IT?

Pick one (or two!) of the following and construct a story in which it serves as an "information technology." Try to make your story ingenious without being completely implausible.

a. necktie
b. blanket
c. rubber duckie
d. can of beans
e. lemon
the "age of information"

& the “information revolution”

Paul Duguid
info 103
January 19, 2017
administrative matters

wait list
  sign in
  wait/drop

class website
  https://ucberkeley.instructure.com/courses/1457197

Bancroft tour
  sign up on google doc via syllabus

class reader
  Copy Central, 2576 Bancroft Way

class recording
  CalCentral
where are we?

all over the place?
the "age of information"

what's in an age?

getting from one age to another

revolution

intergenerational revolution

why history matters

the "age of information"
it’s the ....?
"The period beginning around 1970 ... "

when was that?

"November 16, 1992 — the day the Information Age began in America" — Bob Metcalfe,

"ISDN is the Information Age Infrastructure," InfoWorld, 1992
24 Jan: Technological Revolutions

Read: "Preface to Third Printing" (pp. v-x), and "Introduction" & "The Medium is the Message" (pp. 3-21).

earlier yet

45 years and counting

Intel 4004, 1971

(nb. Moore's Law, 1965)

50 years and counting

"In the new ...
Age of Information."

local changin'

when was that?

In 1964, students at the University of California, Berkeley, formed a protest movement to repeal a campus rule banning students from engaging in political activities.
"no reason to reject the hypothesis that the Information Society developed as a result of a crisis of control created by railroads and other steam-powered transportation in the 1840s" — Beniger, 1986

---

**Table 1.1. Modern societal transformations identified since 1950**

<table>
<thead>
<tr>
<th>Year</th>
<th>Transformation</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>Lonely crowd</td>
<td>Riesman 1950</td>
</tr>
<tr>
<td>1950</td>
<td>Posthistoric man</td>
<td>Sondheim 1950</td>
</tr>
<tr>
<td>1953</td>
<td>Organizational revolution</td>
<td>Boulding 1953</td>
</tr>
<tr>
<td>1956</td>
<td>Organization man</td>
<td>Whyte 1956</td>
</tr>
<tr>
<td>1957</td>
<td>New social class</td>
<td>Dijias 1967; Gouldner 1970</td>
</tr>
<tr>
<td>1958</td>
<td>Meritocracy</td>
<td>Young 1958</td>
</tr>
<tr>
<td>1959</td>
<td>Educational revolution</td>
<td>Drucker 1969</td>
</tr>
<tr>
<td>1960</td>
<td>Postcapitalist society</td>
<td>Dahrendorf 1969</td>
</tr>
<tr>
<td>1960</td>
<td>End of ideology</td>
<td>Bell 1969</td>
</tr>
<tr>
<td>1962</td>
<td>Postmaturity economy</td>
<td>Rostow 1960</td>
</tr>
<tr>
<td>1963</td>
<td>Industrial society</td>
<td>Acoc 1961; 1966</td>
</tr>
<tr>
<td>1968</td>
<td>Knowledge economy</td>
<td>Machlup 1962; 1986; Drucker 1965</td>
</tr>
<tr>
<td>1968</td>
<td>New working class</td>
<td>Malin 1965; Ginz 1970; Galie 1978</td>
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<tr>
<td>1969</td>
<td>Postbureaucratic society</td>
<td>Lichtheim 1966</td>
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<tr>
<td>1964</td>
<td>Global village</td>
<td>McLuhan 1964</td>
</tr>
<tr>
<td>1966</td>
<td>Managerial capitalism</td>
<td>Mars 1964</td>
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<tr>
<td>1967</td>
<td>One-dimensional man</td>
<td>Marcuse 1964</td>
</tr>
<tr>
<td>1966</td>
<td>Postcapitalistic era</td>
<td>Bouding 1964</td>
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<tr>
<td>1967</td>
<td>Service class society</td>
<td>Dahrendorf 1964</td>
</tr>
<tr>
<td>1967</td>
<td>Technological society</td>
<td>Ethul 1964</td>
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<tr>
<td>1967</td>
<td>New industrial state</td>
<td>Galbraith 1967</td>
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<tr>
<td>1968</td>
<td>Knowledge-income society</td>
<td>Galbraith 1967; Doglah 1972; Prague Academy 1972</td>
</tr>
<tr>
<td>1968</td>
<td>Dual economy</td>
<td>Avertit 1968</td>
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<tr>
<td>1968</td>
<td>Neocapitalism</td>
<td>Gorn 1968</td>
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<tr>
<td>1970</td>
<td>Postmodern society</td>
<td>Enzi 1968; Breed 1971</td>
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<tr>
<td>1970</td>
<td>Neocolonialism</td>
<td>Macnaim 1968</td>
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<tr>
<td>1969</td>
<td>Age of discontinuity</td>
<td>Drucker 1969</td>
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<tr>
<td>1969</td>
<td>Postindustrial society</td>
<td>Beer 1969</td>
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<tr>
<td>1970</td>
<td>Postindustrial society</td>
<td>Fejer 1969</td>
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<tr>
<td>1970</td>
<td>Computerized society</td>
<td>Martin and Norma 1970</td>
</tr>
<tr>
<td>1970</td>
<td>Personal society</td>
<td>Walsom 1970</td>
</tr>
<tr>
<td>1970</td>
<td>Posteconomic society</td>
<td>Kahn 1970</td>
</tr>
<tr>
<td>1971</td>
<td>Postliberal age</td>
<td>Vickers 1970</td>
</tr>
<tr>
<td>1971</td>
<td>Preindustrial culture</td>
<td>Modd 1970</td>
</tr>
<tr>
<td>1971</td>
<td>Technocratic era</td>
<td>Bresdres 1970</td>
</tr>
<tr>
<td>1971</td>
<td>Age of information</td>
<td>Helvey 1971</td>
</tr>
<tr>
<td>1971</td>
<td>Communications</td>
<td>Gettinger 1971</td>
</tr>
</tbody>
</table>

