

talking about information

**the "age of information"
& the information revolution**

history of information

January 19, 2012

administrative matters

wait list

sign up
check with departments
wait

class website

<http://blogs.ischool.berkeley.edu/i103s12/>

class slides

<http://courses.ischool.berkeley.edu/i103/s12/SLIDES/2-Hof112-Talking-PD.pdf>

class reader

Copy Central, 2560 Bancroft Way

in the news



coming up:

Feb 16 - reference books

Mar 6 - information as property

overview

- history matters

- interintergenerational
revolution

- revolution

- how do we get from one
to another?

- what's in an age??

- age of
information



but first: talking about *information technology*

Pick one of the following and write a (very) brief story or anecdote in which it serves as an "information technology"

a necktie

a blanket

a glass of water

a rubber duckie

a moustache

a lemon

overview

- history matters

- intergenerational revolution

- revolution

- how do we get from one
to another?

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the age of information





what's going on?

it's the age of information



what's going on?

it's the age of information

everything's now on the internet

my desktop is made to sedate me ...

the age of information is hell

I still feel the human race has

not progressed as much as we should be

How come the human race isn't

progressing as fast as technology has?

Yea we're going to be staying on the moon

But there's still going to be racists

...

what's going on?

agreement?

Information: there's growing agreement that it's the name of the age we live in.

Human history has long been described in terms of Ages whose names reflect the stages of development through which mankind has passed: the Stone Age, the Bronze Age, the Iron Age and so on — down to the Industrial Age, which established the foundations of our modern society.

Today, there is growing agreement that we have entered a new era: a post-industrial stage of development in which the ability to put information to use has become critical, not only to the essential production of goods, but to efforts to provide a better life for the individual, as well.

This new era is being referred to with increasing frequency as the Information Age.

Information in the Information Age

Changes in our perception of information itself—its nature as well as its scope—have accompanied this profound shift of emphasis in our society.

Much has been written about the so-called "information explosion." It has been pointed out, for example, that the number of technical journals published throughout the world today exceeds 100,000, and that the total body of technical information is now doubling every ten years.

At the same time as the volume of information has been increasing dramatically, our understanding of the meaning of the term information itself has also broadened—to encompass a wide variety of timely data relating to "how things really are" across the whole spectrum of human activity.

A heartbeat, for example, can be extremely meaningful information when recorded and analyzed on sophisticated electrocardiogram equipment. So can electrical impulses reflecting the load level in a power network, or numeric digits representing the availability of a seat for you on an airplane—when processed by a modern computer.

These and a wide range of similar types of data are clearly recognized today as information, the kind of information on which we increasingly de-

pend for the growth and health of our economy, the smooth functioning of our institutions—and, even more important, for the quality of our individual lives.

Information—an inexhaustible resource

Information is one of the few resources not in danger of exhaustion on this shrinking planet. It is unique because the supply is limitless, because it actually becomes more valuable with use and because—when properly managed and applied—it can greatly enhance our use of all our other resources, natural, human and economic.

One reason, of course, that information has proved to be such a dynamic resource is the fact that there exists today a remarkable technological capacity for dealing with it rapidly and effectively.

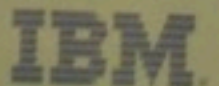
Through a vast array of electronic tools and techniques, mankind is able to accumulate, organize, store, interpret, retrieve and transmit information on a worldwide scale, in a volume, at a speed, and with an accuracy that would have been impossible barely two decades ago.

It is also a technology that continues to grow and that has proved to be amazingly efficient in economic terms. As advance has followed advance, the cost of processing information has steadily declined. Since the 1950's, the cost of performing 100,000 calculations on an IBM computer has fallen from \$1.26 to less than one cent—and the downward trend continues.

Putting information to work for people

IBM makes many different products—from computers to copiers—but clearly, the essence of our business is information.

As a company, we are committed to exploring the limits of technology to find better, more imaginative and more productive ways to help put the benefits of this uniquely valuable resource to work for people.



What do
you want?

before IBM



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for all time?

