

Barcelona 22-9-2007

**Challenges in the XXIst  
century: participatory  
media for a community of  
scholars**  
**(History of Science and the Digital  
Revolution)**

*Fabio Bevilacqua, Lidia Falomo*

*Dipartimento di Fisica "A. Volta"*

*Università di Pavia*

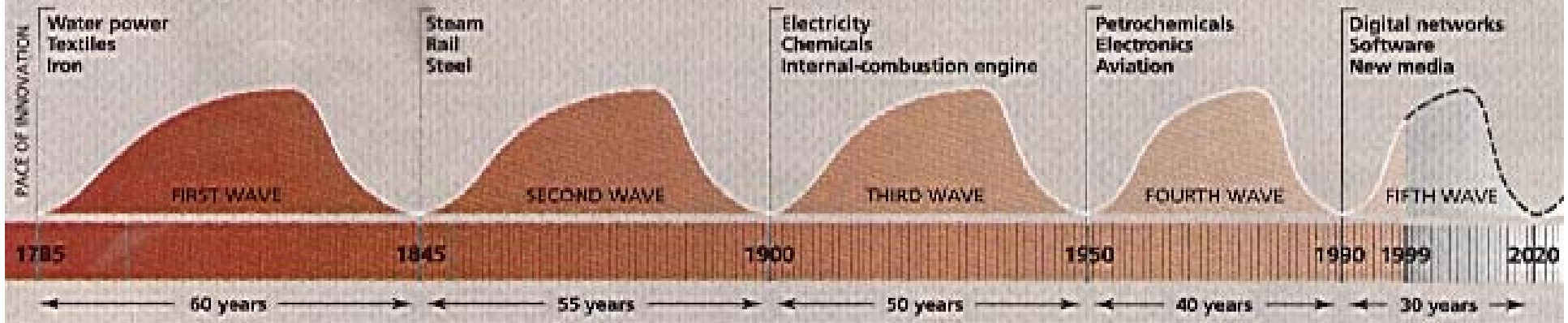


# Waves of innovations

## Surf's up

Schumpeter's waves accelerate

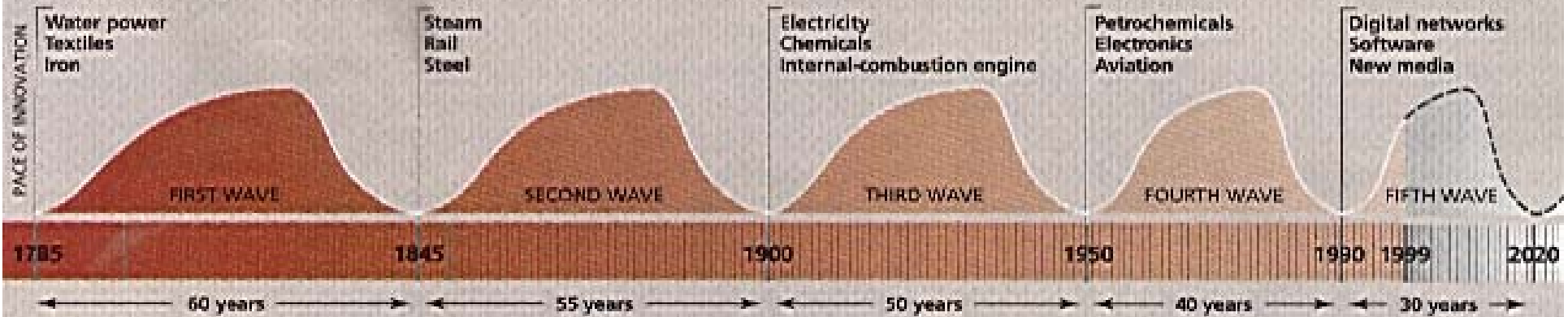
1



# Waves of innovations: the '40s

## Surf's up

Schumpeter's waves accelerate



**1940s**

***Two  
cultures***

***Manhattan  
Project***

***Big  
Science***

***End WW2***

***India***

***China***



# The 40's: From small to big science: the Manhattan project





- **James Conant (1893-1978)**
- **Chemist**
- **Military advisor to F.D.Roosevelt**
- **Head of NDRC Manhattan Project**
- **President of Harvard (1933-53)**
  - SAT
  - Core Curriculum
  - **1945** Two cultures, Big and Small science: Case studies in History of Science (for the Humanities)

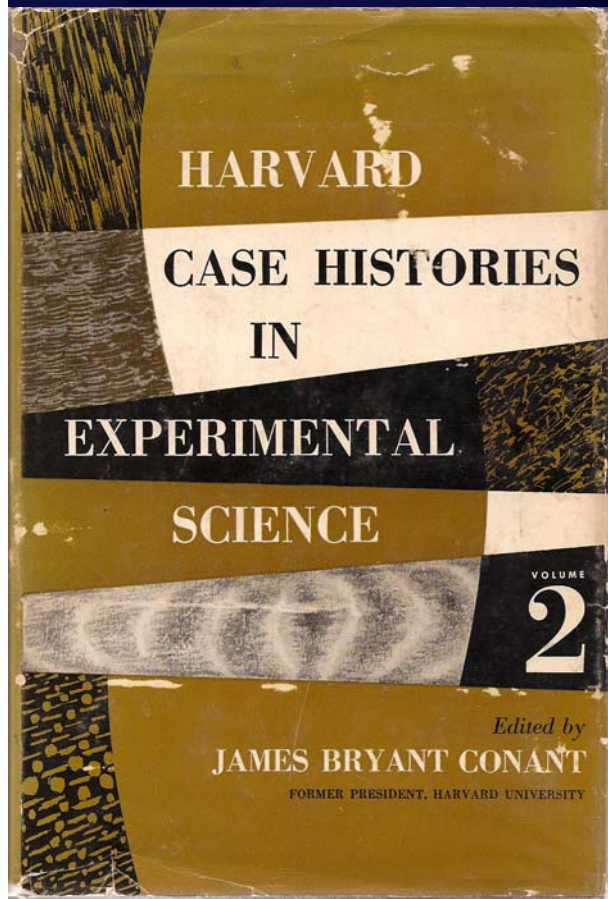


- **Vannevar Bush (1890-1974)**
- **Engineer**
- **Director of the Office of Scientific Research and Development (1940-43)**
- **National Science Foundation (1947)**
- **1945: “As We May Think”: the Memex machine**

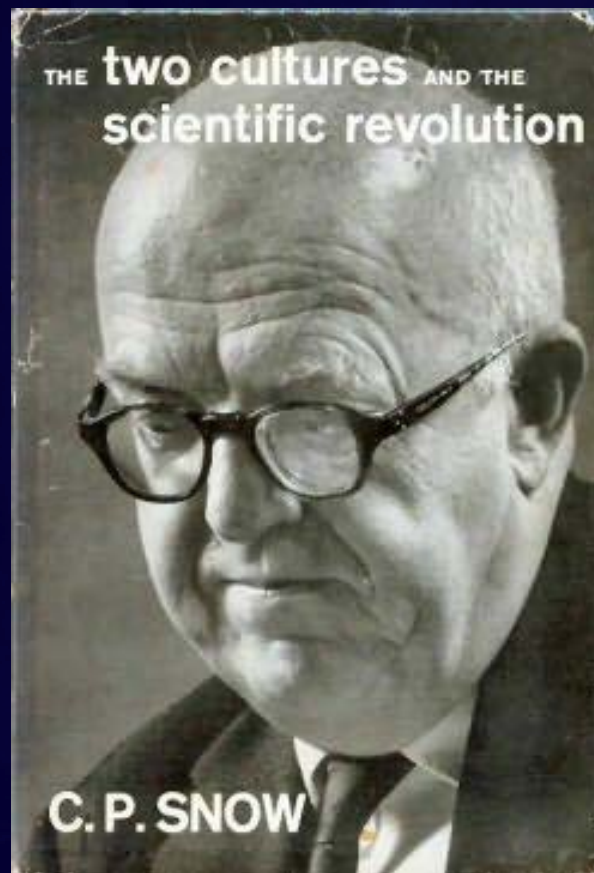


# From the 40's to the 90's: the cold war

1957



Cambridge U. P., 1959.



## *Historiography: paradigms and thematics*

- Kuhn, Archives QM
  - Heilbron, N. Wise, Buchwald
- Holton, Harvard Project (cold war)
  - Brush





# The Structure dedicated to Conant



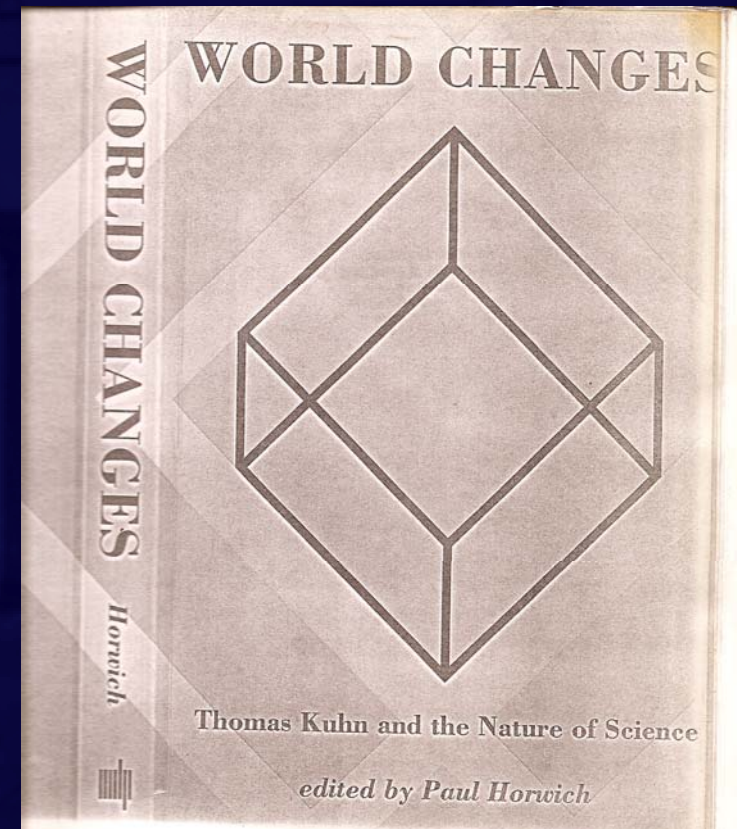
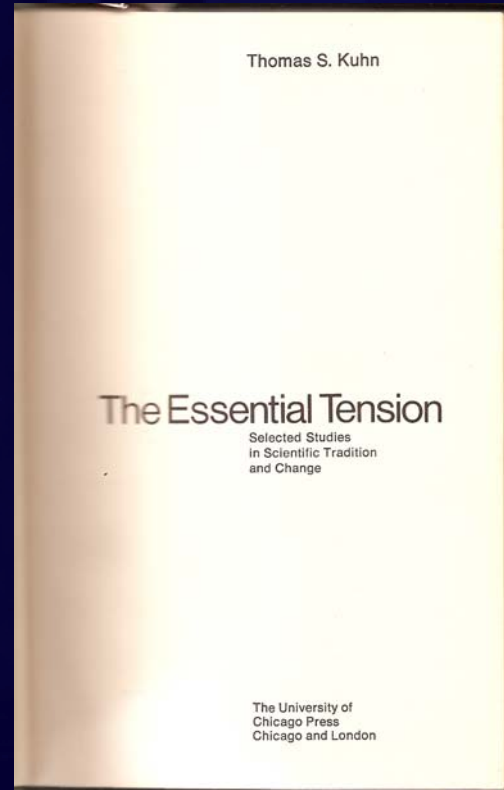
1962

1977

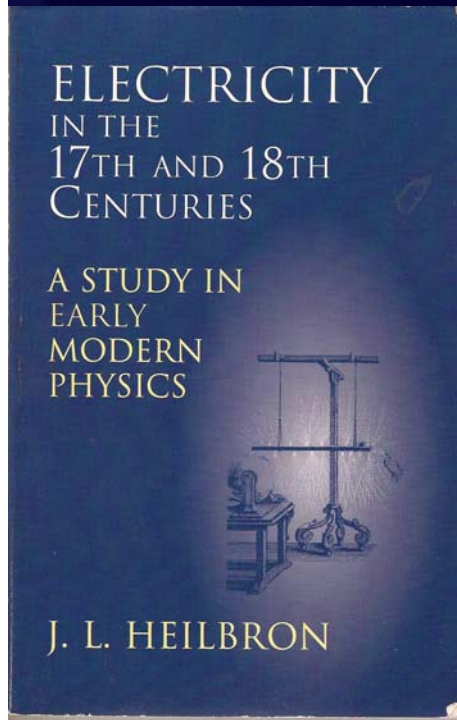


Thomas Kuhn (1922-1996)

