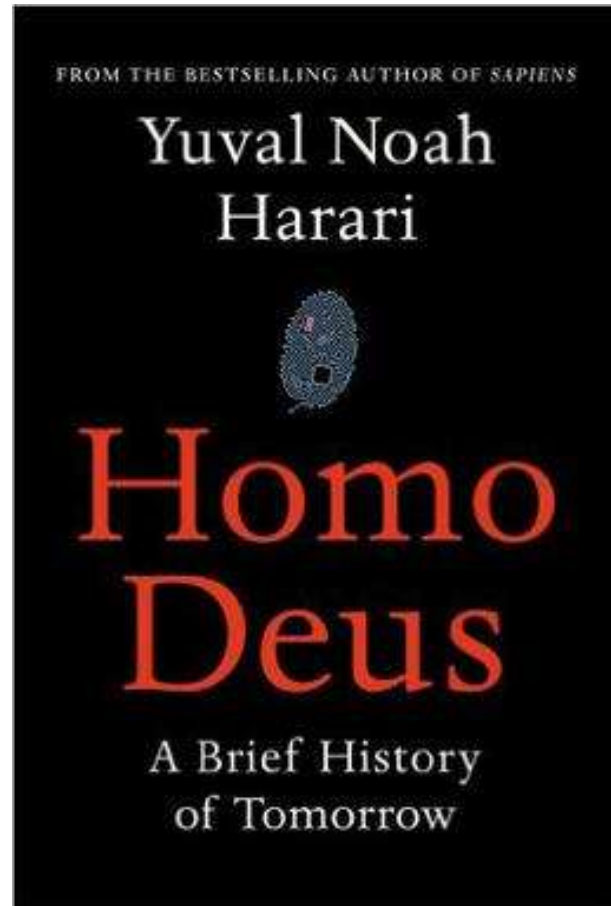


Stephen Toulmin

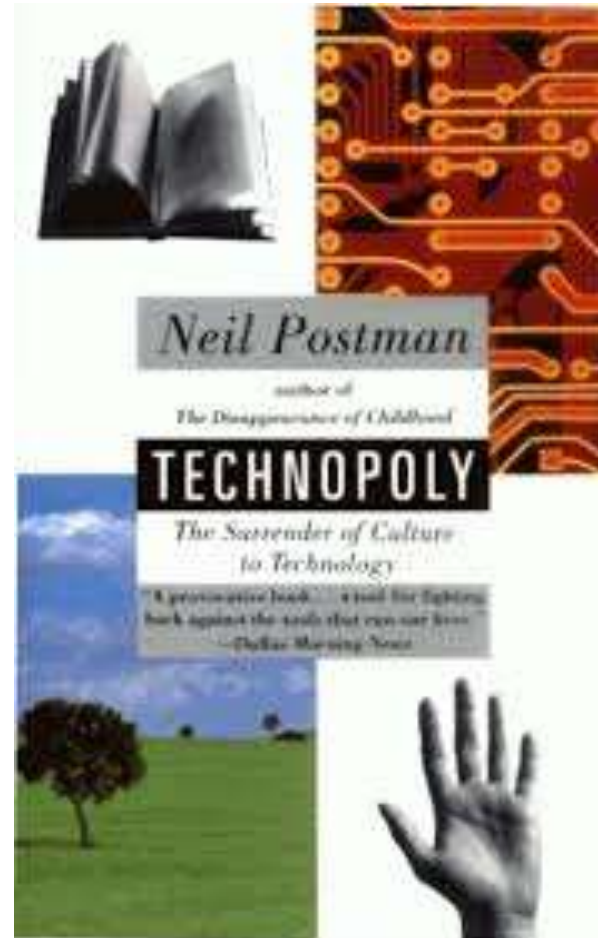


Stephen Toulmin, 1990, *Cosmopolis: The Hidden Agenda of Modernity*, The University of Chicago Press.

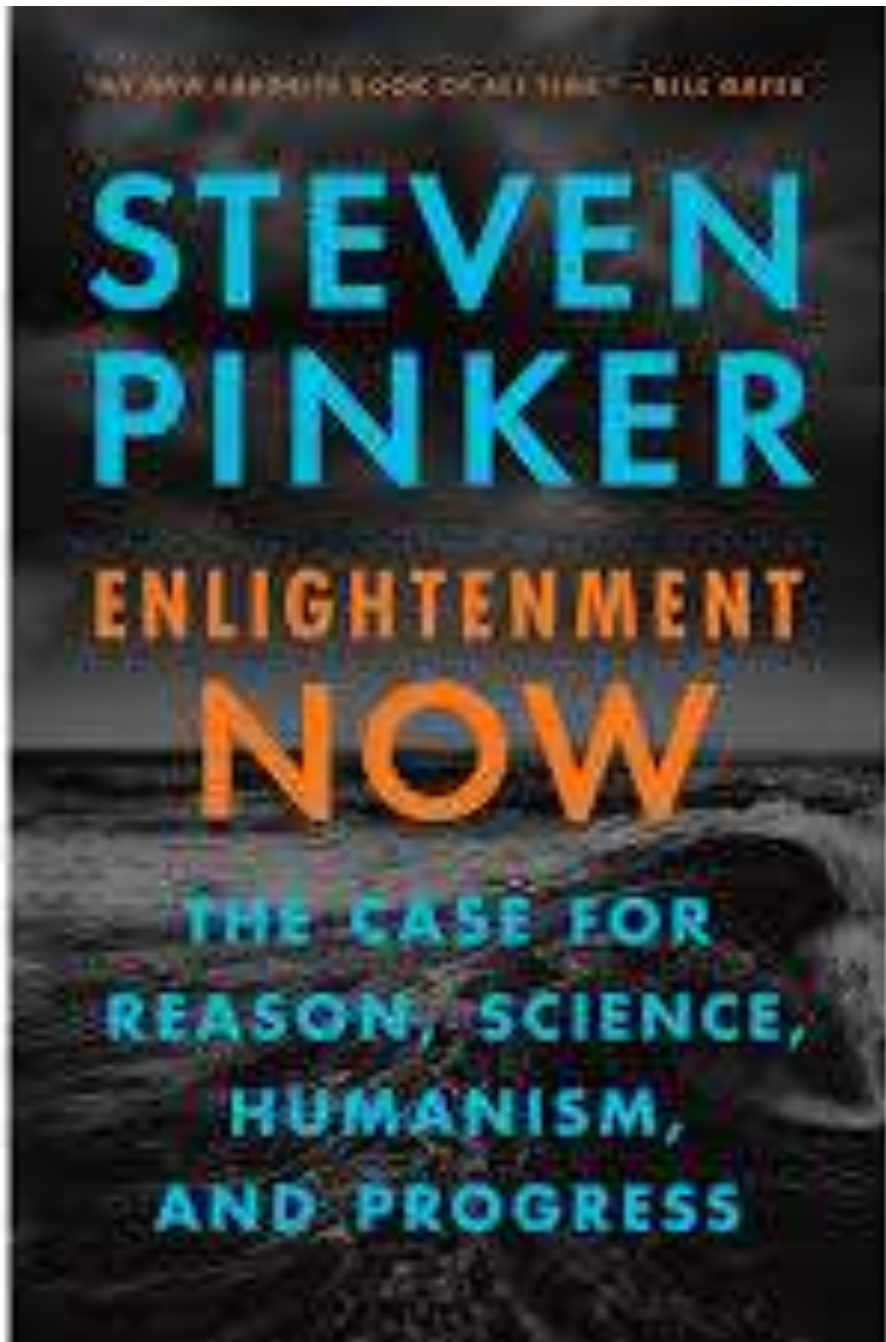
Making sense of the human condition without science, innovation and technology?