"Every society is an information society and every organization an information organization, just as every organism is an information organism. Information is necessary to organize and run everything from a cell to General Motors or the Pentagon"

-- Anthony Oettinger,
"Information Resources Knowledge and Power
in the 21st Century," 1980



for all time?

just more of the same

"On an average weekday, the *New York Times* contains more information than any contemporary of Shakespeare's would have acquired in a lifetime"

- Richard Wurman,
Information Anxiety, 1983



for all time?

just more of the same

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"this is one Lucio's Information against me"
Measure for Measure

eternal view



there's growing
agreement that ...

self-conscious age of information

("reflexivity" -- Anthony Giddens)

"In the long run, history is the story of
information becoming aware of itself."

-- James Gleick,
The Information, 2011

growing agreement?



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Vicesimus Knox
1752-1821

another opinion

"But though books are easily procured, yet, even in **this age of information**, there are thousands in the lower classes that cannot read. Besides, it is a well-known truth, that the same precepts inculcated by a living instructor, adorned by a proper oratory, enforced by a serious and authoritative manner, produce a powerful effect, not to be experienced in solitary retirement."

-- Vicesimus Knox,
Essays Moral and Literary, 1778

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what was going on?

the rise of the public sphere

newspapers, public opinion [coming up, Feb 14]

organization of knowledge

Chambers, Diderot, Smellie [coming up, Feb 16]

Donaldson v. Beckett (1774)

limited copyright [coming up, March 6]



what was going on?

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organization of knowledge

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limited copyright [coming up, March 6]

revolution

[coming up, today]

overview

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"Human history has long been described in terms of ages ...The Stone Age, the Bronze Age, the Iron Age, and so on"

IBM ad,
Fortune 1977

what's in an age??

ages past

stone

bronze

iron

steel

plastic

"Human history has long been described in terms of ages ...The Stone Age, the Bronze Age, the Iron Age, and so on"

IBM ad,
Fortune 1977

what's in an age??

ages past

stone	oral
bronze	manuscript
iron	Gutenberg
steel	electronic
<i>plastic</i>	

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IBM ad,
Fortune 1977

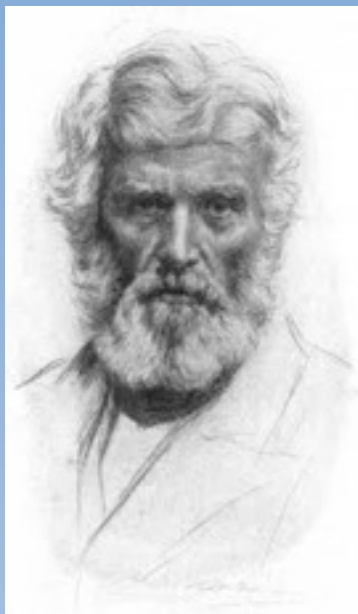
what's in an age??

ages past

stone	oral	hunter-gatherer
bronze	manuscript	agricultural
iron	Gutenberg	industrial
steel	electronic	post-industrial
<i>plastic</i>		

"Not an Heroical,
Devotional,
Philosophical, or
Moral Age, but
above all others
the Mechanical Age.
It is the Age of
Machinery."

-- Thomas Carlyle,
"Sign of the Times"
1829



Thomas Carlyle
1795-1881

what's in an age??

ages past

classical

dark

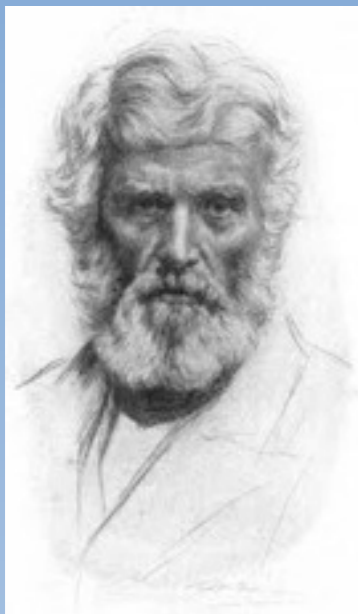
middle

modern

postmodern

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Thomas Carlyle
1795-1881

what's in an age??