1993

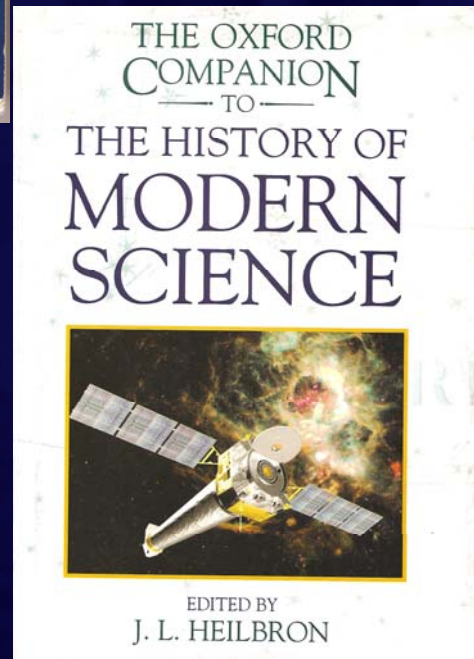


# 3 brands of Kuhnians

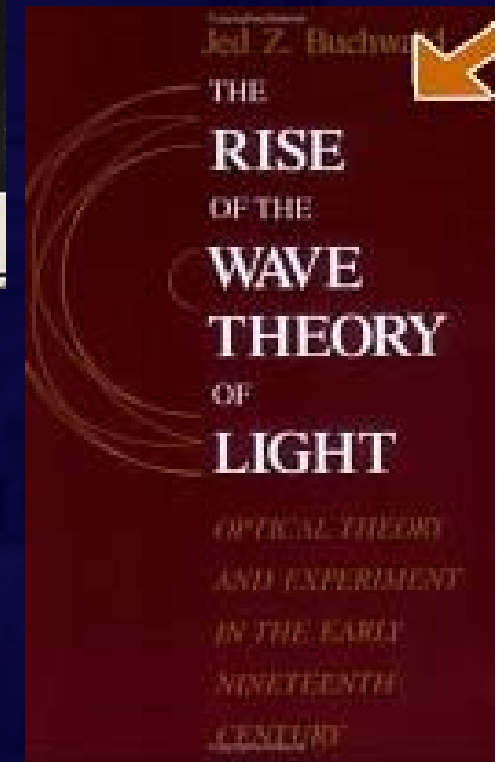


1979

2003



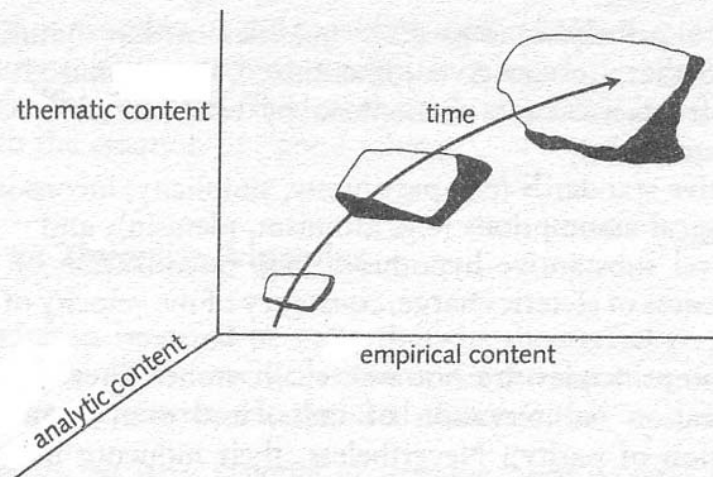
1995



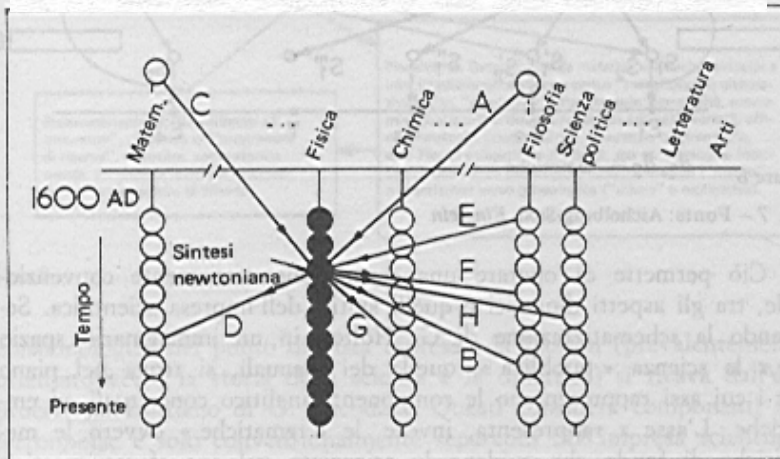


# The Project Physics Course

*Descriptive Philosophies of Science*



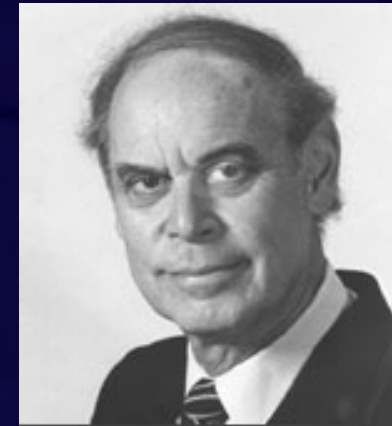
*Holton's Three-Dimensional Grid*



b. Il Project Physics Cause evidenza i legami interdisciplinari: il caso della meccanica newtoniana.

Fig. 5 - Fonte: G. Holton, *The scientific imagination*

Gerald Holton  
Berlin 1922-



What I am recommending, especially in the third type of course, is what I call a **connective approach** to the teaching of science, and indeed of each field, not least as intellectual preparation for the student's later life. For historically, most basic findings developed not linearly, but as part of a constellation of an interdisciplinary network



# From Vannevar Bush: Hypertexts and the web Engelbart, Nelson, Tim Berners Lee and CERN



**Douglas C. Engelbart (1925-)**  
1960': Hypertext; 1969 Arpanet



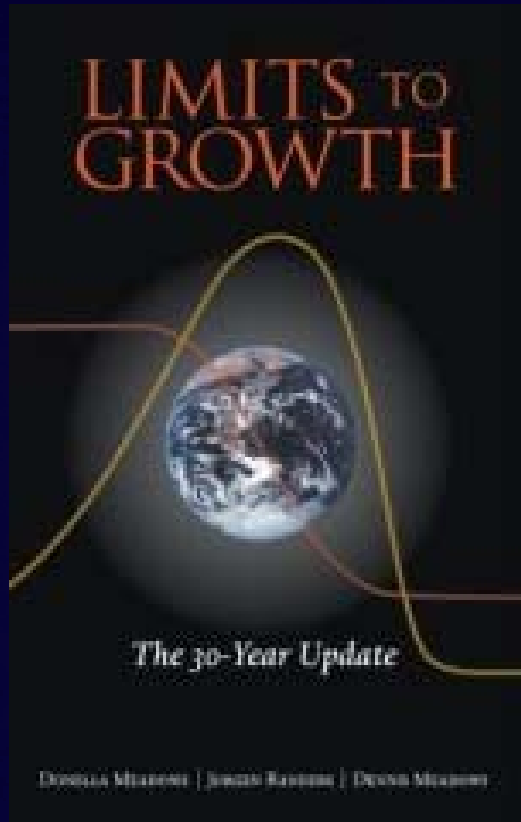
**Theodor H. Nelson (1937-)**  
1960: Xanadu; 1965: Hypertext



**Tim Berners-Lee (1955-)**  
WWW: 1980: Enquire); 1991: First web site at CERN



# Limits to Growth/ No Limits to Learning



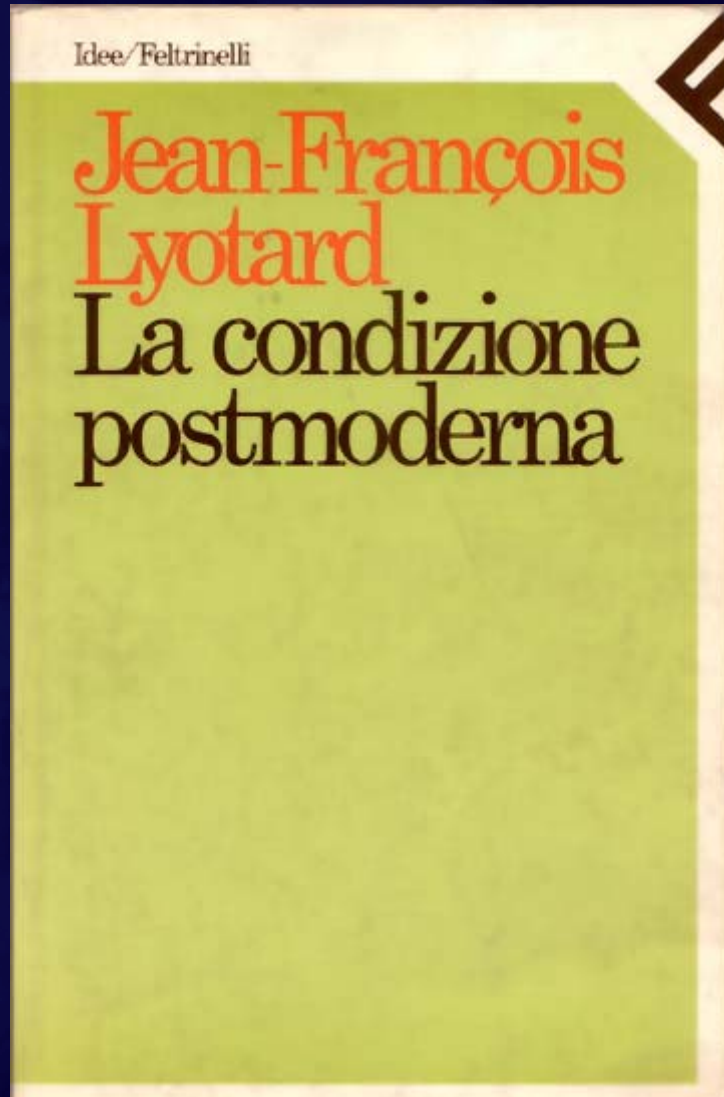
- **1972: (D. H. Meadows, J. Randers, D. L. Meadows)**



- **1979: No limits (J. W. Botkin M. Elmandjra, M. Malitza)**



# 1979 *Lyotard: the postmodern condition*

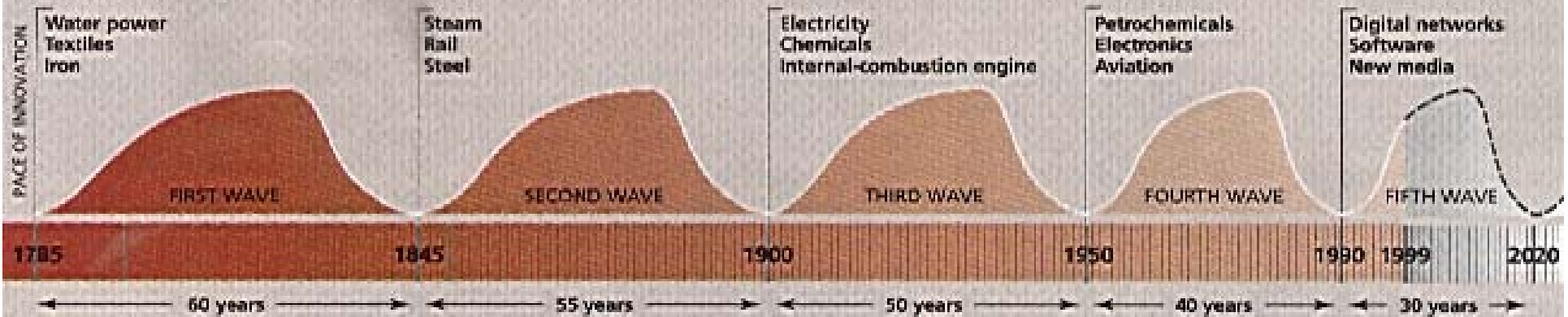




# Waves of innovations: the '90s

## Surf's up

Schumpeter's waves accelerate



**1990s**

**Science wars**

**Network Society**

**Emergence/Reductionism**

**End Cold War**



# April 1996: *Science Wars*, a new version of the “two cultures” debate

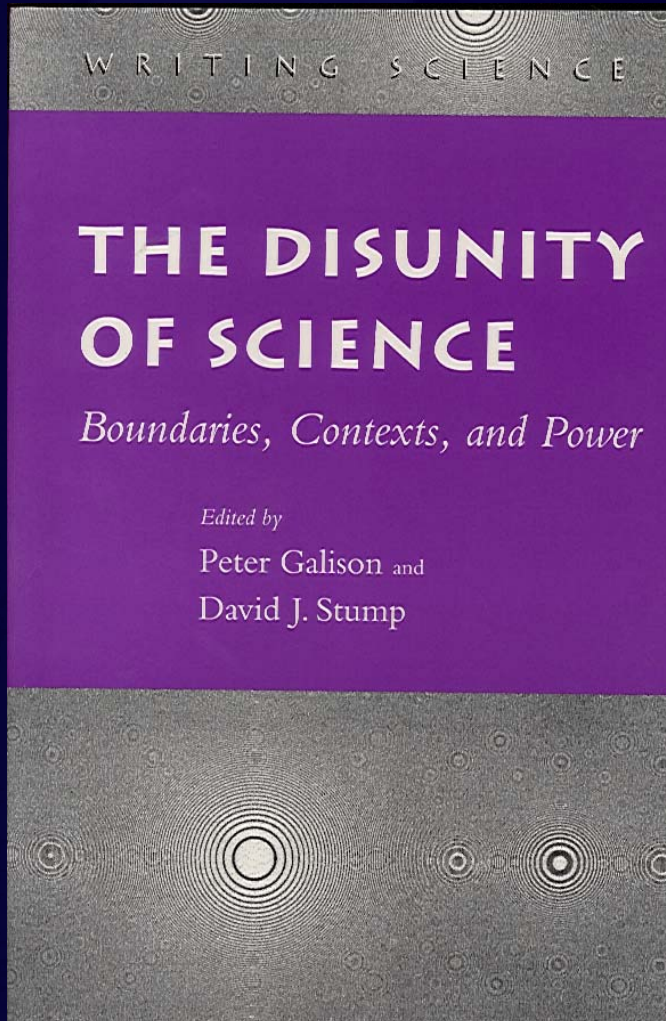
- *A Special Issue of Social Text*

- The eighties saw the advent of the "Culture Wars," led by Alan Bloom, William Bennett, Dinesh D'Souza, and others; now the nineties may bear witness to the "Science Wars," a conflict led by conservatives in science such as Paul Gross and Norman Levitt against so-called science bashers. Science Wars presents research and commentary from scholars in the U.S. and the U.K., including natural scientists, sociologists, anthropologists, historians, and scholars in literary and cultural studies, to discuss the issues raised by the current debate.