"it is inescapable that every culture must negotiate with technology, whether it does so intelligently or not" (N. Postman, Technopoly).



The discussion on the
legacy of Enlightenment
goes on

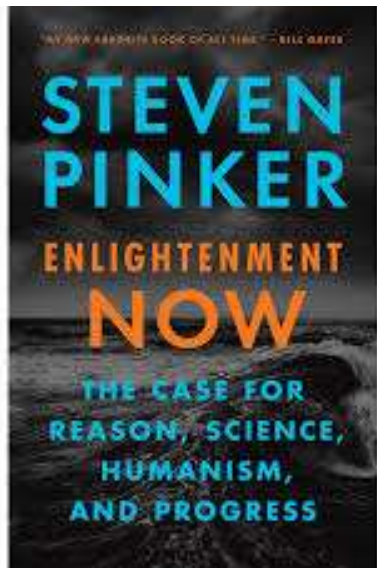


Steven Pinker



Jeremy Lent





“A future perfect. Steven Pinker’s case for optimism; “Enlightenment Now” explains why the doom-mongers are wrong”, The Economist

“Steven Pinker Wants You to Know Humanity Is Doing Fine. Just Don’t Ask About Individual Humans” (Jennifer Szalai, The New York Times)

“a monumental apologia for a currently fashionable version of Enlightenment thinking” ((John Gray, New Statesman)



The history of western history's two powerful metaphors: “man as master and possessor of nature” and “nature as a machine”

From the dualism of Greek and Christian philosophies to our days

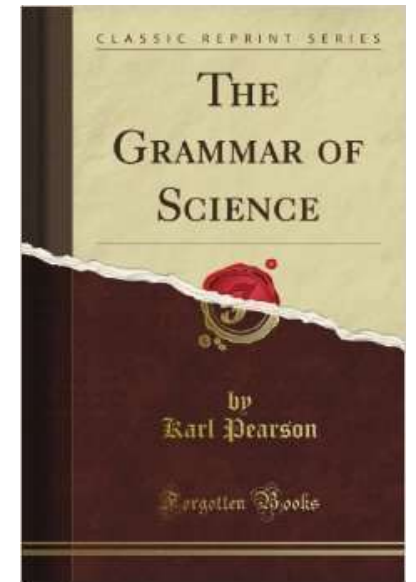
Contrasted with alternative metaphors, such as nature as a system of systems

How are we taught
our science?

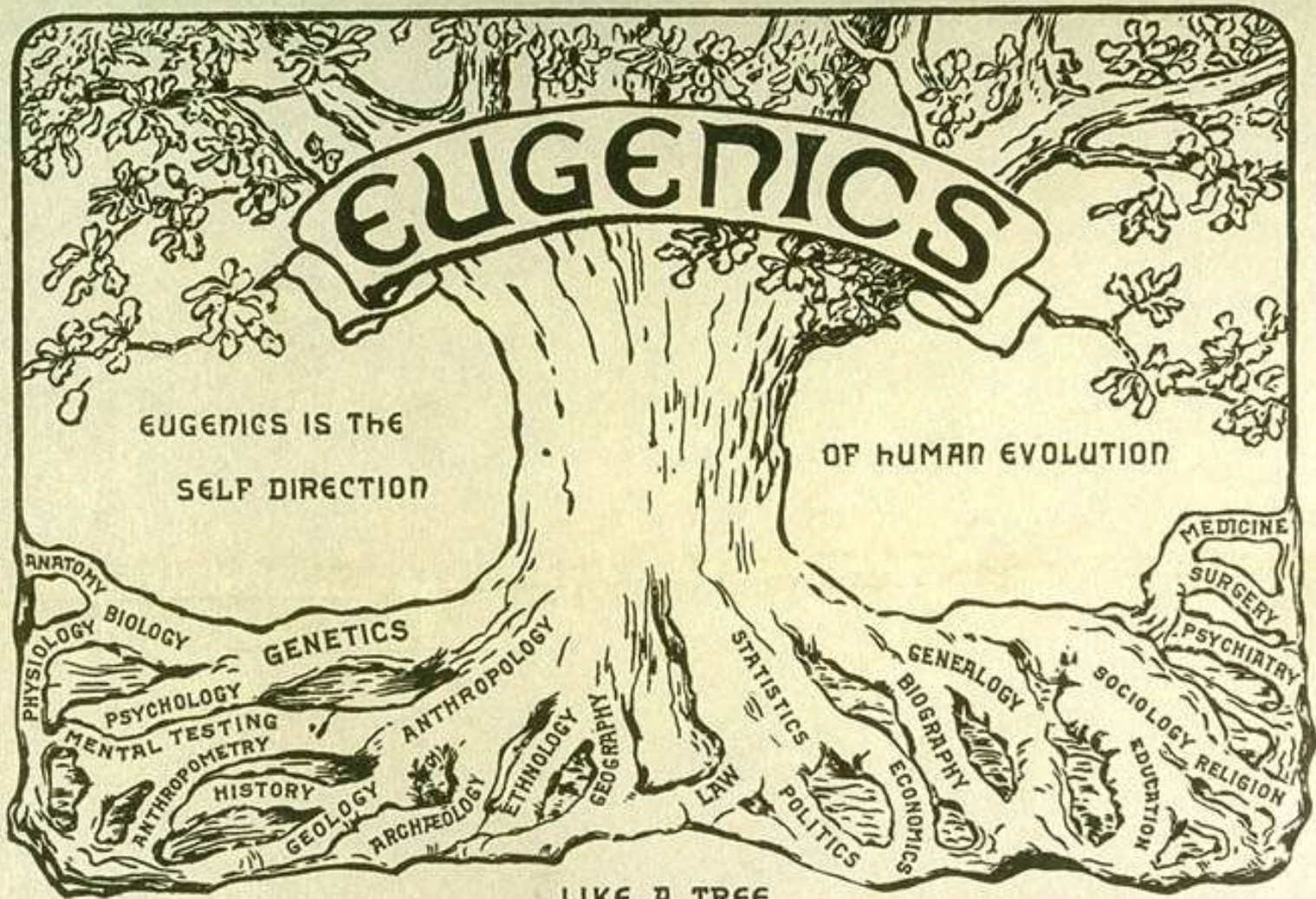
Karl Pearson (a social Darwinist) suggests not wasting resources on social programs as:

“No degenerate and feeble stock will ever be converted into healthy and sound stock by the accumulated effects of education, good laws, and sanitary surroundings”

Karl Pearson



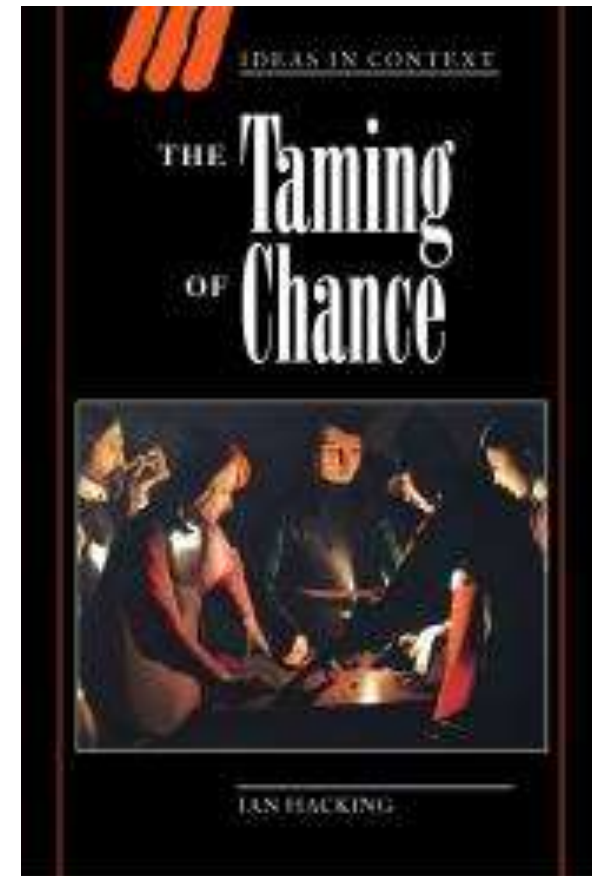
Pearson, K., 1892, *The Grammar of Science*, Walter Scott Publisher, London, p.32.



LIKE A TREE
EUGENICS DRAWS ITS MATERIALS FROM MANY SOURCES AND ORGANIZES
THEM INTO AN HARMONIOUS ENTITY.

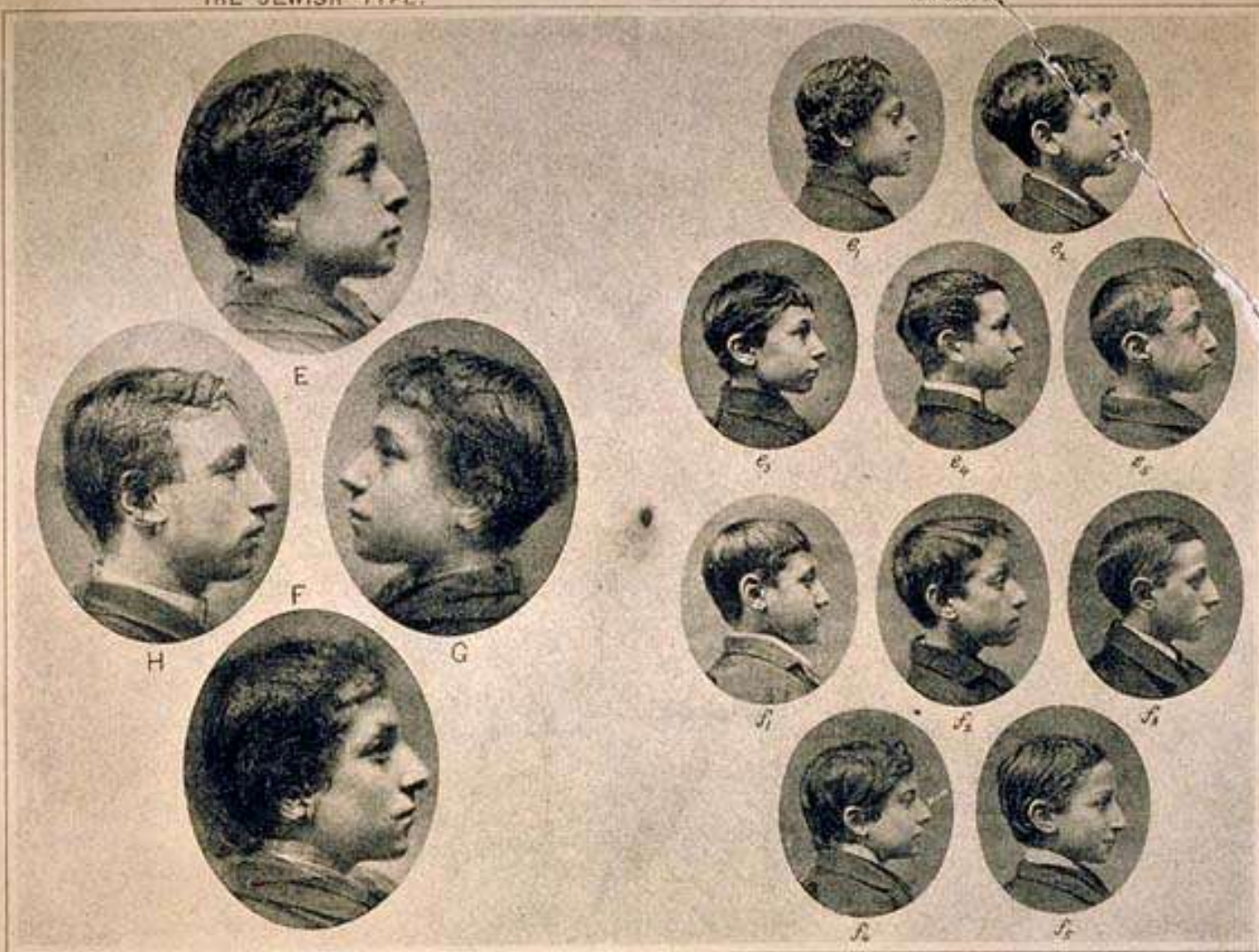
Francis Galton and Karl Pearson (the one of chi-squared); laboratory of biometrics; distinguishing army officers from private soldiers from criminals convicted of murder from non-violent felons from Jews ...