ages past

classical

renaissance

dark

reformation

middle

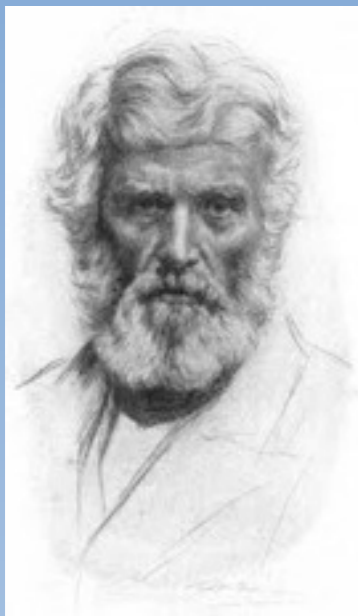
enlightenment

modern

postmodern

"Not an Heroical,
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Philosophical, or
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It is the Age of
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-- Thomas Carlyle,
"Sign of the Times"
1829



Thomas Carlyle
1795-1881

what's in an age??

ages past

classical	renaissance	sail
dark	reformation	steam
middle	enlightenment	jet
modern		nuclear/atomic
postmodern		space

overview

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- revolution

- how do we get from one
to another?

- *revolution*

- *evolution*

- what's in an age?

- age of
information

evolution?

"Printed books **evolved** into
better-designed packages of information."

-- Paul Grendel,
*Cambridge History of
Renaissance Philosophy* 1988



evolutionary force?

"[I]n order to satisfy the **new needs for information** and education, more books, ...and soon newspapers were required."

Lucien Febvre & Henri-Jean Martin
The Coming of the Book, 1984





evolutionary force?

"The **need** for readily available information, which had been steadily rising, was accelerated by the advent of Christianity ..."

"The **need to find information** more rapidly than is possible in a papyrus-roll-form book initiated the development of the Greco-Roman codex in the second century ..."

-- Frederick Kilgour,
*The **Evolution** of the Book*, 1998



not *one* information age

"glittering proof that a **new** information age was dawning in Europe, fuelled by the power of the printed word."

--Stephen Fry,
The Machine That Made Us.
BBC 2008
[veoh.com]
[youtube]

an earlier opinion

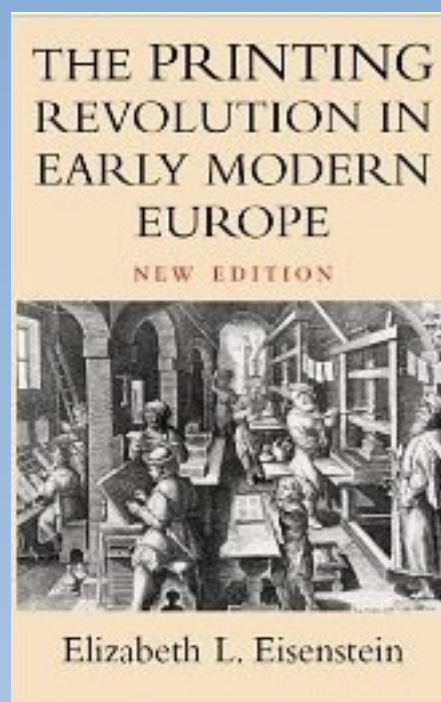
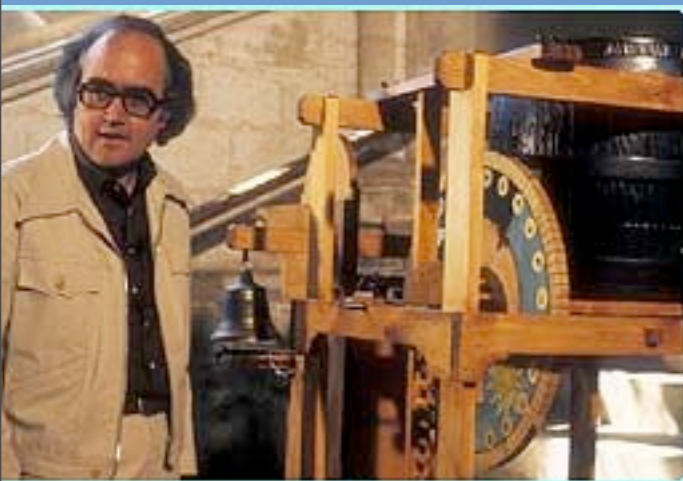
"The day the universe **changed**"