- *The Sokal hoax: Toward a Transformative Hermeneutics of Quantum Physics*

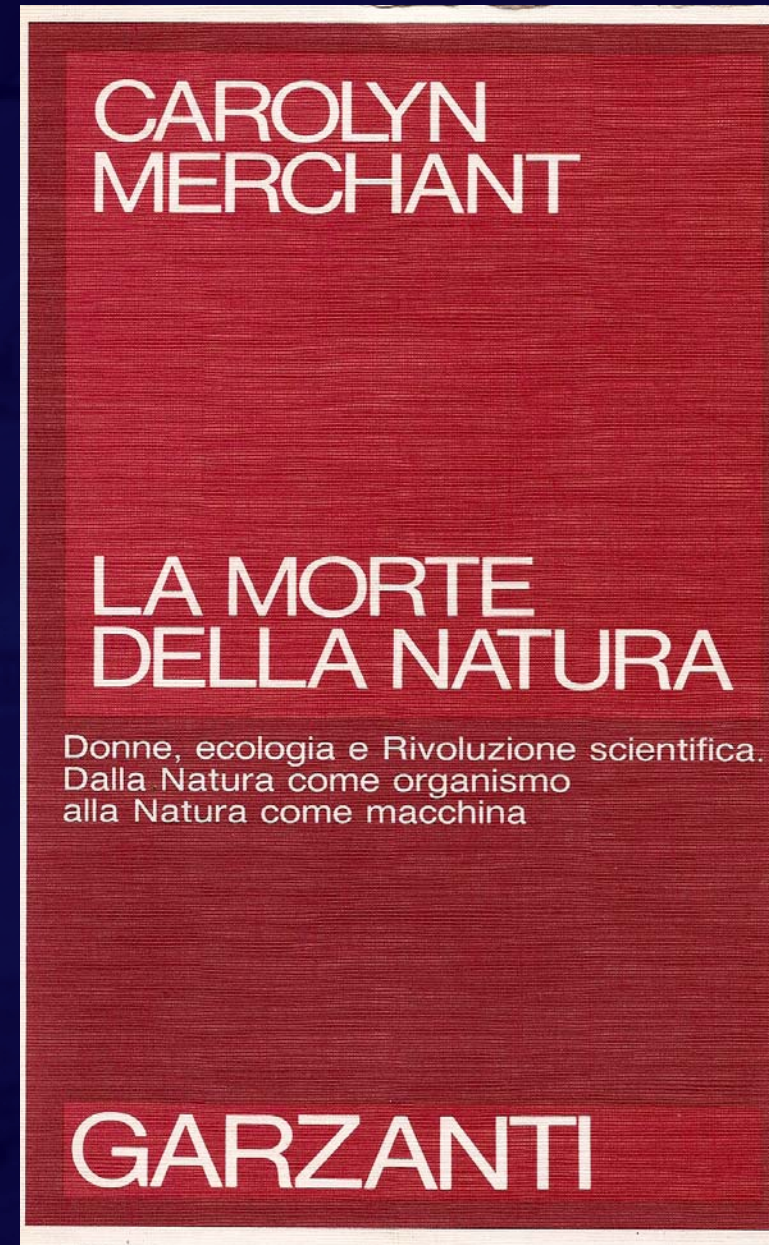
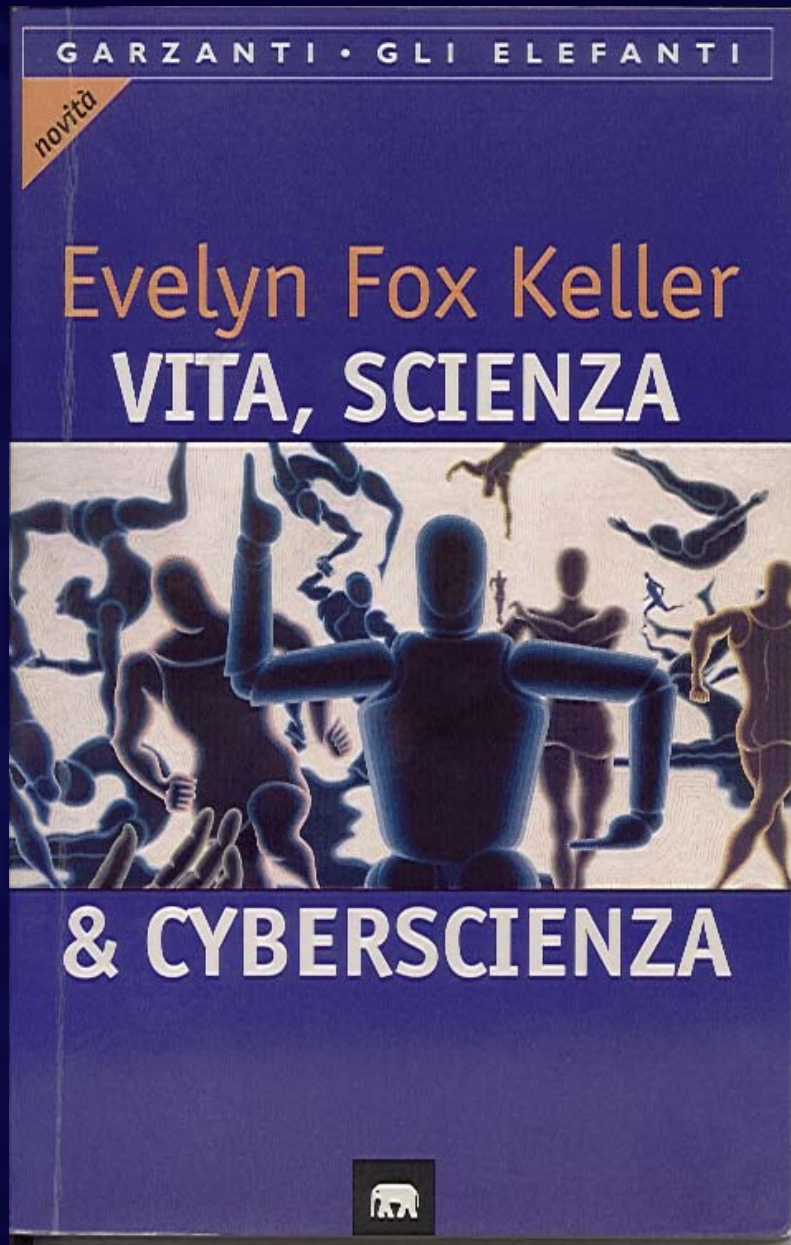


# Unity? Construction?





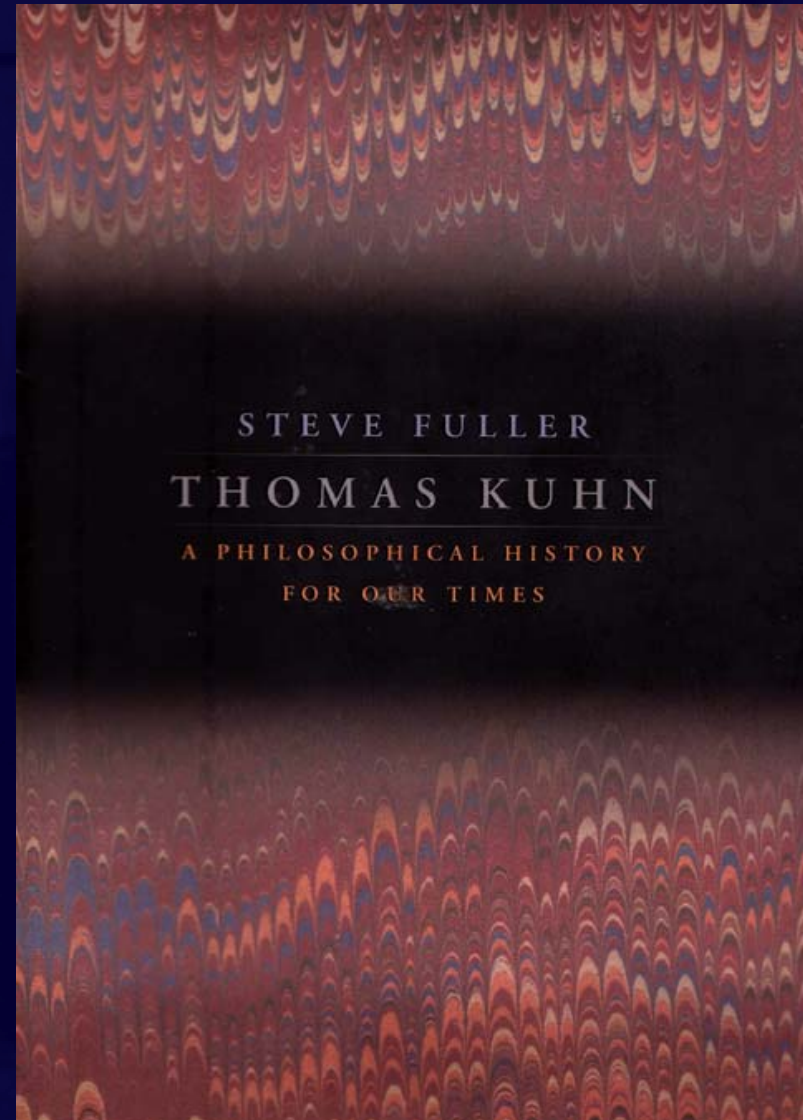
# Gender, Class, Religion, Ethnicity





# 2000: Steve Fuller

- ***“The seminal influence of Kuhn's *The Structure of Scientific Revolutions* on the history, philosophy, and sociology of science illustrates how changes in pedagogical demands can significantly alter patterns of research. Kuhn's book was honed as a teacher in the General Education of Science curriculum designed by Harvard President James Bryant Conant, to whom *Structure* is dedicated. The courses targeted non-scientists who would have to make policy decisions in the dawning 'Atomic Age', where science would play an increasing role, despite the public skepticism generated by the atomic bomb (which Conant administered). Conant wanted these future policymakers to be 'connoisseurs' of science who understood problematic Big Science as continuing the basic mindset of culturally valued Little Science. This partly explains why Kuhn presented science as following the same stages, regardless of the specific science and period under discussion. “ (Science and Education)***



# 1995: Reductionism or emergence?

## Twentieth Century Physics Volume III

Edited by

Laurie M Brown  
Northwestern University

Abraham Pais  
Rockefeller University

and  
Niels Bohr Institute

Sir Brian Pippard  
University of Cambridge

Institute of Physics Publishing  
Bristol and Philadelphia

and

American Institute of Physics Press  
New York

## Chapter 27

### REFLECTIONS ON TWENTIETH CENTURY PHYSICS: THREE ESSAYS

#### Historical overview of the twentieth century in physics

*Philip Anderson*

##### Introduction

To write a philosophical overview of this century of physics is a more than daunting task. It may be that with this century the history of science and technology will be seen to so overshadow and determine the conventional history of the world as to be inextricable from it. The ramifications of physics alone determined the outcome of the century's major war and dominated the politics in the half century since the war, through the physics-based revolution in communications as much as through the revolution in weaponry. With luck the politics of the next century will focus on science-dominated problems: population energy and global ecology. Technologies based on new science—the Green Revolution, the Pill, increasing control of many diseases, the electronics industry, aerospace, and the many uses of the computer—have dominated world economics and sociology (a wonderful reference on this point is Pico Ayer, *Video Time in Kathmandu*). I also sense seeds of a coming revolution in modes of thinking which certain scientific discoveries—fractals, chaos, complex adaptive systems such as neural networks—are preparing for us. Leaving aside this wider context of physics I turn my gaze inwards, to a great extent, to look at how physics grew and changed, seeing how the world context affects physics and physicists but ignoring the very important feedback loop of how we affect the world.

Even so, I am left with a great variety of choices as to how to structure what I have to say, whether to focus on the great theoretical discoveries such as relativity, the structure of the atom and the nucleus, quantum

2017

#### Nature itself

*Steven Weinberg*

The state of science at the end of the twentieth century is very different from its condition at the century's beginning. It is not just that we know more now—we have come in this century to understand the very pattern of scientific knowledge. In 1900 many scientists supposed that physics, chemistry and biology each operated under its own autonomous laws. The empire of science was believed to consist of many separate commonwealths, at peace with each other, but separately ruled. A few scientists held fast to Newton's dream of a grand synthesis of all the sciences, but without any clear idea of the terms on which this synthesis would be reached. Today we know that chemical phenomena are what they are because of the physical properties of electrons, electromagnetism, and a hundred or so types of atomic nuclei. Biology of course involves historical accidents in a way that physics and chemistry do not, but the mechanism of heredity which drives biological evolution is now understood in molecular terms, and vitalism, the belief in autonomous biological laws, is safely dead. This has truly been the century of the triumph of reductionism.

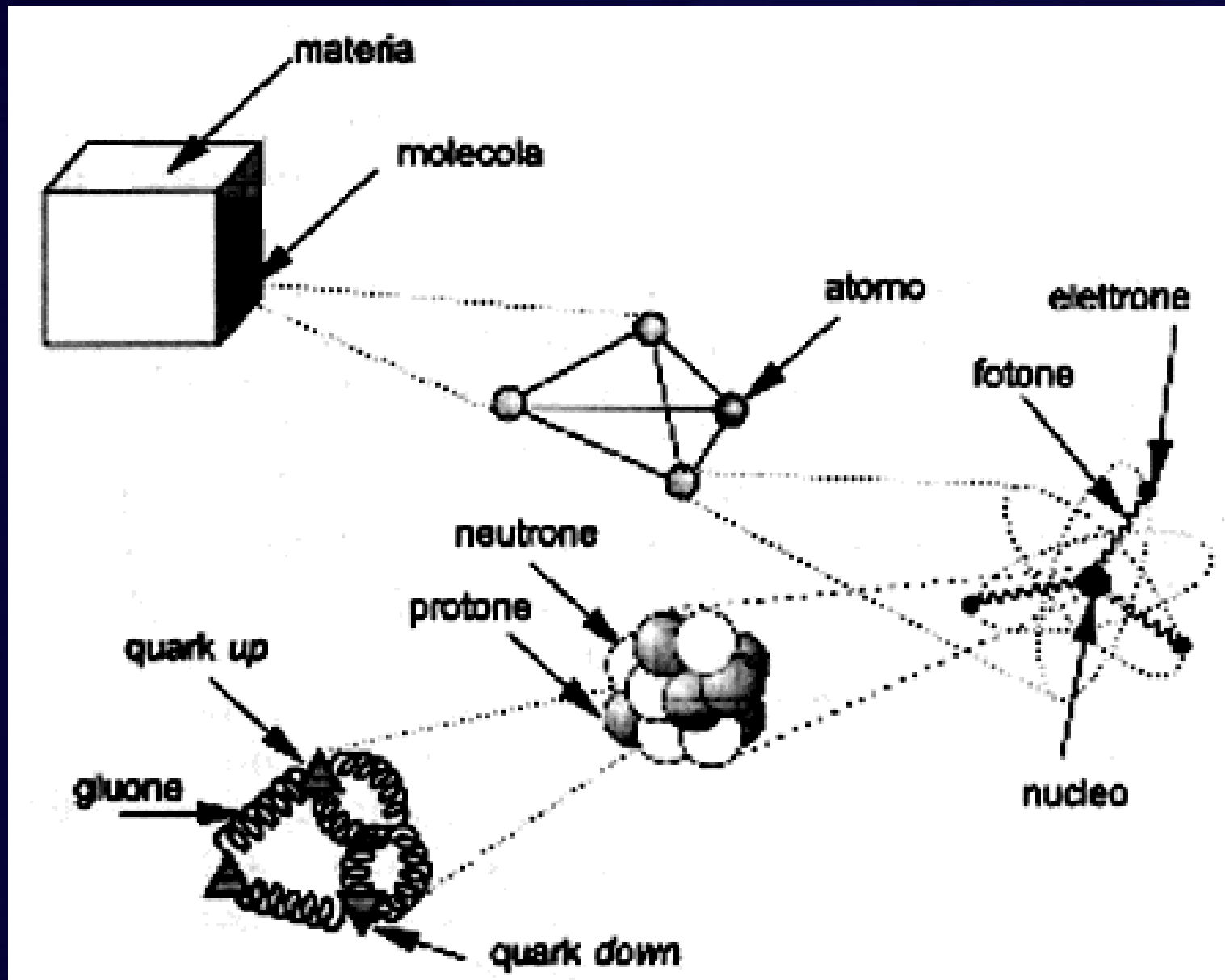
The same reductionist tendency is visible *within* physics. This is not a matter of how we carry on the practice of physics, but how we view nature itself. There are many fascinating problems that await solution, some like turbulence left over from the past, and others recently encountered, like high-temperature superconductivity. These problems have to be addressed in their own terms, not by reduction to elementary particle physics. But when these problems are solved, the solution will take the form of a deduction of the phenomenon from known physical principles, such as the equations of hydrodynamics or of electrodynamics, and when we ask *why* these equations are what they are, we trace the answers through many intermediate steps to the same source: the Standard Model of elementary particles. Along with the theory of gravitation and cosmology, the theory of elementary particles thus now constitutes the whole outer frontier of scientific knowledge.