EUGENICS
"IS THE STUDY OF THE AGENCIES UNDER SOCIAL CONTROL, THAT IMPROVE OR IMPAIR THE RACIAL QUALITIES OF FUTURE GENERATIONS EITHER PHYSICALLY OR MENTALLY."
SIR FRANCIS GALTON.



THE JEWISH TYPE.

Profile.



COMPOSITES.

Components.

FRANCIS GALTON, F.R.S. PHOTO.

ILLUSTRATIONS OF COMPOSITE PORTRAITURE.



The Jewish type ...

EUGENICS

G. F. IVES, 16, Haringtz, Editor

CHARLES McALPIN PYLE, Business Manager



EDITORIAL BOARD

SAMUEL J. HUNTER
ROSWELL H. JOHNSON
HARRY H. LAUDLIN
LEON F. WHITNEY
A. B. WIGGAM

"Eugenics is the study of all of the agencies under social control which may improve or remedy the inherent qualities of future generations of man, either physically or mentally."

—Francis Galton



Volume II

AUGUST 1929

Number 3

PRINTED AND PUBLISHED BY THE
Cold Spring Harbor Laboratory, Cold Spring Harbor, New York

The first R&D Statistics ever, by Francis Galton
(1822–1911)

Measuring the numbers of sons and daughters of
'great men of science' will tell us whether a
society degenerates toward stupidity (Benoît
Godin, 2010)

Godin, B., From Science to Innovation, INRS, Montreal, Canada,
Communication presented to the Government–University–Industry Research
Roundtable (GUIRR) US National Academy of Sciences, Washington, May 21,
2010.

Young statistician,
you shall live in
adventurous times



The so-called "crisis in science" presents challenges for statisticians starting out in their career. But there are strategies for survival, says **Andrea Saltelli**

A discussion of the challenges facing young statisticians

<https://rss.onlinelibrary.wiley.com/doi/10.1111/j.1740-9713.2016.00983.x>

Kuhn said that the “educational initiation that prepares and licenses the student for professional practice... is both rigorous and rigid”

and “It is a narrow and rigid education [in physics/science], probably more so than any other except perhaps in orthodox theology”



Thomas Kuhn, *The structure of scientific revolution*, 192, Chapters I and XIII

and “the member of a mature scientific community is, like the typical character of Orwell’s 1984, the victim of a history rewritten by the powers that be.”



Thomas Kuhn, *The structure of scientific revolution*, 192, Chapter XIII

Thus disciplinary advancements are presented in textbooks as the “perception of the obvious” made by one-eyed men in the kingdom of the blinds (Ravetz, 1971).

Can statisticians ignore their role in Eugenics, can chemists ignore what is phlogiston, or geologists how Alfred Lothar Wegener 1915 theory of Continental Drift was met with skepticism ...

Evidence based policy

PETRUCHIO: I say it is the moon.

KATHERINE: I know it is the moon.

PETRUCHIO: Nay, then you lie. It is
the blessèd sun.

KATHERINE: Then God be blessed, it is the
blessèd sun.

But sun it is not, when you say it is not,
And the moon changes even as your mind.

...



W. Shakespeare,
the Taming of the
Shrew, Act IV.

‘Policy based evidence’ has entered the public discourse

Warring parties accuse one another of the sin

“Greenpeace [...] wants is policy based evidence making not evidence based policy making”
(Sanderson, 2015) ...

Wilkes, G., 2015, Free Lunch: Policy-based evidence-making, Financial Times, July 3.

Sanderson, A.B., 3 Feb 2015, Breitbart, see

<http://www.breitbart.com/london/2015/02/03/academic-attacks-greenpeace-for-ignoring-the-evidence-on-gm-crops/>; the politician is UKIP Energy Spokesman Roger Helmer MEP.

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

The pretended distinction between facts and value is used instrumentally

In the policy process fact and values cannot be separated in the making of an argument

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

“When science, technology, and public policy intersect, different attitudes, perspectives, and rules of argument come into sharp conflict. Scientific criteria of truth clash with legal standards of evidence and with political notions of what constitutes sufficient ground for action”

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

“Factual conclusions are not easily separable from considerations having to do with the plausibility of the opponent's assumptions and his selection of the evidence or choice of the methodology”

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

My aphorism: “the technique is never neutral”

<https://arxiv.org/ftp/arxiv/papers/1712/1712.06457.pdf>

Majone: “In any area of public policy the choice of instruments, far from being a technical exercise that can be safely delegated to the experts, reflects as in a microcosm all the political, moral, and cultural dimensions of policy-making”

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

"Dialectical confrontation between generalists and experts often succeeds in bringing out unstated assumptions, conflicting interpretations of the facts, and the risks posed by the projects"

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

“ [my suggestion is to view a] policy analyst as a producer of arguments, capable of distinguishing between good and bad rhetoric, rather than as a “number cruncher” ...

Evidence based medicine hijacked to serve corporate agendas. “Under market pressure, clinical medicine has been transformed to finance-based medicine”
(David Sackett interviewed by J.P.A. Ioannidis)

J. P. A. Ioannidis, “Evidence-based medicine has been hijacked: a report to David Sackett,”
J. Clin. Epidemiol., vol. 73, pp. 82–86, May 2016.

Power asymmetries in the framing of issues:
those who have the deepest pockets marshal
the best evidence → Instrumental use of
quantification to obfuscate

A. Saltelli and M. Giampietro, “What is wrong with evidence based policy, and how can it be improved?,” *Futures*, vol. 91, pp. 62–71, Feb. 2017.

A. Saltelli and S. Funtowicz, “What is science’s crisis really about?,” *Futures*, vol. 91, pp. 5–11, 2017.

JAMA Internal Medicine

Home Current Issue All Issues Online First Collections CME Multimedia

September 12, 2016



Online First >



Special Communication | September 12, 2016



Sugar Industry and Coronary Heart Disease Research



A Historical Analysis of Internal Industry Documents **FREE**



ONLINE FIRST

Cristin E. Kearns, DDS, MBA^{1,2}; Laura A. Schmidt, PhD, MSW, MPH^{1,3,4}; Stanton A. Glantz, PhD^{1,5,6,7,8}

[+] Author Affiliations


JAMA Intern Med. Published online September 12, 2016. doi:10.1001/jamainternmed.2016.5394

Text Size: A A A

See also <https://www.theguardian.com/society/2016/apr/07/the-sugar-conspiracy-robert-lustig-john-yudkin>, and the story of US President Dwight Eisenhower heart attack,...