James Burke,

*Printing **Transforms** Knowledge*

BBC 1986

[Media Center]



[coming up "Print revolution"]

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overview

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revolting

first wave

agrarian revolution

second wave

industrial revolution

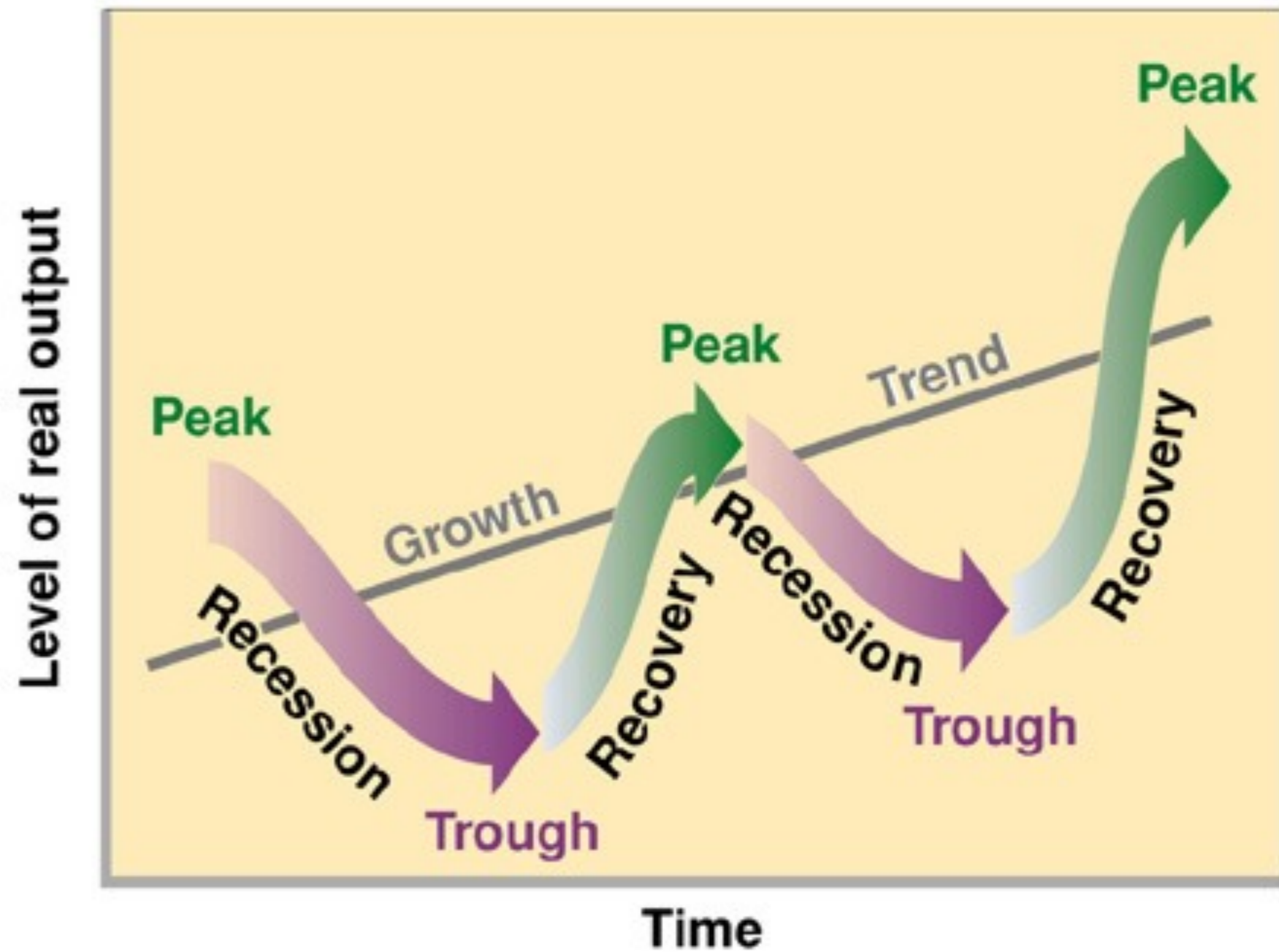
third wave

post-industrial society

what does it look like?



still around?





what does it looke like?

an English perspective:

- going round in circles:

1640-1660

- gaining direction? *Glorious Revolution* (1688)

"The Popists in offices lay down their
Commissions and flie:

it lookes like a Revolution."