The Standard Model is a quantum field theory. The fundamental ingredients of nature that appear in the underlying equations are fields: the familiar electromagnetic field, and some twenty or so other fields. The so-called elementary particles, like photons and quarks and electrons, are 'quanta' of the fields—bundles of the fields' energy and momentum. The properties of these fields and their interactions are

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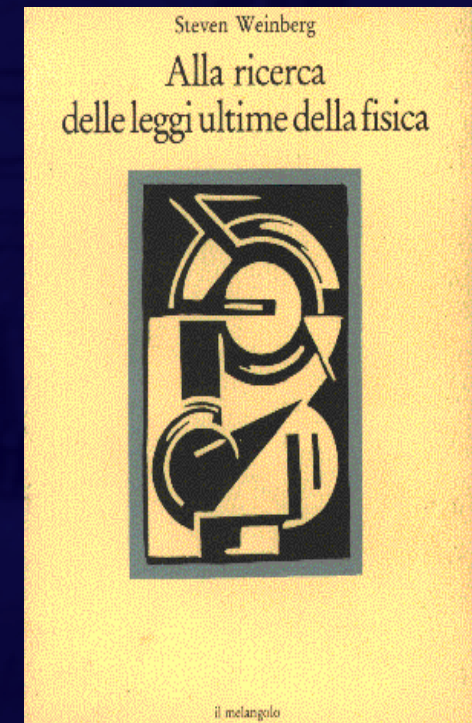
2033

# Reductionism or emergence?





# Big science and reductionism: SSC defeated (1993)



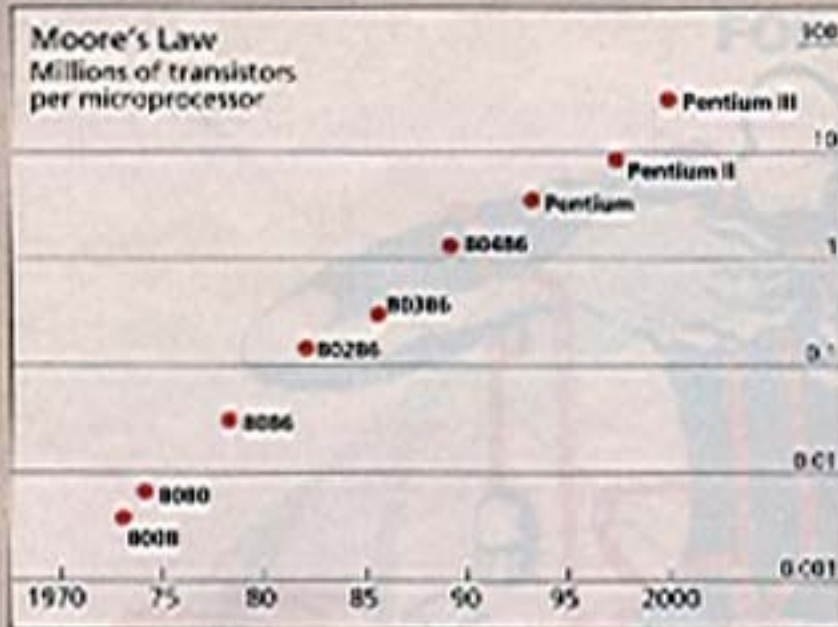


# CERN e Web



# Processing power and information

## Moore power, less cost



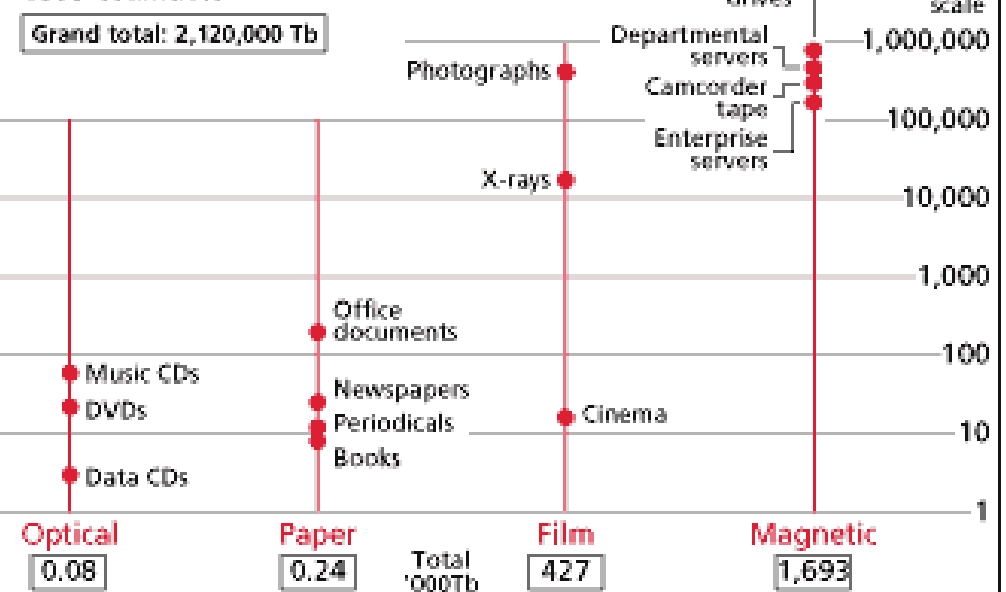
Price of power and speed, \$

	1970	1999
Cost of 1 MHz processing power	7,601	0.17
Cost of 1 megabit storage	5,257	0.17
Cost of sending 1 trillion bits	150,000	0.12

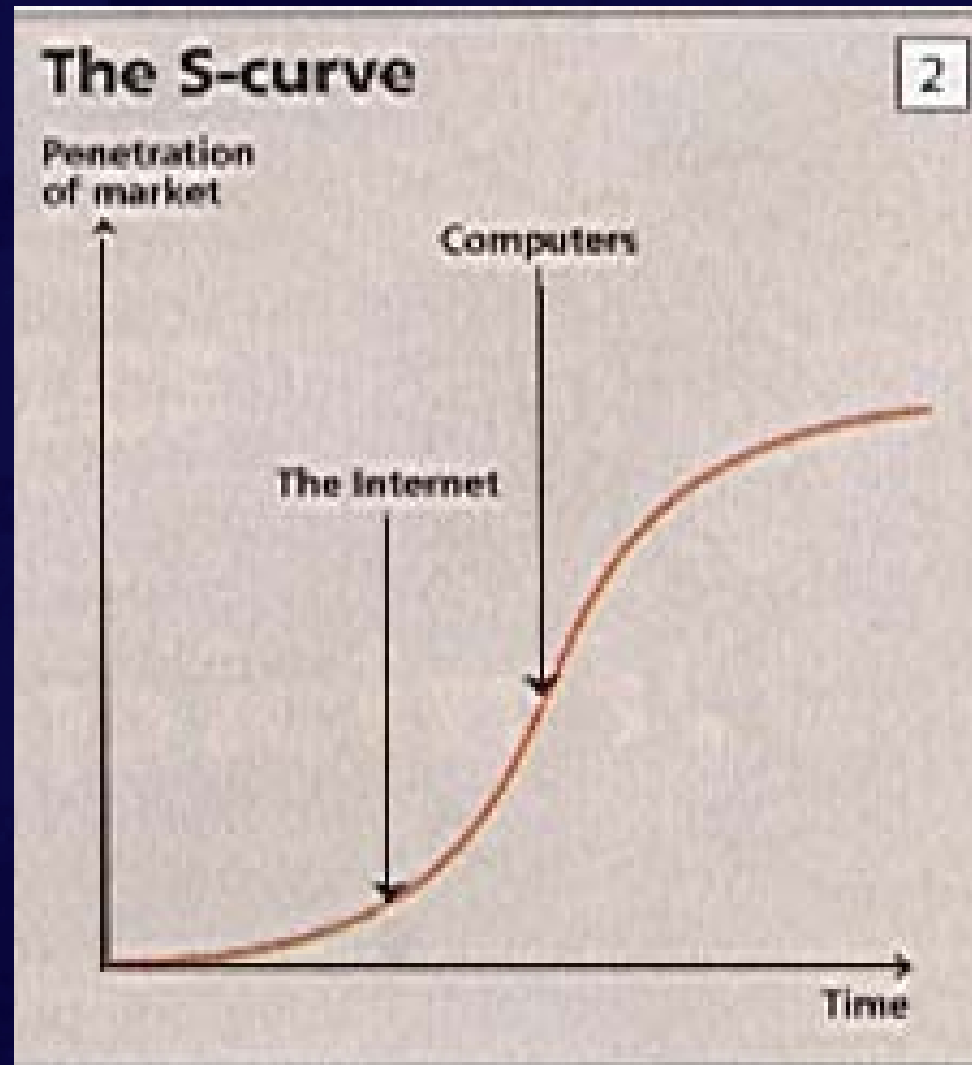
Source: The Bank Credit Analyst; Federal Reserve Bank of Dallas

## Too much information

World production of data, terabytes  
1999 estimates



# Dangers of a new analphabetism



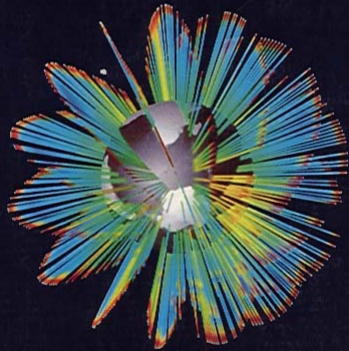


# 1996-2000: The Network Society

THE INFORMATION AGE:  
ECONOMY, SOCIETY AND CULTURE

Volume I

## THE RISE OF THE NETWORK SOCIETY



Manuel Castells



THE INFORMATION AGE:  
ECONOMY, SOCIETY AND CULTURE

Volume II

## THE POWER OF IDENTITY



Manuel Castells



THE INFORMATION AGE:  
ECONOMY, SOCIETY AND CULTURE

Volume III

## END OF MILLENNIUM

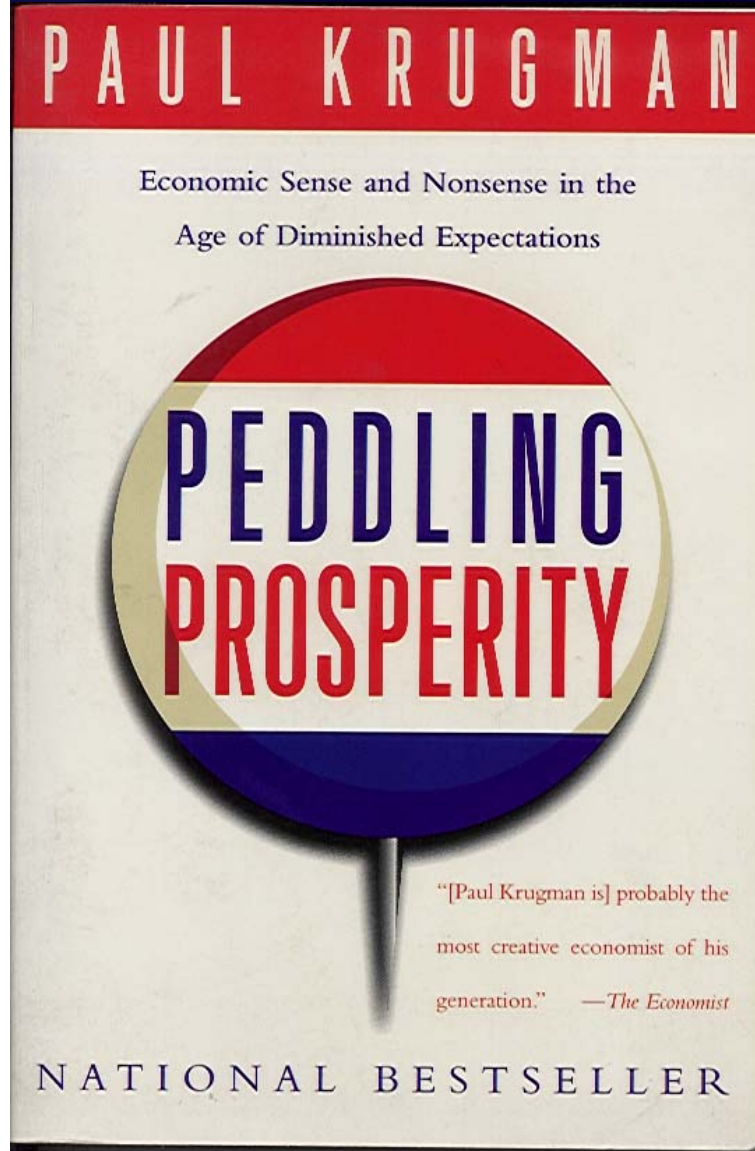


Manuel Castells





# 1994: Globalization



Non è un gioco a somma zero (non c'è un problema di competitività), ma la produttività premia i lavoratori con maggiori capacità tecnologiche



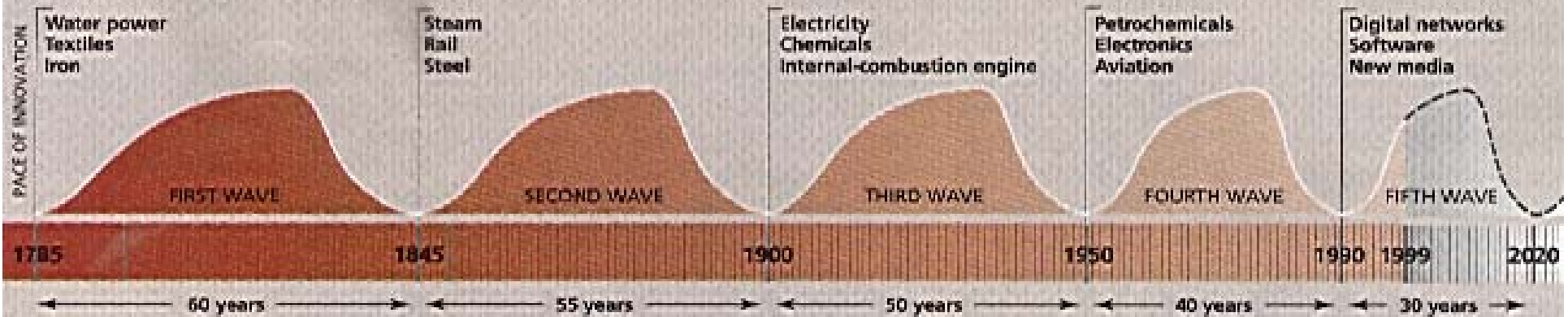
# ***Clash of civilizations (1997 Huntington) or communicative action (Habermas)***