“our findings suggest the industry sponsored a research program in the 1960s and 1970s that successfully cast doubt about the hazards of sucrose while promoting fat as the dietary culprit in CHD [coronary hearth disease]”

<http://archinte.jamanetwork.com/article.aspx?articleid=2548255>



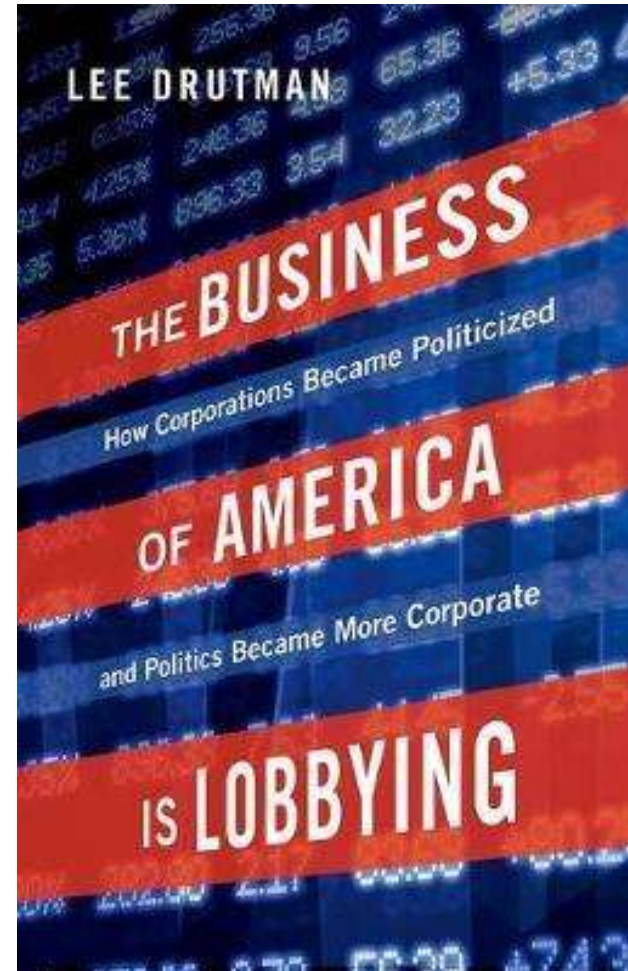
The screenshot shows the top portion of a JAMA Internal Medicine article page. At the top is a dark navigation bar with the text "The JAMA Network" and links for "Journals >", "Collections", "Store", "Physician Jobs", and "About Mobile". Below this is the "JAMA Internal Medicine" logo. A secondary navigation bar contains links for "Home", "Current Issue", "All Issues", "Online First", "Collections", "CME", and "Multimedia". The main content area begins with "Online First >" and "Special Communication | September 12, 2016". The article title is "Sugar Industry and Coronary Heart Disease Research", followed by the subtitle "A Historical Analysis of Internal Industry Documents" with a "FREE" badge. A "ONLINE FIRST" badge is also present. The authors listed are "Cristin E. Kearns, DDS, MBA^{1,2}; Laura A. Schmidt, PhD, MSW, MPH^{1,3,4}; Stanton A. Glantz, PhD^{1,5,6,7,8}". There is a "[+] Author Affiliations" link. At the bottom, the page number "5394" and the publication information "JAMA Intern Med. Published online September 12, 2016. doi:10.1001/jamainternmed.2016.5394" are visible, along with a "Text Size" option.

Science and lobbying

(US) corporate interest can spend on lobbying
\$34 for each dollar spent by diffuse interest
and unions combined



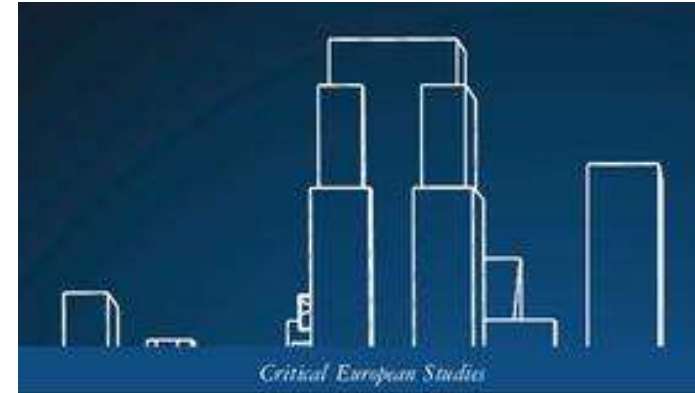
Lee Drutman



(EU) the Brussels concentration effect



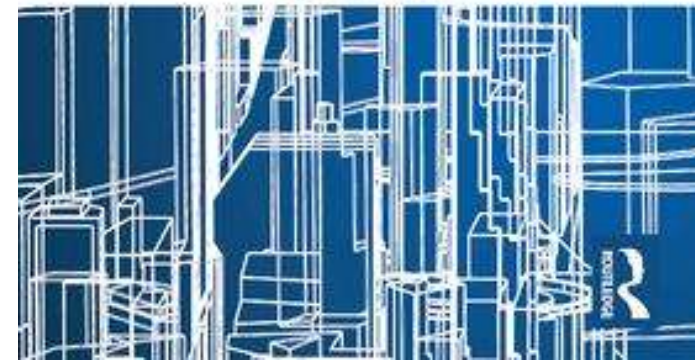
Sylvain Laurens



LOBBYISTS AND BUREAUCRATS IN BRUSSELS

CAPITALISM'S BROKERS

Sylvain Laurens



For both scholars a salient aspect of this power is lobbyists' access to more and better disseminated science

→ Urgent a remedial action to give citizens and political staffers some structured mechanism of access to independent scientific evidence (L. Drutman)

See discussion on OTA in Adam Keiper, 2004, Science and Congress, The New Atlantis, <https://www.thenewatlantis.com/publications/science-and-congress>



“HIS MASTER’S VOICE”

REG. U.S. PAT. OFF.