-- John Evelyn, *Diary*, 1688



John Evelyn
1620-1706

what does it look like?

all much the same?

English

American

French

Haitian

Russian

Iranian

Tunisian/Egyptian/Syrian

--Jacques Ellul,
Autopsie de la Revolution, 1969

PRÉFACE

permanent revolution?

Révoltes, révolutions, émeutes, rébellions, émotions, guerres civiles, coups d'État, l'histoire entière en est tissée¹. La vie de l'homme en est faite. Non point accident mais constante, non

1. L'histoire en est tissée... Prenons quelques exemples : le XVII^e siècle : 1601 à 1610, « le temps des troubles » série de révoltes en Russie; 1610, révolte des Sikhs; 1620-1630, révolte chinoise contre les Mings; 1631, soulèvement de Dijon et d'Aix-en-Provence; 1635, soulèvement de Bordeaux; 1636, révolte des Croquants; 1637, révolte d'Awa Kousa au Japon; 1639, révolte des Nu-pieds; 1640 à 1644, révoltes contre les Mings, aboutissant à la chute de la dynastie; 1640, révolte de la Catalogne contre l'Espagne qui ne s'achève qu'en 1652; et la même année, 1640, débute aussi la révolution du Portugal, qui restera, latente ou explosive, permanente jusqu'en 1668; 1641, année de troubles très généralisés, révoltes paysannes en Irlande, Suisse, Allemagne, Russie; 1643, révolte du Rouergue; 1645, révolte de Montpellier; 1647, révolte de Masaniello à Naples, contre le vice-roi espagnol, pendant un an; 1648 est également une année forte pour les révolutions : révolution d'Angleterre commencée en 1640 mais qui se développe de 1648 à 1653 tout particulièrement, et dont on a dit qu'elle était peut-être « la première grande révolution bourgeoise des temps modernes »; la Fronde en France, de 1648 à 1652; l'insurrection d'Ukraine, de 1648 à 1654; les émeutes populaires en Russie, dans cette même année, à Moscou, Koslov, Tomsk, etc.; la révolte hindouiste des Mahrattes contre les envahisseurs mongols, toujours en 1648; en 1649, la révolte de Moscou qui reprend; 1650, émeute de Novgorod et coup d'État de Guillaume de Hollande; 1653, guerre paysanne de Suisse; 1662, révolte du Boulonnais, révolte de Moscou pour un problème monétaire; 1664-1670, la grande rébellion d'Audijos; 1670-1671, la grande révolte de Stenka Razin et le soulèvement paysan de Bohême;

point trouble mais mouvement apporté dans le cours paresseux de l'histoire.

Il n'y a pas un exceptionnel de la révolution opposé à un normal ou à une règle de la vie des peuples, des pouvoirs, des civilisations. Ne nous contentons pas des schémas historiques qui nous parlent de 1649, de 1785, de 1917 : alors, scrutant les événements d'un peu plus près, voici que nous constatons dans les faits cette permanence de la révolution parmi les hommes. Il est vain de chercher une division entre des périodes calmes et des périodes troublées. La révolution est moins la locomotive que l'un des éléments de la chaîne invisible du tissu des civilisations.

Mais nous nous trouvons immédiatement arrêté par un souci formel de définition. Que disons-nous au travers de ce mot révolution? Qu'entendra l'autre dans ces quatre syllabes? « Le devoir de tout chrétien est d'être révolutionnaire », proclama Camilo

1673 à 1681, le soulèvement considérable du nord-est de la Chine; 1675 nouvelle année d'abondance : révoltes dites du papier timbré en Bretagne et à Bordeaux, accroissement des rébellions sikhs et mahrattes, et aussitôt après la révolte religieuse des Camisards; 1679, la révolution d'Irlande