**Introduction**

1971 | Postindustrial society | Tournite 1971; Bell 1973 |
1972 | Self-guiding society | Bred 1971 |
1972 | Superindustrial society | Toffler 1971 |
1972 | Limits to growth | Meadows 1972; Cole 1973 |
1972 | Postindustrial society | Ezekiel 1972 |
1972 | World without borders | Brown 1972 |
1973 | New service society | Lewis 1973 |
1974 | Stalled society | Osgood 1973 |
1974 | Consumer vanguard | Garrison and Riesman 1974 |
1974 | Information revolution | Lambert 1974 |
1976 | Communications age | Phillips 1976 |
1976 | Mediaocracy | Phillips 1976 |
1976 | Third industrial revolution | Stone 1976; Stonier 1976 |
1976 | Industrial-technological society | Junsopp 1976 |
1977 | Megacorp | Eichner 1976 |
1977 | Electronics revolution | Evans 1977 |
1978 | Information economy | Flors 1977 |
1978 | Anticipatory democracy | Remold 1978 |
1978 | Network nation | Hiltz and Turoff 1978 |
1979 | Republic of technology | Borealis 1978 |
1979 | Toematization society | Nors and Minz 1978; Martin 1981 |
1979 | Wired society | Martin 1979 |
1979 | Collapse of work | Jenkins and Sherman 1979 |
1979 | Computer age | Dertouzos and Moses 1979 |
1979 | Credential society | Collins 1979 |
1980 | Micro millennium | Evans 1979 |
1980 | Micro revolution | Large 1980; 1984; Laroie 1981 |
1980 | Microelectronics revolution | Forester 1980 |
1981 | Third wave | Toffler 1980 |
1981 | Information society | Martin and Butler 1981 |
1982 | Communications revolution | Williams 1982 |
1983 | Information age | Dinsel 1983 |
1983 | Computer state | Burnham 1983 |
1984 | Geneculture | Synter and Elms 1984 |
1984 | Second industrial divide | Piore and Sabel 1984 |
Information: there's growing agreement it's the name of the age we live in.

growing agreement?
there's growing awareness that ...

self-conscious age of information

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

-- James Gleick, *The Information*, 2011
1. when did people \textbf{become aware} that they lived in an “age of information”?

2. what were the most important innovations of the time and how did they affect this awareness?
1. when did people **become aware** that they lived in an “age of information”?

ahead of his time?
When was that?

1. when did people become aware that they lived in an “age of information”?

ahead of his time?

"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
2. what were the most important innovations of the time and how did they affect this awareness?

quiet times?

everything's now on the internet ...

“Wassup, bro?”

“N’ much”
what was going on?

the emergence of the public sphere
newspapers, public opinion [coming up, Feb 9]

organization of knowledge
Chambers, Diderot, Smellie [coming up, Feb 21]

advertising, IP
Donaldson v. Beckett [coming up, Feb 23; March 9]

revolution [coming up, today]
Age of Information

- what's in an age?
- getting from one age to another
- the "age of information"
- intergenerational revolution
- revolution
- why history matters

why history matters

1 HOFI-1.17.17-Intro-PD 17
"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
"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

**ages past**
stone  
sail
bronze  
steam
iron  
jet
steel  
nuclear/atomic
space

**plastic**

what's in an age?
what's in an age

ages past

hunter-gatherer

husbandry

manufacturing

commerce

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

— Adam Smith, Wealth of Nations, 1776

— Thomas Carlyle, "Sign of the Times" 1829
what’s in an age?

the “age of information”

getting from one to another

revolution

intergenerational revolution

why history matters
transformation?