“Regulatory policy is increasingly made with the participation of experts, especially academics. A regulated firm or industry should be prepared whenever possible to co-opt these experts. This is most effectively done by identifying the leading expert in each relevant field and hiring them as consultants or advisors or giving them research grant or the like”

Owen, B. M., & Braeutigam, R., 1978 *The regulation game, : Strategic Use of the Administrative Process*, Ballinger Press

“This activity requires a modicum of finesse; it must not be too blatant, for the experts themselves must not recognize that they have lost their objectivity and freedom of action”

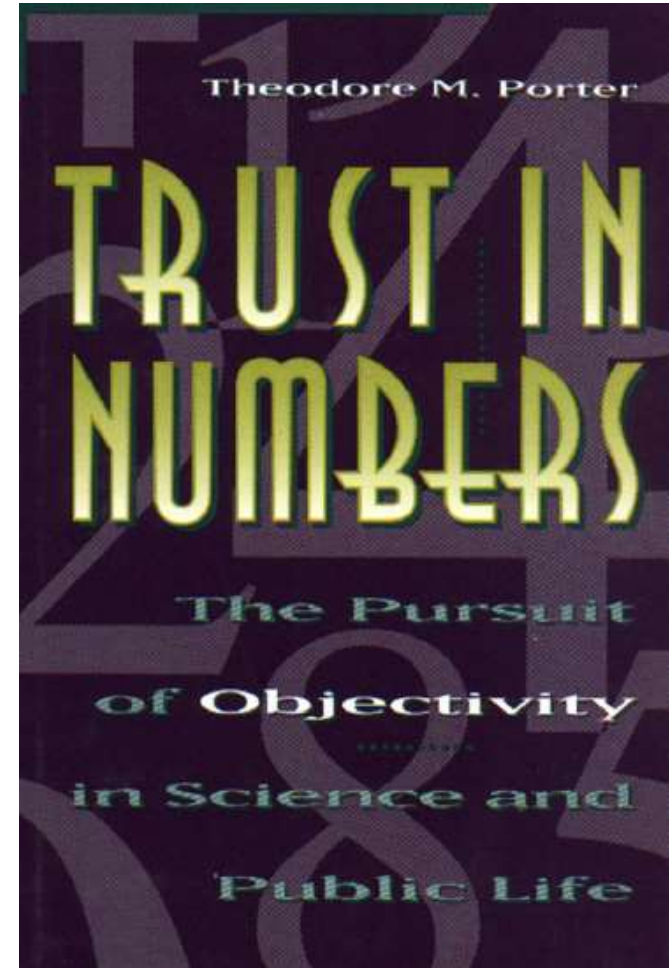
Thanks to Erik Millstone

Owen, B. M., & Braeutigam, R., 1978 The regulation game, : Strategic Use of the Administrative Process, Ballinger Press

Numbers and trust

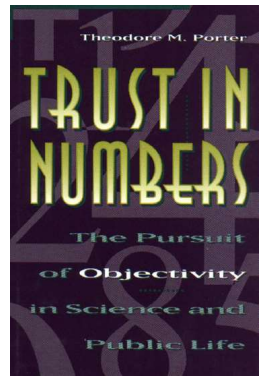


Theodor
M. Porter



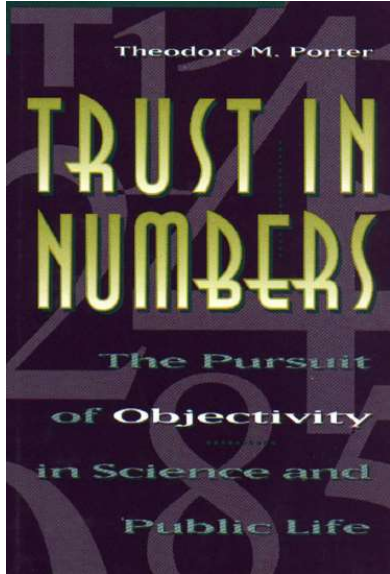
Theodore M. Porter, *Trust in Numbers, The Pursuit of Objectivity in Science and Public Life*, Princeton 1995

p. 8: “The appeal of numbers is especially compelling to bureaucratic officials who lack the mandate of a popular election, or divine right.



Arbitrariness and bias are the most usual grounds upon which such officials are criticized.

A decision made by the numbers (or by explicit rules of some other sort) has at least the appearance of being fair and impersonal.”

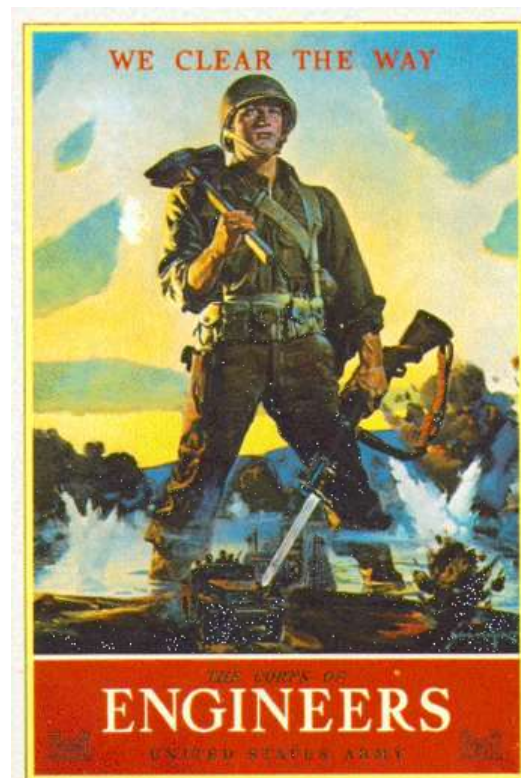
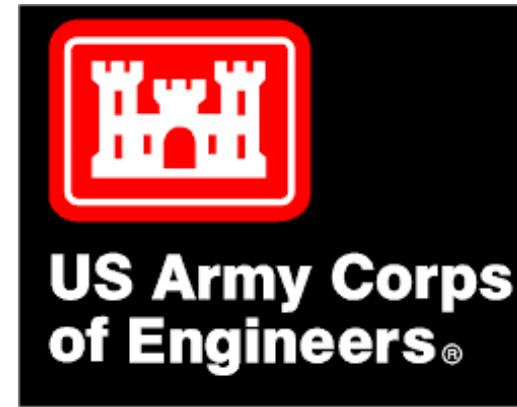


p. 8: “Scientific objectivity thus provides an answer to a moral demand for impartiality and fairness.

Quantification is a way of making decisions without seeming to decide.

Objectivity lends authority to officials who have very little of their own.”

Trust, authority and styles of quantification: two different stories



Porter's story: Quantification needs judgment which in turn needs trust ...without trust quantification becomes mechanical, a system, and 'systems can be played'.