Prenons une autre période : de 1770 à 1850. Là encore nous constatons émeutes, rébellions, révoltes, révolutions dans le monde entier. 1768, révolution démocratique de Genève; 1770 à 1783, la révolution américaine, à la suite de sa guerre contre la Grande-Bretagne; 1772, révolution royale en Suède; 1780 à 1783, révoltes multiples en Angleterre et en Irlande, grande révolte des Indiens du Pérou; 1781, insurrection de Nouvelle-Grenade, révolution à Fribourg, et de nouveau à Genève en 1782; 1783 à 1787, révolution aux Provinces-Unies avec diverses orientations; 1787-1790, révolution des Pays-Bas autrichiens; 1788-1794, révolte de Guyane, révolution polonaise; 1789, début de la révolution française, démocratisation du régime en Suède; 1791, révolution polonaise; 1792, reprise de la révolution belge et révolution rhénane, révolte généralisée dans les Antilles; 1794, émeutes en Irlande; 1795, révolution en Hollande et à Genève, émeutes à Londres, Birmingham, etc., à Constantinople, à Smyrne; 1796, révolution dans les États italiens; 1797, mutinerie des flottes anglaises; 1798, révolution en Suisse et en Irlande; 1799, révolte des îles Ioniennes et de Malte; 1810, révolution des colonies espagnoles qui s'achèvera par la reconnaissance de leur indépendance en 1825; et de 1810 également à 1829, guerre pour l'indépendance des peuples balkaniques; 1820, révolution d'Italie, et d'Espagne; 1821, révolution grecque, et 1830, grande flambée révolutionnaire en France en Belgique, en Pologne... en attendant 1848.

--Jacques Ellul,
Autopsie de la Revolution, 1969

PRÉFACE

permanent revolution?

1601-10	Russia
1610	India: Sikhs
1620-30	China: against the Ming
1631	France: Dijon & Aix-en-Provence
1635	France: Bordeaux
1636	France: Croquants
1637	Japan: Awa Kousa
1639	France: Nu-pieds
1640-44	China: against the Ming
1640	Spain: Catalonia
1640-88	Portugal (against Spain)
1641	Ireland, Switzerland, Germany, Russia
1643	France: Rouergue
1645	France: Montpellier
1647	Italy: Naples (against Spain)
1648-54	England
1648	France: Fronde
1648-54	Ukraine, Moscow, Koslov, Tomsk; Maharatta (Hindus against Mongols)
1649	Russia: Moscow
1650	Russia: Novgorod; Holland
1653	Switzerland
1653	Russia: Moscow
1664-70	France: Audijos
1670-71	Russia/Azerbaijan: Stenka Razin; Bohemia
1673-81	China
1675	France: Brittany, Bourdeaux, Camisards; India: Sikhs,
1679	Ireland

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- what's in an age?

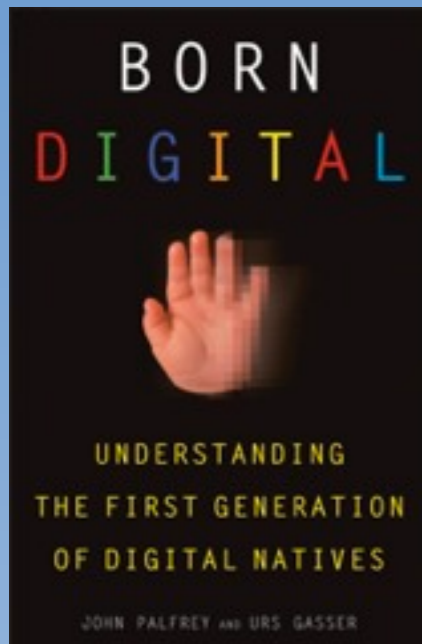
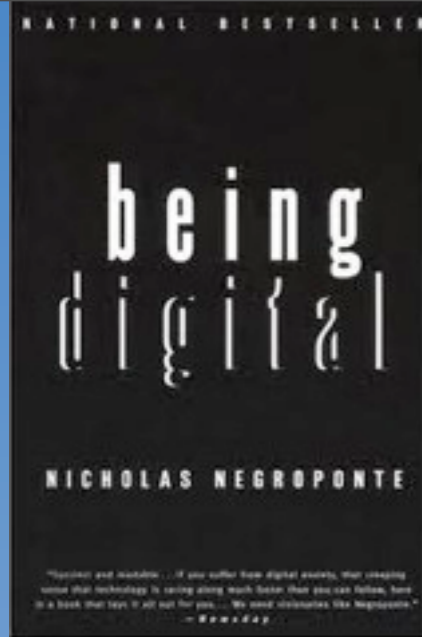
- age of
information



cosmetic change?