# Waves of innovations: the 2000s

## Surf's up

Schumpeter's waves accelerate



**2000s**

**Cosmopolitanism**

**Web 2.0**

**Digital revolution**

**Globalisation**

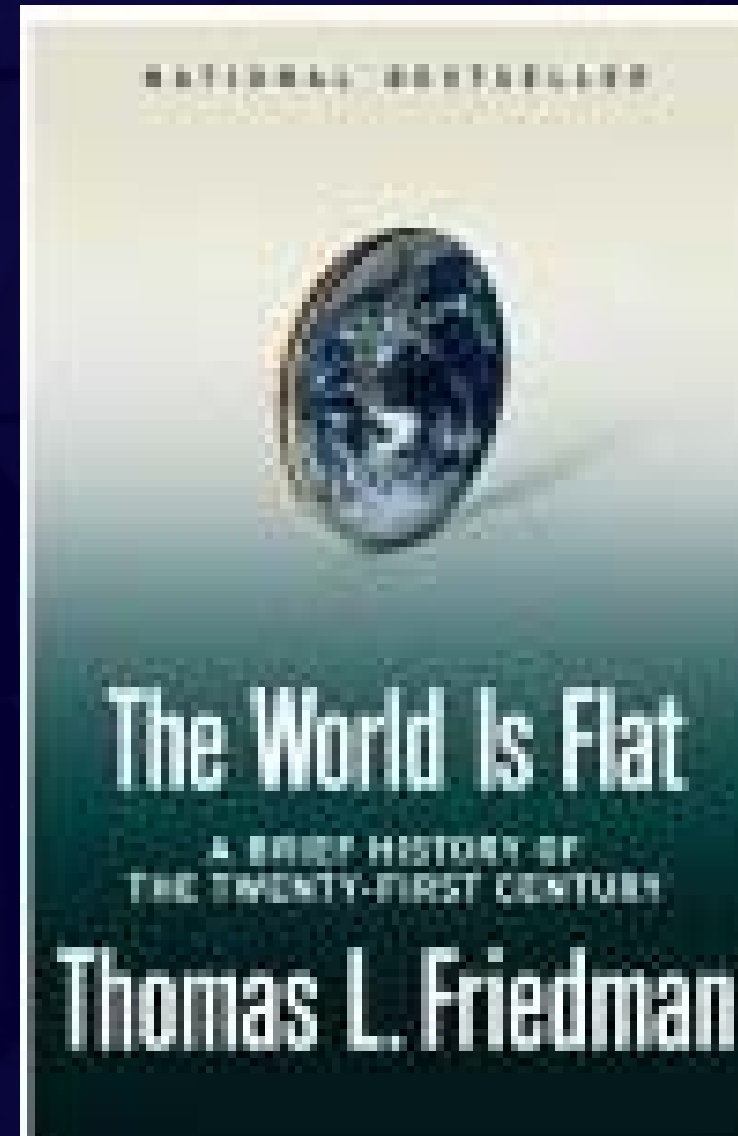




# 2005: Globalization

*“What Friedman means by “flat” is **“connected”**: the lowering of trade and political barriers and the exponential technical advances of the digital revolution that have made it possible to do business, or almost anything else, instantaneously with billions of other people across the planet. –*

***Globalization 3.0**, as he calls it, **is driven** not by major corporations or giant trade organizations like the World Bank, but **by individuals**: desktop freelancers and innovative startups all over the world (but especially in India and China) who can compete--and win--not just for low-wage manufacturing and information labor but, increasingly, for the highest-end research and design work as well. (He doesn't forget the “mutant supply chains” like Al-Qaeda that let the small act big in more destructive ways.) “*



# Dematerialisation

- *Dematerialisation may refer to:*
- *Demat accounts - a type of banking account which dematerialize the paper-based physical shares.*
- *Teleportation - the movement of objects from one place to another without travelling through space.*
- *Dematerialization - the economic concept of reducing the quantity of materials required to serve economic functions (doing more with less)*
- *"the reduction of total material and energy throughput of any product and service, and thus the limitation of its environmental impact. This includes reduction of raw materials at the production stage, of energy and material inputs at the use stage, and of waste at the disposal stage."*



# A new scientific revolution?

- *Quantification of the classical sciences*
- *Quantification of the baconian sciences*
- *Emergence of theoretical physics*
- *Relativity and quantum mechanics*
- *Big science*
- *Digitalization of knowledge*





# Digital Revolution 1

- *Elementary particle physics*
- *Genome projects*
- *Virtual observatory*



# Digital Revolution

- *Towards a Virtual Observatory*
- ***"Virtual Astronomy, Information Technology, and the New Scientific Methodology"***
- ***"Virtual Astronomy, Information Technology, and the New Scientific Methodology"***
- *European Virtual Observatory*
- ***It is now possible to have powerful and expensive new observing facilities at wavelengths from the radio to the X-ray and gamma-ray regions. Together with advanced instrumentation techniques, a vast new array of astronomical data sets will soon be forthcoming at all wavelengths. These very large databases must be archived and made accessible in a systematic and uniform manner to realise the full potential of the new observing facilities***



# Digital Revolution 2: Distributed computing

- *Observational astronomy*
- *Network computing*
- *Climate change*
- *Applied research: innovative*





# Digital Revolution 2

BOINC - Mozilla Firefox  
File Modifica Visualizza Cronologia Segnalibri Strumenti ?  
http://boinc.berkeley.edu/

**BOINC** Berkeley Open Infrastructure for Network Computing

Open-source software for **volunteer computing** and **desktop grid computing**

Download | Running BOINC | Web sites | Add-ons | Survey

-- language --

Search

### Volunteer

Use the idle time on your computer (Windows, Mac, or Linux) to cure diseases, study global warming, discover pulsars, and do many other types of scientific research. It's safe, secure, and easy:

1. **Choose** projects
2. **Download** and run BOINC software
3. **Enter** the project URLs, your email address, and password.

Or, if you run several projects, try an **account manager** such as **GridRepublic** or **BAM!**.

If you have any questions, or need help getting started, you can **talk to a Volunteer Helper**.

**Chris Icide** is contributing 153 billion floating-point operations per second (GFLOPS)

Project	Percentage
Einstein@Home	38.3%
MalariaControl	3.0%
climateprediction.net	1.4%
SIMAP	

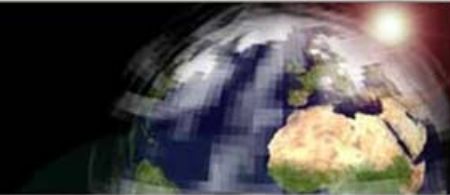
### News

September 7, 2007  
The new BOINC logo is now available in **a variety of formats and resolutions**.

August 17, 2007  
World Community Grid has announced that it is **migrating fully to BOINC**. Welcome to all WCG participants!

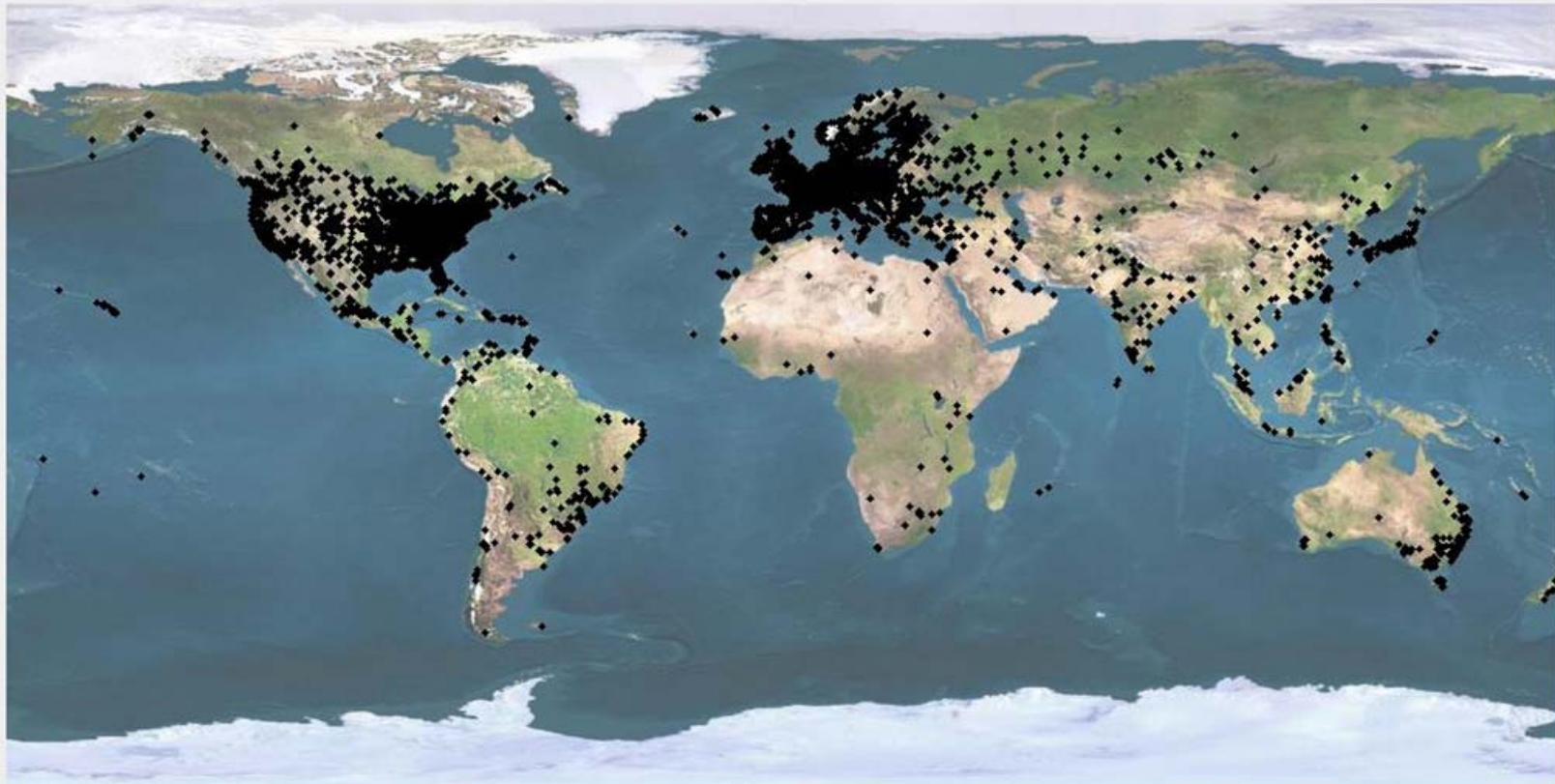
July 25, 2007  
BOINC finally has a new logo! Many thanks Michal Krakowiak, the graphic designer who created it. The logo (and icons based on it) will soon appear on the BOINC client software as well as the web site.

July 23, 2007  
The Africa@home workshop on volunteer computing with BOINC, sponsored by the Geneva International Academic Network (GIAN), was held



## Map of All Participants

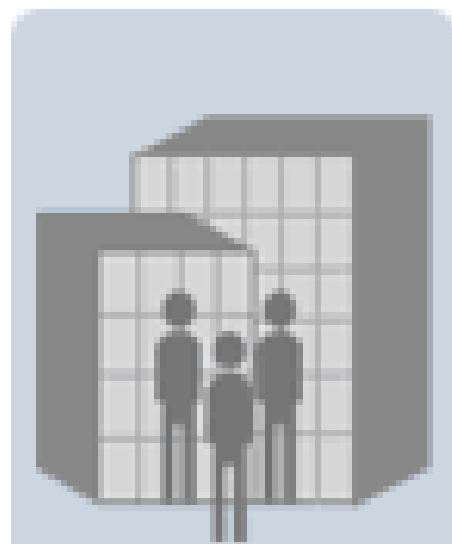
Generated on 14 September 2007 02:39:45 GMT



Code	Country	# Machines	Population
		13,844	0
MK		14	0
PS		1	0
AP		4	0
YU		5	0



# INNOCENTIVE™



COMPANIES

Solve Challenges



Receive Awards



SCIENTISTS

Companies contract with InnoCentive as "Seekers" to post R&D challenges. Scientists register as "Solvers" to review challenges and submit solutions online. The Seeker company reviews submissions and selects the best solution. InnoCentive issues the award amount to the winning scientist/Solver.

# Innocentive

***Gli esperti esterni non sono come ve li aspettereste. Molti lo fanno per hobby, e questo non dovrebbe sorprendere, spiega Kaim Lakhani, docente di tecnologia e innovazione al Mit che ha studiato a fondo InnoCentive. “La forza di un network come InnoCentive consiste proprio nella varietà di background intellettuale”, precisa. Lakhani e i tre coautori della sua ricerca hanno esaminato 166 problematiche postate su InnoCentive da 26 aziende diverse.***

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**INNOCENTIVE OPEN INNOVATION MARKETPLACE**

**Welcome to the InnoCentive Open Innovation Marketplace™!**

Here, commercial, academic, and nonprofit organizations (**Seekers™**) post Challenges™ that span a wide spectrum of industries and disciplines. Each Challenge has a cash award for the **Solver™** who submits the solution that best meets the Seeker's requirements.

Click on any of the six disciplines below to view open Challenges, or view all [past awarded Challenges](#).

<b>Physical Sciences</b> Unravel quandaries in Nanotechnology, BioPhysics, Geology, Physics, ... <a href="#">More</a>	<b>Life Sciences</b> Resolve problems in Biology, Medicine, Food Science, Pharmacology, Molecular Biology, ... <a href="#">More</a>
<b>Engineering/Design</b> Solve dilemmas in Bioengineering, Civil Engineering, Electronics, Mechanical Engineering, ... <a href="#">More</a>	<b>Chemistry</b> Discover solutions in Organic, Polymer, Synthetic Chemistry, Biochemistry, ... <a href="#">More</a>
<b>Math/Computer Science</b> Develop fixes in Information Technology, Programming, Artificial Intelligence, Statistics, ... <a href="#">More</a>	<b>Business/Entrepreneurship</b> Produce results in Product Development, New Business Development, Marketing Programs, Business Process Re-Engineering, ... <a href="#">More</a>



# 2006

"No company today, no matter how large or how global, can innovate fast enough or big enough by itself. Wikinomics reveals the next historic step—the art and science of mass collaboration where companies open up to the world. It is an important book." —A. G. Lafley, CEO, Procter & Gamble



## WIKINOMICS

*How Mass Collaboration  
Changes Everything*

Don Tapscott

*Bestselling Author of The Digital Economy*

and Anthony D. Williams



# Web 2.0

- *The digital world is witnessing and participating in a new revolution that goes under the name of “Web 2.0” and deals with “participatory media” and “social networking”; together with other relevant recent developments it can offer great opportunities for the international community of historians of science.*

The screenshot shows a web browser displaying the Economist.com website. The URL in the address bar is [http://www.economist.com/surveys/displayStory.cfm?story\\_id=6794156](http://www.economist.com/surveys/displayStory.cfm?story_id=6794156). The page features a search bar, navigation links, and a main article titled "Among the audience" under the "Surveys" category. The article is dated April 20th, 2006, and is from the print edition. The main text of the article reads: "The era of mass media is giving way to one of personal and participatory media, says Andreas Kluth. That will profoundly change both the media industry and society as a whole." Below the text is an image of a laptop with a microphone and a sign that says "UN AIR". To the right of the article, there are links for "Printable page", "E-mail this", and "Buy PDF". A "Related Items" section lists several related articles, including "In this survey" and "From The Economist".



# Communities

- *Phenomenal rapid increase of sites that allow easy communications and exchange of information between members (like MySpace that has now reached 100 millions)*

The screenshot shows the MySpace website homepage in a web browser. The browser's address bar displays "http://www.myspace.com/". The website's header includes the MySpace logo with the tagline "a place for friends" and a navigation menu with links for Home, Browse, Search, Invite, Film, Mail, Blog, Favorites, Forum, Groups, Events, Videos, Music, Comedy, and Classifieds. A search bar is located in the top right corner.