Charles Goodhart

p. 44 “Any … measures necessarily involve a loss of information … [and distorts behavior]” (Porter, 1995)

This is what we normally call Goodhart’s law, from Charles Goodhart. “When a measure becomes a target, it ceases to be a good measure.”

http://cyberlibris.typepad.com/blog/files/Goodharts_Law.pdf

Still there is a
market for 'brave'
quantifications

Nobel and Holberg Prize to advocates/practitioners of cost benefit analyses ...

<https://www.sciencemag.org/news/2018/10/roles-ideas-and-climate-growth-earn-duo-economics-nobel-prize>

<https://www.vox.com/future-perfect/2018/10/22/18001014/cass-sunstein-cost-benefit-analysis-technocracy-liberalism>

William Nordhaus and
Cass Sunstein



Methods for responsible quantification

See slides of a recent course: 'Numbers for Policy'
<http://www.andreasaltelli.eu/presentations/#Course>

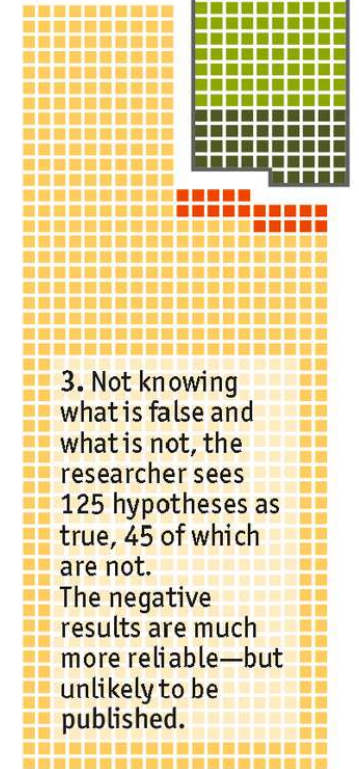
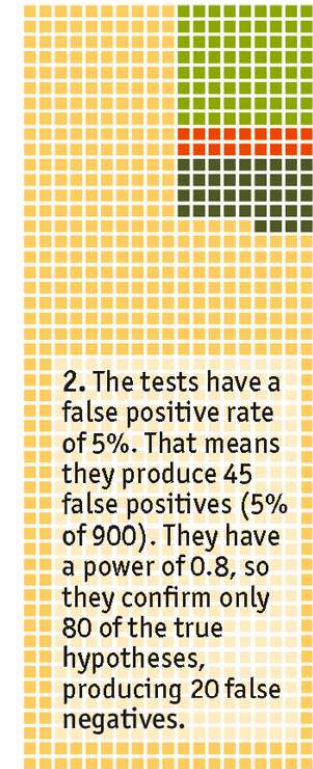
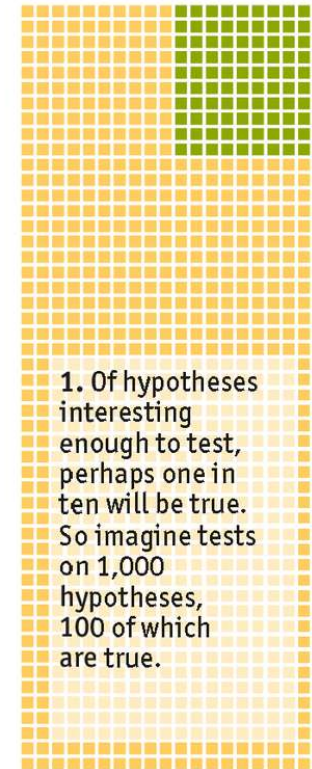
This video gives a crash course in false positive and false negative in 1:35

The Economist

Unlikely results

How a small proportion of false positives can prove very misleading

False True False negatives False positives



Source: *The Economist*

<https://www.economist.com/graphic-detail/2013/10/21/unlikely-results>

Downloaded from <http://rsos.royalsocietypublishing.org/> on January 13, 2017

**ROYAL SOCIETY
OPEN SCIENCE**

rsos.royalsocietypublishing.org

Review



CrossMark
click for updates

Cite this article: Colquhoun D. 2014 An investigation of the false discovery rate and the misinterpretation of p -values. *R. Soc. open sci.* **1**: 140216.

<http://dx.doi.org/10.1098/rsos.140216>

An investigation of the false discovery rate and the misinterpretation of p -values

David Colquhoun

Department of Neuroscience, Physiology and Pharmacology, University College London, Gower Street, London WC1 6BT, UK

P-hacking (fishing for favourable p-values) and
HARKing (formulating the research Hypothesis
After the Results are Known);
Desire to achieve a sought for – or simply
publishable – result leads to fiddling with the data
points, the modelling assumptions, or the research
hypotheses themselves

Leamer, E. E. Tantalus on the Road to Asymptopia. *J. Econ. Perspect.* 24, 31–46 (2010).

Kerr, N. L. HARKing: Hypothesizing After the Results are Known. *Personal. Soc. Psychol. Rev.* 2, 196–217 (1998).

A. Gelman and E. Loken, “The garden of forking paths: Why multiple comparisons can be a problem, even when there is no ‘fishing expedition’ or ‘p-hacking’ and the research hypothesis was posited ahead of time,” 2013.

Has statistics become a
ritual?

Surrogate Science

The Idol of a Universal Method for Scientific Inference

Gerd Gigerenzer, Julian N. Marewski,

First Published September 2, 2014 | Research Article |



<https://doi.org/10.1177/0149206314547522>

Advances in Methods and Practices in Psychological Science **APSP**

Statistical Rituals: The Replication Delusion and How We Got There

Gerd Gigerenzer,

First Published June 14, 2018 | Research Article |



<https://doi.org/10.1177/2515245918771329>

IN PRACTICE

Cargo-cult statistics and scientific crisis

ROYAL
STATISTICAL
SOCIETY
DATA · EVIDENCE · DECISIONS

ASA
AMERICAN STATISTICAL
ASSOCIATION

significance

The mechanical, ritualistic application of statistics is contributing to a crisis in science. Education, software and peer review have encouraged poor practice – and it is time for statisticians to fight back. By **Philip B. Stark** and **Andrea Saltelli**

Is it that statistics is
difficult, like baseball,
or knitting?