"One of the first known references to the "generation gap" came in 1925, when people referred to the gap between generations of mother and daughter being signified by one wearing lipstick and the other not"

-- Jessica Pallington,
Lipstick, 1998



intergenerational

The Keyboard Becomes a Hangout For a Computer-Savvy Generation

By JOHN MARKOFF

Sixteen-year-old Jon Leger, a high school student in Port Arthur, Tex., does not consider himself a computer whiz. In fact he doesn't see himself as

Encountering
The Digital Age

An occasional look at computers in everyday life.

New York Times Aug 31, 1993

digital natives

"Today's students think and process information fundamentally differently, and these differences...run much deeper than most educators would like to have it."

--Edith Ackermann,

"Anthropology of Digital Natives" 2008
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The Children of Cyberspace: Old Fogies by Their 20s

By BRAD STONE

Published: January 9, 2010

The New York Times

newly new

"I've begun to think that my daughter's generation will also be utterly unlike those that preceded it. Researchers ... theorize that the **ever-accelerating pace of technological change** may be minting a series of mini-generation gaps. ... 'People two, three or four years apart are having completely different experiences with technology,' said Lee Rainie, director of the Pew Research Center's Internet and American Life Project. 'College students scratch their heads at what their high school siblings are doing, and they scratch their heads at their younger siblings. It has sped up generational differences.' "

move over M¹

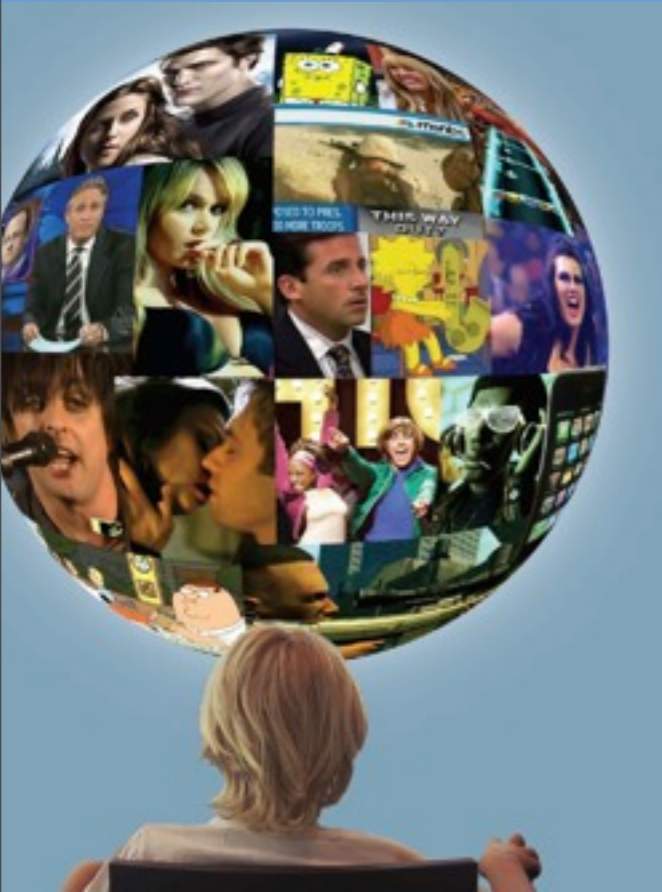
Generation M²:

Media in the Lives of 8 to 18-year olds.

"Five years ago, we reported that young people spent an average of nearly 6-1/2 hours (6:21) a day with media—and managed to pack more than 8-1/2 hours (8:33) worth of media content into that time by multitasking. At that point it seemed that young people's lives were filled to the bursting point with media. Today, however, those levels of use have been shattered.