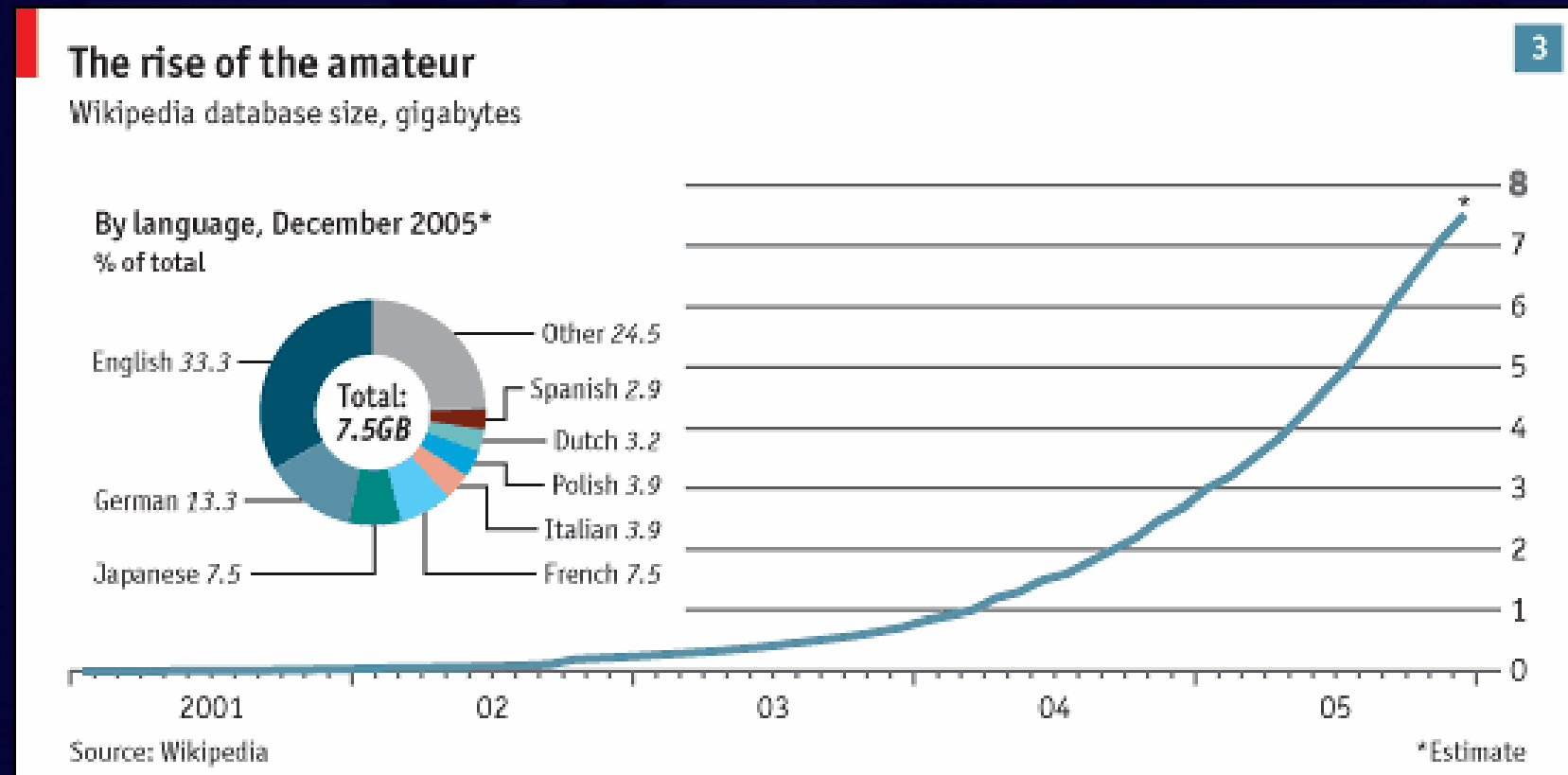
The main content area is divided into several sections:

- myspace.com**: A central banner for MySpace IM, with a "download" link and the MySpace IM logo.
- myspace movies**: A section titled "Check Out Movies Now" with a "showtimes" link and a "movies.myspace.com" link.
- Member Login**: A login form with fields for "E-Mail:" and "Password:", a "Remember Me" checkbox, and "LOGIN" and "SIGN UP!" buttons. A "Forgot your password?" link is also present.
- Cool New People**: A section featuring three profile pictures of users named Derek, Mark, and Babygirl.
- MySpace Music**: A section titled "Ratatat" with a photo of the band and text describing their music: "Rock / Electronica / Hip Hop Brooklyn, NY. Emerging from mix-tape fame, Brooklyn-based duo **Ratatat** serve up arena-sized guitars, slashing synths and screeching wildcat samples in their second album, 'Classics' out now. > Listen Now".
- MySpace Specials**: A section titled "Nelly Furtado Video Premiere" with a photo of Nelly Furtado and text: "Check out the premiere of No Hay Igual featuring Calle 13 off of the hottest release of the summer Loose in stores Now! > Check it out!".
- Videos**: A section titled "Crazy Irish Turkeys" with a video thumbnail and text: "Watch as I communicate with Irish turkeys. >> Watch It Now!".

The browser's status bar at the bottom shows a green arrow icon and a home icon.

# Cooperative work

- *New tools (like wikis) have led to new cultural projects that are used by millions of users daily and compete with well-established ones*





# Indexing

*Powerful instruments of “search and retrieve” allow not only to find but also to reorder*

*(for instance using “tags”) all sorts of Documents*

*From taxonomy to folksonomy*

The screenshot shows the del.icio.us website interface. At the top, there's a search bar and a navigation menu. The main content area displays a list of bookmarked items under the heading "HOT NOW". Each item includes a thumbnail, the title, the user who posted it, the date, and a list of tags. The number of people who have bookmarked each item is shown in a blue box. The sidebar on the right contains several sections: "tags to watch", "tickets", "movies", "photo", "audio", and "useful". Each section lists relevant items with their titles and brief descriptions.

del.icio.us  
your bookmarks | your network | inbox | links for you | post

del.icio.us hotlist something new every 1800 seconds see also popular, recent

HOT NOW

- Mac BitTorrent Clients Reviewed at Torrentfreak** save this 72 people  
first posted by ernesto999 mac bittorrent osx software apple tags
- MacLibre | Open Source Software Distribution for Mac OS X** save this 82 people  
first posted by Marc\_D mac software opensource osx freeware tags
- Zapr - Really Simple Sharing** save this 83 people  
first posted by RichardDavies filesharing sharing share p2p collaboration tags
- Techcrunch » Blog Archive » An interview with investor Paul Graham of Y Combinator** save this 77 people  
first posted by grobertson startup paulgraham interview web2.0 business tags
- jQuery 開発者向けメモ** save this 85 people  
first posted by altstack javascript jquery ajax reference library tags
- The Man in Seat Sixty-One...** save this 358 people  
first posted by revbob travel train europe rail trains tags
- Being an Atheist in America Isn't Easy - Newsweek** 30 people

tags to watch more ...

tickets

- Tip For Best Purchase Time of Airline Tickets - SeekingAlpha
- Orbitz: Airline Tickets, Hotels, Car Rentals, Travel Deals
- FareCompare -- Airfare Search Engine

movies

- How-To: Turn Your Mac mini into a DVD Jukebox
- Public Domain Movie Torrents
- Rotten Tomatoes

photo

- A Gradient Tutorial » 9rules Network Official Blog [daily dose of imagery] [f] downtown strips
- Geek to Live: 6 ways to find reusable media - Lifehacker

audio

- audacity
- metaquark.de > Aurora
- The freesound project

useful

- 10 tips for keeping your desk clean and tidy | LifeClever
- GiaaSize - The easiest way to upload & share files

# A cloud of tags

Popular tags on del.icio.us - Mozilla Firefox

File Modifica Visualizza Cronologia Segnalibri Strumenti ?

http://del.icio.us/tag/

del.icio.us / tag /

popular | recent  
login | register | help

Popular tags on del.icio.us  del.icio.us search

This is a **tag cloud** - a list of tags where size reflects popularity.  
sort: [alphabetically](#) | [by size](#)

advertising ajax apple architecture **art** article au audio bandslash **blog** blogging  
**blogs** book **books** **business** community computer cooking cool **CSS** culture  
database **design** **development** diy **download** downloads **education**  
english fashion **fic** film finance firefox **flash** **food** **free** freeware fun **funny**  
gallery game **games** **google** graphics green gtd hardware **health** **history**  
home **howto** **humor** illustration images **imported** **inspiration** **internet**  
**iphone** **java** **javascript** job jobs knitting language learning library lifehacks **linux**  
**mac** magazine maps marketing math media mobile money movies mp3  
**music** network **news** **online** opensource osx photo **photography**  
photos photoshop php **politics** portfolio productivity **programming**  
psychology python radio rails recipe **recipes** **reference** religion **research**  
**resources** ruby rubyonrails school **science** **search** **security** sga  
**shopping** **slash** social **software** teaching tech **technology** **tips** tool  
**tools** toread **travel** **tutorial** tutorials tv ubuntu **video** videos **web**  
**web2.0** **webdesign** wiki wikipedia **windows** wishlist wordpress work  
writing youtube

Completato



# Learning tools

- *Lectures can be made available to all through podcasts and videocasts*



# News available in real time (through “RSS” or “Atom”)

- *Current Contents*

fabio.bevilacqua@gmail.com | [Offline](#) <sup>New!</sup> | [Settings](#) | [My Account](#) | [Help](#) | [Sign Out](#)

dhst

Folder settings...

Expanded view

List view

Show: [47 new items](#) - [all items](#)

☆ Science & Education	Whose Science and Whose Religion? Reflections on the Relations between Scientific and Religious Worldviews -	Jun 23, 2007	»
☆ Science & Education	<b>Worldviews and their relation to science</b> - Abstract Worldviews are not only about whether God exists or whether the world has a	Jun 23, 2007	»
☆ Science & Education	<b>The Importance of History and Philosophy of Science in Correcting Distorted Views of ‘Amount of Substance’ and ‘Mole’</b>	Jun 22, 2007	»
☆ Science & Education	<b>Three Kinds of Political Engagement for Philosophy of Science</b> - Abstract In responding to critics and reviewers of my book,	Jun 21, 2007	»
☆ Science & Education	<b>Eric R. Scerri, The Periodic Table—Its Story and its Significance</b> - Eric R. Scerri, The Periodic Table—Its Story and its	Jun 21, 2007	»
☆ physics.hist-ph updates or	<b>Is the Interpretation of Delayed-Choice Experiments Misleading?. [arXiv:0706.2596v1]</b> - The interpretation of an experimental	Jun 19, 2007	»
☆ physics.hist-ph updates or	<b>On the Dirac-Infeld-Plebanski delta function. [arXiv:0705.0376v1 CROSS LISTED]</b> - The present work is a brief review of the	Jun 18, 2007	»
☆ Centaurus	<b>Immaterial Devices</b> - Centaurus Volume 49, Issue 2, Page 81-113, May 2007. Abstract. The concept of immaterial devices is	Jun 16, 2007	»
☆ Centaurus	<b>A Serpent without Teeth. The Conservative Transformism of Jean-Baptiste d’Omalius d’Halloy (1783–1875)</b> - Centaurus	Jun 16, 2007	»
☆ Centaurus	<b>Geomagnetism by the North Pole, anno 1769: The Magnetic Observations of Maximilian Hell during his Venus Transit</b>	Jun 16, 2007	»
☆ Centaurus	<b>ESHS*. History of Science in Education and Training in Europe: What New Prospects?Round Table Discussion at the</b>	Jun 16, 2007	»
☆ Centaurus	<b>Asger Hartvig Aaboe. 26 April 1922 to 19 January 2007</b> - Centaurus Volume 49, Issue 2, Page 172-177, May 2007.	Jun 16, 2007	»
☆ Centaurus	<b>Growing Explanations. Historical Perspectives on Recent Science</b> - Edited by M. Norton Wise - Centaurus Volume 49, Issue	Jun 16, 2007	»
☆ Centaurus	<b>Mathematics Unbound: The Evolution of an International Mathematical Research Community, 1800–1945</b> - Edited by Karen	Jun 16, 2007	»
☆ Centaurus	<b>Science and Religion, 400 BC–AD 1550: From Aristotle to Copernicus</b> - by Edward Grant and <b>Science and Religion,</b>	Jun 16, 2007	»
☆ Centaurus	<b>Geschichte der Pharmazie. Vol. II: Von der Frühen Neuzeit bis zur Gegenwart</b> - by Rudolf Schmitz - Centaurus Volume 49,	Jun 16, 2007	»
☆ Science & Education	<b>An Essay for Educators: Epistemological Realism Really is Common Sense</b> - Abstract "What is truth?" Pontius Pilot asked	Jun 16, 2007	»
☆ Science & Education	<b>Imagining the World: The Significance of Religious Worldviews for Science Education</b> - Abstract This article begins by	Jun 16, 2007	»

▲ Previous item ▼ Next item

more than 60 items



# New Alexandria

*The digitalisation of millions of printed books, images, movies, music tracks could within a decade cover the entirety of humankind's cultural production*

The screenshot shows a web browser window displaying a Google Books page. The browser's address bar shows the URL: <http://books.google.com/books?vid=ISBN0486606368&id=bgbhZbc6WecC&pg=PA1&pg=PA1&dq=maxwell>. The page title is "Treatise on Electricity and Magnetism" by James Clerk Maxwell. The main content area shows the title "ELECTRICITY AND MAGNETISM." followed by "PRELIMINARY." and "ON THE MEASUREMENT OF QUANTITIES." The first paragraph reads: "1.] EVERY expression of a Quantity consists of two factors or components. One of these is the name of a certain known quantity of the same kind as the quantity to be expressed, which is taken as a standard of reference. The other component is the number of times the standard is to be taken in order to make up the required quantity. The standard quantity is technically called the Unit, and the number is called the Numerical Value of the quantity." The second paragraph begins: "There must be as many different units as there are different kinds of quantities to be measured, but in all dynamical sciences it is possible to define these units in terms of the three fundamental units of Length, Time, and Mass. Thus the units of area and of volume are defined respectively as the square and the..." The right sidebar contains a book cover, a description: "Volume 1 of an important foundation work of modern physics. Brings to final form Maxwell's theory of electromagnetism and rigorously derives his general equations of field theory.", and a list of purchase links: "Buy this book" with links to "DoverPublications.com", "Amazon.com", "Barnes&Noble.com", "BookSense.com", "Froogle", "iBS", and "Librenauniversitaria.it". At the bottom, there is a search box with "maxwell" entered and a "Go" button, and a result count of "Results 6-8 of 8".