“applied statistics is hard. Doing a statistical analysis is like playing basketball, or knitting a sweater. You can get better with practice”



Andrew Gelman

<https://andrewgelman.com/2016/03/11/statistics-is-like-basketball-or-knitting/>

“20% of the faculty teaching statistics in psychology, 39% of the professors and lecturers, and 66% of the students” don’t understand what the P-test is about

Gigerenzer, G., 2018, Statistical Rituals: The Replication Delusion and How We Got There, *Advances in Methods and Practices in Psychological Science*, 1–21

The statistical garden of the forking paths

Jorge Luis Borges

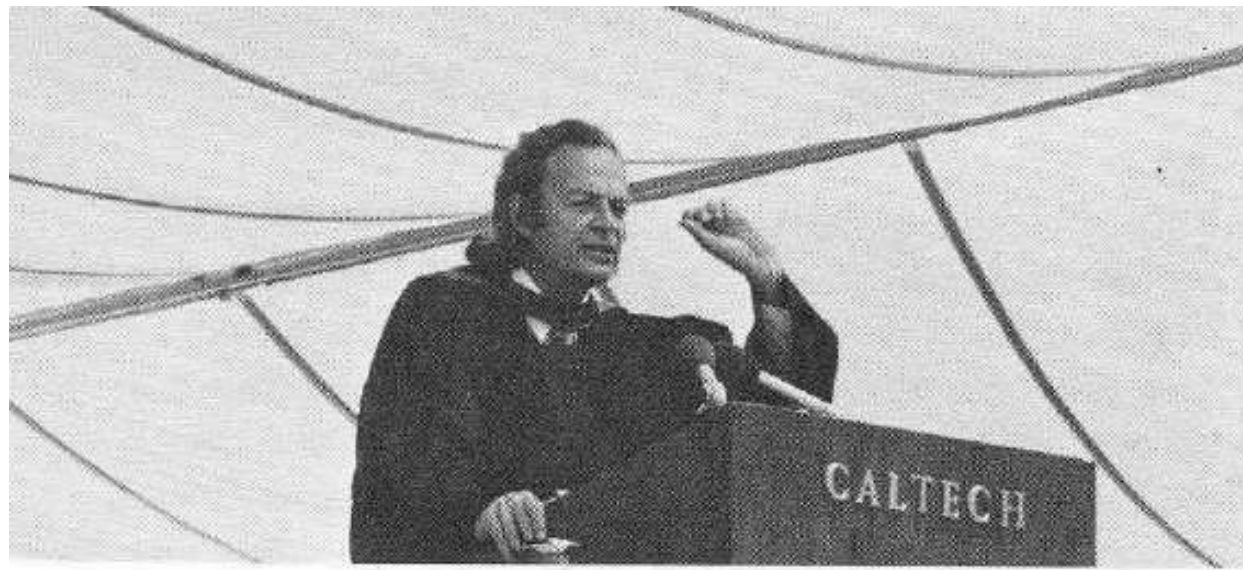


Andrew Gelman



http://www.stat.columbia.edu/~gelman/research/unpublished/p_hacking.pdf

A lesson from a
recent past



Cargo Cult Science

by RICHARD P. FEYNMAN

**Some remarks on science, pseudoscience,
and learning how to not fool yourself.
Caltech's 1974 commencement address.**



“[...] there is one feature I notice that is generally missing in cargo cult science. That is the idea that we all hope you have learned in studying science in school [...] .



It's a kind of scientific integrity, a principle of scientific thought that corresponds to a kind of utter honesty--a kind of leaning over backwards. [...] Details that could throw doubt on your interpretation must be given, if you know them. [...] give all of the information to help others to judge the value of your contribution.”

The End



@andreasaltelli

Practicum

Search on your mobile/laptop CUDOS, select Mertonian norms (e.g. on Wikipedia) and answer the following questions

- 1) What norm has been described by Richard Feynman
- 2) Choose one among the four norms and offer
 - (i) one reason why we should follow it today,
 - (ii) one reason why we should NOT follow it today (two different students in the team to play the pros and cons advocates)

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

“When mathematicians acknowledge that mathematics is not the antithesis of rhetoric and that mathematics may sometimes be rhetorical just as rhetoric may sometimes be mathematical ... it should not be left to policy analysts to fight the last battles of positivism”

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

"Are the results from a particular model more sensitive to changes in the model and the methods used to estimate its parameters, or to changes in the data?"

EVIDENCE,
ARGUMENT, &
PERSUASION IN
THE POLICY
PROCESS
GIANDOMENICO
MAJONE

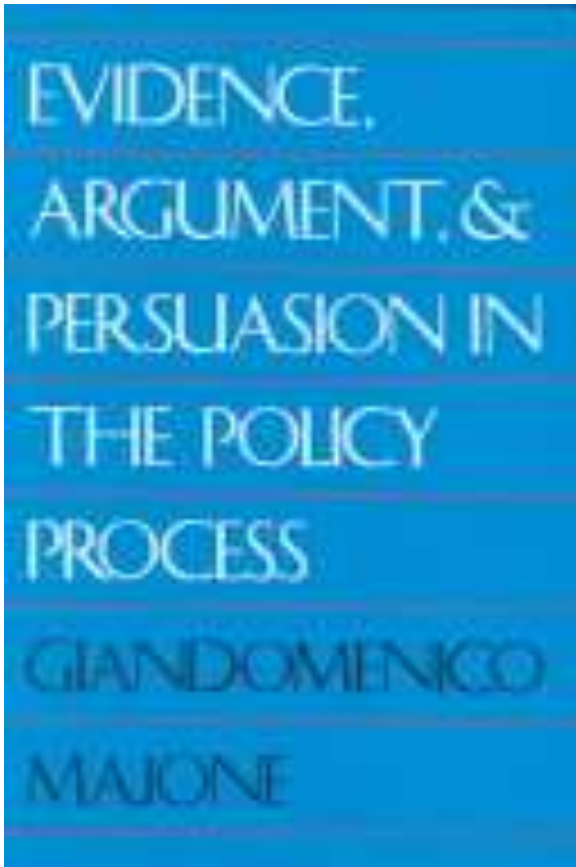
"documentation of models & source data is in an unbelievably primitive state...Poor documentations makes it next to impossible for anyone but the modeler to reproduce modelling results and probe effect of changes to the model" (Greenberger1976 in Majone 1989)

How Majone summarises Alvin Weinberg 'transcience' discussion (1)

“Effects of low level radiation. It has been calculated that in order to determine by direct experimentation, at the 95% confidence level, whether a dosage of X-ray radiation of 150 millirems would increase the spontaneous mutation in mice by $\frac{1}{2}$ percent would require about eight billion mice”

How Majone summarises Alvin Weinberg 'transcience' discussion (2)

“Similarly, the choice of a dose–response function to determine the “virtually safe” dose of a toxic substance must be treated at present as a trans–scientific question”



About multiple policy evaluation

Multiple policy evaluation recognizes the legitimacy of different perspectives; mutual awareness; more than the sum of the perspectives; “The purpose is not to construct a grand model that would combine all the partial perspectives into one general criterion of good policy – a weighted average, as it were, of equity, effectiveness, legality and any other relevant standard – but to contribute to a shared understanding of the multiple perspectives involved”