"<http://www.kff.org/entmedia/upload/8010.pdf>

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permanent revolution?

children of the depression

baby boomers

generation x

generation y

generation m¹

generation m²



Henry Adams
1838-1918

looking back

"Only on looking back ... at his own figure in 1854, and pondering on the needs of the twentieth century, he wondered whether, on the whole, the boy of 1854 stood nearer to the thought of 1904, or to that of the year 1 ... in essentials, the American boy of 1854 stood nearer to the year 1 ... Before the boy was six years old he had seen four impossibilities made actual--the ocean-steamer, the railway, the electric telegraph, and the Daguerreotype."

--Henry Adams,
The Education of Henry Adams [1905]
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overview

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- how do we get from one
to another?

- what's in an age?

- age of
information



let's look back to find ourselves



the same? different? better? worse?

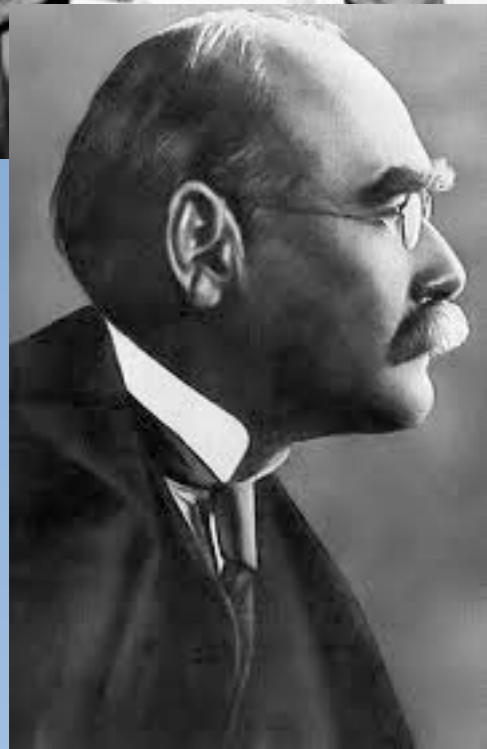
how would we know?

"What should they know of England

Who only England know?"

-- Rudyard Kipling

"The English Flag," 1899



Rudyard Kipling
1865-1936

where are things different?

generation vs country

"The past is another country.
They do things differently there."

--L.P. Hartley,
The Go-Between, 1953



central themes

beyond *presentism*

"The real, central theme of history is not what happened, but what people felt about it when it was happening"

-- George M Young,

Victorian England:

Portrait of an Age, 1960

Plato

Trithemius

Sprat

Johnson

Morse

Babbage

Bell

Marshall

gauging what people felt

even 2005?

To coincide with this year's Reith Lectures, entitled the **Triumph of Technology**, You and Yours asked what has been the most significant technological innovation since 1800.

From the hundreds of listeners' nominations and together with our five experts, voting was opened on a final 10. Here are the results...

[http://www.bbc.co.uk/radio4/youandyours/technology_launch.shtml]

the *Wired* view

10 gadgets that changed the world



most significant



- 59.4% - Bicycle**
- 7.8% - Transistor**
- 7.8% - Electro-magnetic induction ring**
- 6.3% - Computer**
- 4.6% - Germ theory of infection**
- 4.5% - Radio**
- 4.0% - Internet**
- 3.4% - Internal Combustion Engine**
- 1.1% - Nuclear Power**
- 1.1% - Communications satellite**

where we've been:

- history matters

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revolution

- revolution

- how do we get from one
to another?

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information

and where we're going: →

Week 2

24 Jan: Technological Determinism

Required reading:

- Heilbroner, Robert L. 1967. "Do Machines Make History?", *Technology and Culture*. 8(3): 335-345.
- Williams, Raymond. 1974. "The Technology and the Society," pp 1-25 in *Television: Technology and Cultural Form*. London: Fontana.

Additional material:

- Marx, Leo. 2010. "Technology: The Emergence of a Hazardous Concept." *Technology & Culture*, 51 (3 July).

coming up

assignment -- due Sunday Jan 22

Heilbroner and Williams describe the relationship of technology and society in different ways. Who has the better argument and why? Though both wrote before the current "Age of Information," each discusses technologies very much with us today. Heilbroner writes briefly of the computer, Williams writes at length about television. What sort of predictions about contemporary technologies does each make, and do these predictions hold up?

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