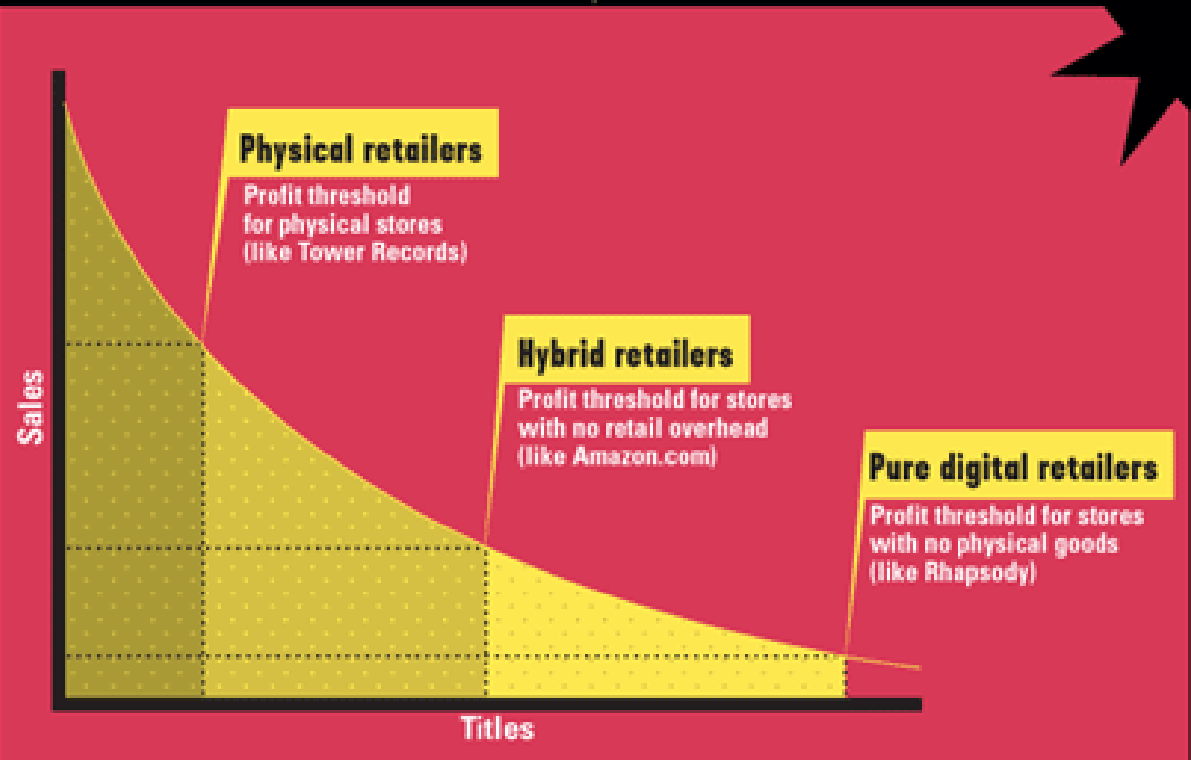
# The long tail

- *Documents and books previously lost in “the long tail” acquire new importance*

## THE BIT PLAYER ADVANTAGE

Beyond bricks and mortar there are two main retail models – one that gets halfway down the Long Tail and another that goes all the way. The first is the familiar hybrid model of Amazon and Netflix, companies that sell physical goods online. Digital catalogs allow them to offer unlimited selection along with search, reviews, and recommendations, while the cost savings of massive warehouses and no walk-in customers greatly expands the number of products they can sell profitably.

Pushing this even further are pure digital services, such as iTunes, which offer the additional savings of delivering their digital goods online at virtually no marginal cost. Since an extra database entry and a few megabytes of storage on a server cost effectively nothing, these retailers have no economic reason not to carry everything available.



# Quantity and not quality

- *Citation index*
- *Google ranking algorythm*



# History of Science and Web 2.0

- *Disciplinary, National and International Societies*
- *DHST: countries, commissions, historians*
- *The new Web 2.0 project*
- *Pavia Examples*





# Tow. Web 2.0: [www.dhstweb.org](http://www.dhstweb.org)

Division of History of Science and Technology of the International Union of History and Philosophy of Science



Structure of DHST - History of Science on Internet - News and further informations - Contact us

## DHST

### Division of History of Science and Technology of the International Union of History and Philosophy of Science

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[Site blog](#)

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[The Members' vade mecum](#)

[Organization chart](#)

[Structure of DHST](#)

[Council](#)

[National Members](#)

[Commissions](#)

[Inter-Union Commissions](#)

[Scientific Sections](#)

[The Budapest 2009 Conference](#)

[Calendar](#)

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#### Personal tools:

[Mail, chat, talk](#)

[Start page](#)

[Blogs, Podcasts](#)

#### Introduction to HST studies:

[Archives](#)

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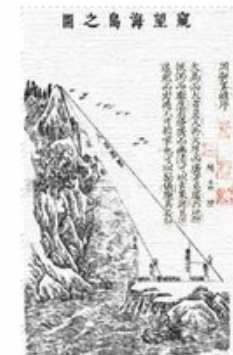
[Journals](#)

[Museums](#)

[Societies](#)

[WebSites](#)

[Bibliographies, Libraries, Programmes, Educational Materials, Research Centers](#)



# An experiment: case studies in History of Electromagnetism

- *First qualitative experiments*
- *The quantification of Volta and Coulomb*
- *The Galvani-Volta controversy and the pile*
- *Ohm and the laws of circuits*
- *Electricity and magnetism: Oersted and Ampère*
- *Faraday and relativistic induction*
- *Weber, Clausius and forces depending on velocities and accelerations*
- *Maxwell, Poynting and local conservation*
- *Helmholtz, Clausius and the potentials*
- *Hertz's experiments and his classification*
- *The theory of electrons of Lorentz*



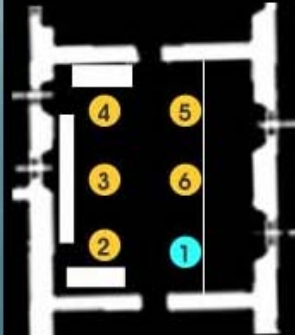
# Primary sources: arch., docs, instr.



GABINETTO DI FISICA  
DI ALESSANDRO VOLTA  
E LE SUE INVENZIONI



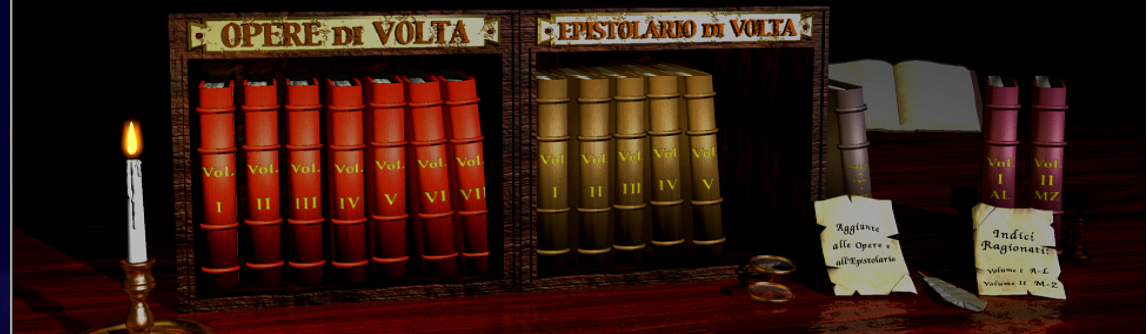
+ navigazione  
ricerca  
cenni storici



**Alessandro Volta**  
Edizione Nazionale delle Opere e dell'Epistolario  
Milano, 1918-1976

Posiziona il mouse al centro dell'immagine, premi il tasto sinistro del mouse e trascinalo lentamente nella direzione verso la quale ti vuoi muovere. Punta e clicca sugli oggetti per muoverti in quella direzione.

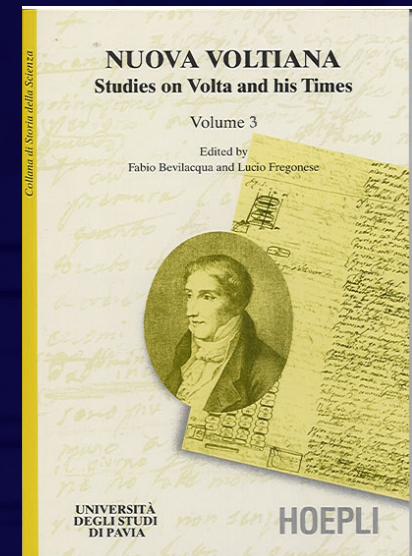
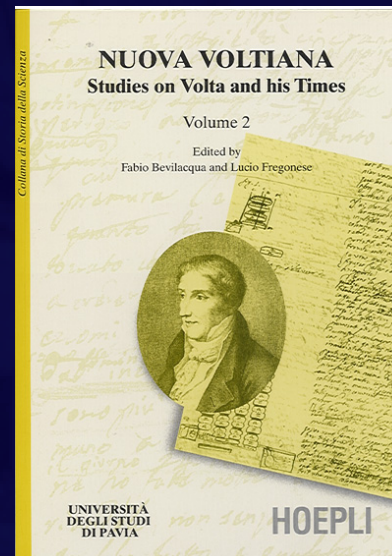
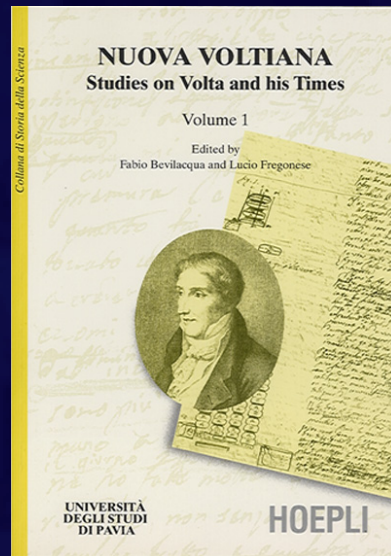
*Scegli il volume  
da consultare*





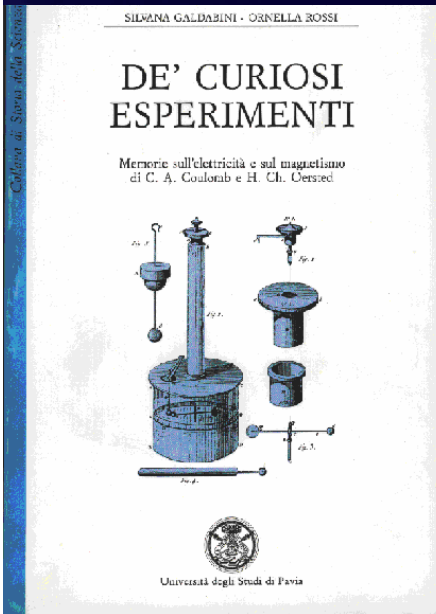
# Second. sources: 5+1 vols, papers

- **Volume 1**
- **Volume 2**
- **Volume 3**
- **Volume 4**
- **Volume 5**
- ***Volta and the History of Electromagnetism***





# Educat. Res.: CD (3D), exhib, books



Alessandro Volta

On the Electricity excited by the mere Contact of conducting Substances of different kinds

Bicentenary Edition in French, English, German and Italian of the Letter to Sir Joseph Banks of the 20<sup>th</sup> of March 1800



UNIVERSITÀ DEGLI STUDI DI PAVIA

HOEPLI

UNIVERSITÀ DEGLI STUDI DI PAVIA  
DIPARTIMENTO DI FISICA A. VOLTA

**1799... E LA CORRENTE FU**

SEZIONE I  
Alessandro Volta: l'uomo e lo scienziato

SEZIONE II  
L'elettricità prima di Volta

SEZIONE III  
Volta fisico elettrizzante

SEZIONE IV  
La controversia Galvani-Volta

SEZIONE V  
L'eredità di Volta

**1799... E LA CORRENTE FU.**  
DUECENTO ANNI DALLA DILA DI VOLTA.

**Coordinamento e realizzazione:**  
Gianni Bonera, Università di Pavia  
Marco Di Biase, Associazione Euresis  
Mario Gargantini, giornalista scientifico  
Paolo Guaschi, Università di Pavia  
Ernesto Lunati, Università di Pavia  
Paolo Mascheretti, Università di Pavia  
Elio Sindoni, Università di Milano

Grafica: Multimedia • Mission



# Web site; 60' movie; videoconf.



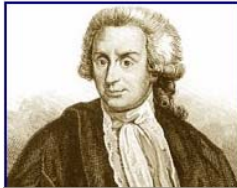
## Il dibattito Volta-Galvani

"La tempesta che l'apparizione del *Commentario* provocò nel mondo della fisica, della fisiologia e della medicina può essere confrontata solo con quella che nello stesso periodo stava montando sull'orizzonte politico dell'Europa". (DuBois)



•Nel 1791 [Luigi Galvani](#) (1737-1798), anatomista e fisiologo bolognese, pubblica un'opera rivoluzionaria: il [Commentarius](#). In essa rivela una straordinaria scoperta: le rane, pur decapitate e scuoiate, sono in grado di produrre ampi e duraturi movimenti delle zampe, se vengono collegati alcuni loro nervi e muscoli. Gli esperimenti di Galvani sono facilmente riproducibili e nel 1792 il volume, in una seconda edizione, suscita l'interesse di numerosi scienziati. Tra questi [Alessandro Volta](#) (1745-1827), fisico dell'Università di Pavia, che passa da un iniziale entusiasmo ad una

profonda critica.



•Galvani infatti sostiene l'esistenza di una elettricità specifica degli animali che si origina nel cervello, si propaga tramite i nervi e si immagazzina nei muscoli. La scarica di questi ultimi è all'origine delle contrazioni. Il programma di ricerca di Galvani si può quindi caratterizzare con un principio di tipo vitalistico: il movimento delle zampe delle rane è dovuto all'elettricità generata nel cervello delle rane vive; il modello cui questo principio viene associato si basa su un'analogia dei muscoli delle rane con una [bottiglia di Leida](#): entrambi immagazzinano l'elettricità, che è poi pronta ad essere



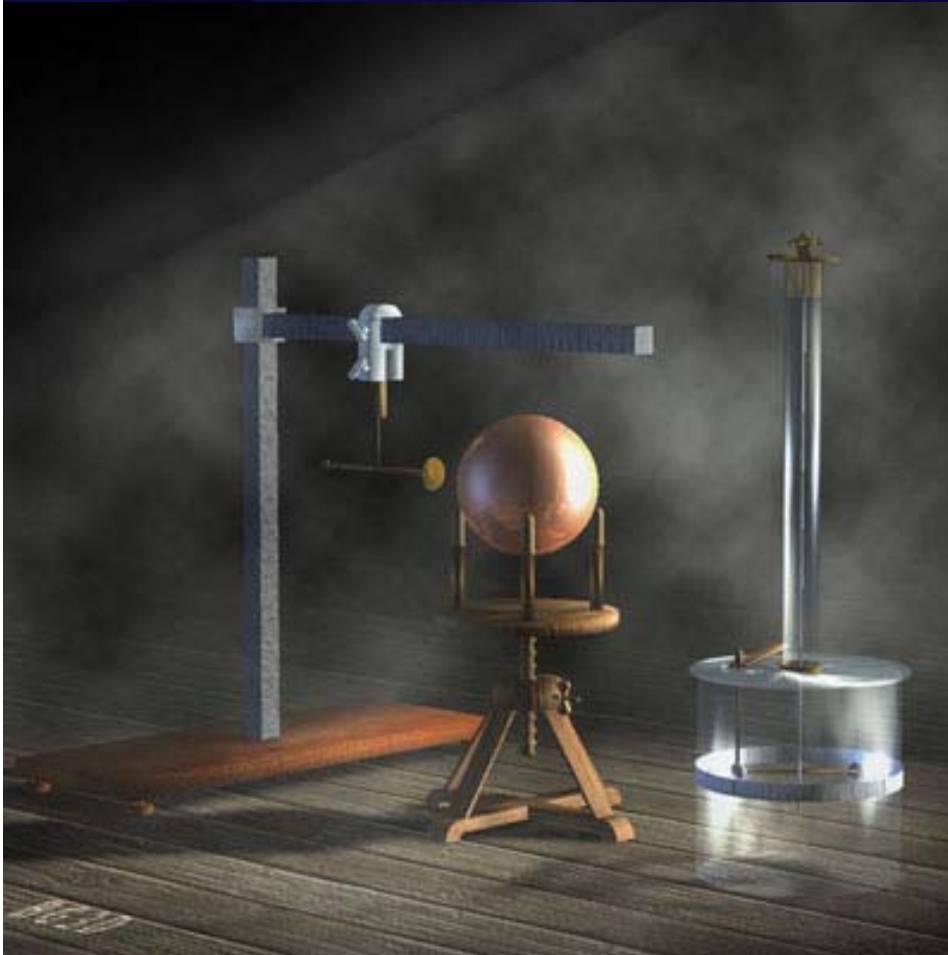
### Pavia Project Physics

Divulgazione: *Videoconferenze*

<p><b>Divulgazione</b></p> <p>Collana</p> <p>Mostre</p> <p><b>Video-conferenze</b></p> <p>DAL SISTEMA TOLEMAICO...</p> <p>IL CASO DELL'ELETTRICITÀ...</p> <p>ASPETTI POLITICI E SOCIO-CULTURALI...</p> <p>LA "MECCANICA CLASSICA"...</p> <p>LE TEORIE DELLA MATERIA</p> <p>NON SOLO LA PILA</p> <p>LA CONTROVERSIA GALVANI-VOLTA</p> <p>ALESSANDRO VOLTA: L'UOMO E LO SCIENZIATO</p> <p>Web Sites</p>	<p><b>DAL SISTEMA TOLEMAICO ALLA RIVOLUZIONE COPERNICANA</b></p> <p><i>G. Bonera, Dipartimento di Fisica "A.Volta" Università di Pavia</i></p>	<p><b>IL CASO DELL'ELETTRICITÀ: DALLE ORIGINI A VOLTA</b></p> <p><i>G. Bonera, Dipartimento di Fisica "A.Volta" Università di Pavia</i></p>	<p><b>ASPETTI POLITICI E SOCIO-CULTURALI NELLA LOMBARDIA AUSTRIACA ALL'EPOCA DI VOLTA</b></p> <p><i>Alessandra Ferraresi, Dipartimento storico-geografico dell'Università di Pavia</i></p>	<p><b>LA "MECCANICA CLASSICA": DA GALILEI A NEWTON</b></p> <p><i>E. A. Giannetto, Dipartimento di Fisica "A.Volta" Università di Pavia</i></p>	
	<p><b>LE TEORIE DELLA MATERIA DURANTE LA RIVOLUZIONE SCIENTIFICA</b></p> <p><i>Franco Giudice, Dipartimento di Fisica "A.Volta" Università di Pavia</i></p>	<p><b>ALESSANDRO VOLTA, NON SOLO LA PILA</b></p> <p><i>Gianni Bonera, Dipartimento di Fisica "A. Volta", Università di Pavia</i></p>	<p><b>LA CONTROVERSIA GALVANI-VOLTA E L'INVENZIONE DELLA PILA</b></p> <p><i>Fabio Bevilacqua, Dipartimento di Fisica "A.Volta", Università di Pavia</i></p>	<p><b>ALESSANDRO VOLTA: L'UOMO E LO SCIENZIATO</b></p> <p><i>Gianni Bonera, Dipartimento di Fisica "A. Volta", Università di Pavia</i></p>	



# Two 10' videocasts: The Volta-Coulomb and Galvani-Volta debate





# A web community:

<http://dhstiuhps.ning.com/>

Own Social Network!

Search

## DHST\_IUHPS

Division of History of Science and Technology



Main

My Page

Members

Videos

Photos

Groups

Join

Community of the Division of History of Science and Technology of the International Union of History and Philosophy of Science.

### Members



### Your DHST\_IUHPS Box

#### Welcome to the community of the Dhst/luhps!

The IUHPS is one of 26 scientific unions belonging to the International Council of Scientific Unions (ICSU). As the world's leading non-governmental organization in the field of science, ICSU promotes congresses, publications, and other initiatives designed to facilitate international exchanges and understanding. The IUHPS joined the ICSU family in 1947, and the history of science congresses that have taken place since that

[Join](#)  
[DHST\\_IUHPS](#)  
[Now!](#)

Existing Members:

Sign In

Ning ID

Password

Forgot

Sign In





# Community

Video Player:

Add a logo or watermark image to your network's video player. [Set it up now!](#)

## Add a Video



You can add your own video to DHST\_IUHPS!

## Popular Tags

battery condenser  
elect... description  
description.  
explanation  
operation **pavia**  
pile straw



## Volta's pile - operation

**Rating:** Not rated yet

Operation of the Volta's battery

Added Jun 16 by [Dhst07](#).

[0 Comments](#)



## Volta's pile - description

**Rating:** Not rated yet

Description of the Volta's battery

Added Jun 16 by [Dhst07](#).

[0 Comments](#)



## Volta's pile - explanation

**Rating:** Not rated yet

Explanation of the Volta's battery

Added Jun 16 by [Dhst07](#).

[0 Comments](#)

## Manage Your



**Network »**

New Features! [Close](#)

- **Groups** – Let your members create groups on your network
- **Music Player** – Add music and podcasts to your network

[+ Click here to add features](#)

Ads by Google

**Commercial Diving Equip.**

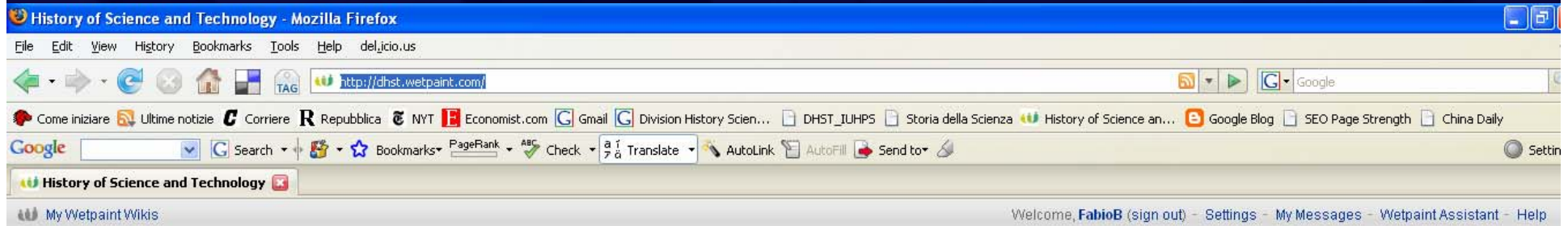
Wholesale  
Prices-Enormous  
Selection Sold by

# Community: Ning

- *On Specific Topics*
- *Groups and subgroups*
- *Tags*
- *Forum*
- *Multimedia (movies, images, podcasts)*
- *Personal pages and members profiles*
- *RSS*
- *Widget*
- *Php personalization*



# A Wiki for scholars, teachers and students: <http://dhst.wetpaint.com/>



## History of Science and Technology

Search this wiki

Navigation

- Home
- Interpreting electrical phenomena
- Feynman's summary of the laws of electromagnetism
- The Volta-Galvani Debate

Add a new page


Top Contributors

View all contributors

Site Reports & RSS Feeds

EasyEdit [\(what's this?\)](#)

### Home



This is an experimental wiki for the DHST community <http://dhstiuhps.ning.com>  
For the dhst website see [www.dhstweb.org](http://www.dhstweb.org)

Latest page update: made by Anonymous, Yesterday, 12:28 PM EDT ([about this update](#) - [complete history](#))  
This page doesn't have any keyword tags yet. ([edit tags](#))  
More Info: [links to this page](#)  
Bookmark: [Del.icio.us](#) [Digg](#) [Blue Dot](#) [StumbleUpon](#)

Page Toolbox

On this page you can:

- Edit the content
- Add a comment
- Watch this page
- Invite others
- Add an attachment
- Email this page
- Add a new page

Manage Page

Learn more in our [help section](#).

Wetpaint Orientation

Orientation: 0% complete

Get started

# Wiki

## History of Science and Technology

Navigation

- Interpreting electrical phenomena
  - Classical and Baconian Sciences in the 17th and 18th Centuries
- Add a new page
- Browse by Keywords
- Site Reports & RSS

EasyEdit [\(what's this?\)](#)

### Interpreting electrical phenomena

#### Interpreting electrical phenomena

- Electricity in the last quarter of the 18th century was a difficult subject, part of what are known today as the "[Baconian Sciences](#)". Electrical phenomena were new and exciting and many attempts were made at interpreting, quantifying and mathematising them. These attempts, even if they eventually gave birth to a sort of "[Standard Model](#)", were rooted in the natural philosophy and in the [epistemological criteria](#) of the time.
- Coulomb was a military engineer, one of the first to have vast mathematical skills. Working on friction, he invented a very precise, if very delicate, instrument: the torsion balance. He decided to apply it to [quantify](#) electrical attractions and

Page Toolbox

On this page you can:

- Edit the content
- Add a comment
- Watch this page
- Invite others
- Add an attachment
- Email this page
- Add a new page

Manage Page

Learn more in our [help section](#)

Wetpaint Orientation

Ads by Google

[Online Data](#)





# Wiki: wetpaint

- *Choice between Wikia (large communities) and Wetpaint*
- *Multimedia (int.+ext.): images (Flickr), movies (YouTube), etc*
- *Links (int.+ext.)*
- *Attachments*
- *Tags*
- *Widgets (gadgets)*



# First attempts: class blogs and class communities

- History of Physics
- History of Science
- Digital Technologies for Education

## LINKS

- [Einstein](#)
- [Lorentz](#)
- [Planck 1887](#)
- [La classificazione di Hertz](#)
- [Maxwell e Poynting](#)
- [Helmholtz sommario](#)
- [Helmholtz](#)
- [Mayer e Joule](#)
- [Il ciclo di Carnot](#)
- [Le macchine termiche](#)
- [Volta e Coulomb](#)
- [Volta e Galvani](#)
- [Conservazione e Rivoluzione: forza viva e lavoro](#)
- [La "Brevis Demonstratio"](#)
- [Leibniz e la forza viva](#)
- [Newton e la caduta](#)
- [Il pendolo composto \(engl.\)](#)
- [Galileo e la caduta](#)
- [La caduta dei gravi](#)
- [La "rivoluzione scientifica"](#)
- [Mappe concettuali](#)

MARTEDÌ, FEBBRAIO 20, 2007

### ● ● ● Laplace: alcune considerazioni sulla "Mécanique Céleste"

Pierre-Simon, Marchese di Laplace (Beaumont-en-Auge, Normandia, 23 marzo 1749 - Parigi, 5 marzo 1827) fu un matematico ed astronomo francese, uno dei principali scienziati nel periodo napoleonico.

Con la sua opera ha dato fondamentali contributi a vari campi della matematica, dell'astronomia e della teoria della probabilità.

Laplace diede la svolta finale all'astronomia matematica riassumendo ed estendendo il lavoro dei suoi predecessori nell'opera in cinque volumi **Mécanique Céleste**, trasformando lo studio geometrico della meccanica sviluppato da Newton in quello basato sul calcolo.

Nel 1783 conobbe Napoleone Bonaparte, che nel 1799 lo nominò ministro degli interni e nel 1806 gli conferì il titolo di conte dell'Impero.

Quando era ancora adolescente, pur avendo studiato matematica solo per breve tempo, acquisì un'abilità tale da affascinare d'Alembert, che si adoperò per procurargli una cattedra.

Nel 1785 diventò membro dell'Académie des Sciences e nel 1816 venne eletto all'Académie française. Grazie alla sua intensa attività accademica esercitò una grande influenza sugli scienziati del suo tempo, in particolare su Quételet e Poisson. In modo del tutto straordinario per un genio matematico della sua capacità, Laplace non vedeva la matematica come una disciplina dal valore particolare, ma come uno strumento utile per la ricerca scientifica e per problemi pratici.

Laplace trascorse gran parte della sua vita lavorando sull'astronomia matematica che culminò nel suo capolavoro sulla dimostrazione della stabilità dinamica del sistema solare, sotto l'ipotesi che esso consista in un insieme di corpi rigidi che si muovono nel vuoto. Egli ha formulato autonomamente l'ipotesi della nebulosa e fu uno dei primi scienziati a postulare l'esistenza dei buchi neri e la nozione di collasso gravitazionale.

Il sistema solare si è sviluppato da una massa globulare di gas incandescente che ruotava attorno ad un asse passante per il suo centro di massa. Quando si è raffreddata questa massa si è ristretta e anelli

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Breve riflessione sul saggio di Holton;"Il terzo paradiso di Einstein":

L'intero saggio di Gerard Holton ruota attorno ad una serie di citazioni autobiografiche, interviste, lettere e saggi di Einstein che dichiarano in forma più o meno esplicita il particolare rapporto del famoso fisico con la fede o, in senso più generale, con l'ambito religioso.

Lo scopo è di far luce sulle ultime considerazioni dello scienziato, proponendo una tesi che vede lo svilupparsi d'un pensiero filosofico denominato dall'autore come il "terzo paradiso" di Einstein. Holton supera la visione dicotomica tra scienza e religione imposta dai biografi contemporanei a favore di un sistema di pensiero sincretico, sviluppato dallo stesso Einstein tra gli anni 20 e 50. Innanzitutto, occorre comprendere che per "paradiso" si intende una sorta di rifugio prima

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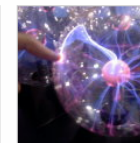
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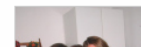
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**Not only for the  
DHST members  
but for all Historians of Science**

an invitation to join in



# HoS: What role in a globalized digital world?

- *Building a cultural international scientific community: DHST (individual members), HSS, ESHS, National Societies*
- *Making accessible the world's cultural scientific inheritance*
- *Bridging the gap between science, technology and the humanities*
- *Revealing the connections between local and global histories of science*
- *Quality and not only quantity in the dematerialisation (from  $e=mc^2$  to search algorithms)*
- *Educational materials*
- *Open source and open access (Berlin declaration)*





# HoS and cosmopolitanism

- *China: Needham*
- *India: Subharayappa*
- *Ottoman empire: Ihsanoglu*
- *Ethnoscience: D'ambrosio*



# STORIA DELLA SCIENZA

**“Basta leggere i libri apparsi recentemente su questo preteso scontro di civiltà per costatare che essi veicolano un'ideologia, e, per di più, poco raffinata. Soltanto un'autentica conoscenza storica può proteggerci da questo”.**

**Roshdi Rashed 2007**

ISTITUTO DELLA ENCICLOPEDIA ITALIANA FONDATA DA GIOVANNI TRECCANI

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# HoS: What role in a globalized digital world?

- *Against clash of civilization*
- *Understanding and integration of scientific traditions*
- *Cosmopolitanism*
- *Digital cooperation among disciplines, cultures, individuals*



# Clash or Integration?