"The day the universe changed"

James Burke, *Printing Transforms Knowledge*
BBC 1986 [UC Media Center]
"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 ..."  

"Printed books evolved into better-designed packages of information."
"glittering proof that a new information age was dawning in Europe, fuelled by the power of the printed word."


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

Age of Information

- Revolution

why history matters

intergenerational revolution

- Getting from one age to another

what's in an age?

the "age of information"
what drives change?

first wave

second wave

third wave

Alvin Toffler,
— The Third Wave, 1980
what drives change?

**first wave**
agrarian revolution

**second wave**
industrial revolution

**third wave**
information revolution

Alvin Toffler,  
— *The Third Wave*, 1980

---

**fourth revolution?**

Copernicus  
Darwin  
Freud  
Turing

Luciano Floridi  
— *The Fourth Revolution*, 2014
what's in a revolution?

a break from the past?
is this what it looks like?

**an English view:**
- going round in circles: 1640-1660

**gaining direction?** "Glorious Revolution" (1688)
"The Popists in offices lay down their Commissions and flie: it looks like a Revolution."

-- John Evelyn, *Diary*, 1688

**coming round again** (English view of the French):
"a Pope/is summoned in, to crown an emperor ... the dog/Returning to his vomit ..."

-- William Wordsworth, *Prelude*, 1805
“Ibn Khaldun, the great fourteenth century north African sociologist developed a cyclical theory of Islam ... alternation between the city and the desert whereby warrior desert nomads sweep in on the decadent cities .... But they in turn become lax and decadent, and new conquest sweeps in from the desert.”

Michael Mann, *Sources of Social Power* vol 4, 2013
still circling?

new media “creates ... depth of involvement ... and human association that our preceding mechanical technology has destroyed.

“... the causes of things begin to emerge to awareness again ... We return to the inclusive form ...”

— McLuhan, Understanding Media, 1964
round and round

80% Stock Market Crash To Strike in 2017, Economist Warns

BY JL YASTINE   December 16, 2016
Révoltes, révolutions, émeutes, rébellions, émotions, guerres civiles, coups d'État, l'histoire entière en est tissée. La vie de l'homme en est faite. Non point accident mais constante, non dérision mais vérité.

1. L'histoire en est tissée... Prenons quelques exemples : le xviième 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; 1633, 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 de 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 Massaquoi à Naples, contre le vice-roi espagnol; pendant un an; 1648 est également une année fortuite pour les révolutions : révolution d'Angleterre commençée 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, Kiotvar, Tomsk, etc.; la révolte hindouiste des Mahrautes 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 Steanka Razin et le soulèvement paysan de Bohême.
Révôltes, révolutions, émeutes, rébellions, émotions, guerres civiles, coups d’État, l’histoire entière en est tissée. La vie de l’homme en est faite. Non point accident mais constante, non

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Age of Information

revolution

getting from one to another

what's in an age?

the “age of information”

why history matters

intergenerational revolution

what's different?
Digital Natives, Digital Immigrants

By Marc Prensky

From On the Horizon (MCB University Press, Vol. 9 No. 5, October 2001) © 2001 Marc Prensky

It is amazing to me how in all the hoopla and debate these days about the decline of education in the US we ignore the most fundamental of its causes. Our students have changed radically. Today’s students are no longer the people our educational system was designed to teach.
permanent revolution?

children of the depression
baby boomers
generation x
generation y
generation m¹
generation m²
... generation mⁿ

* * *

Edward Porter
ECONOMIC SCENE
JAN. 10, 2014

America's Best Days May Be Behind It

Take a look back at some of the most popular TV programs of the mid-1960s — “The Dick Van Dyke Show,” “Bewitched,” even “The Beverly Hillbillies” — and what do you see?

Like today, middle-class Americans typically had washing machines and air-conditioning, telephones and cars. The Internet and video games were not yet invented. But life, overall, did not look that different.

There were TVs and radios in most homes. Millions of people worked in downtown offices and lived in suburbs, connected by multilane highways. Americans’ average life expectancy at birth was 74, only eight years less than it is today.

But fast back 50 years earlier. Then, less than half the population lived in cities. Though Ford Model T’s were starting to roll off the assembly line, Americans typically moved around on horse-drawn buggies on dirt or cobblestone roads. Refrigerators or TVs? Most homes weren’t even wired for electricity. And average life expectancy was only 46.
steam natives/steam immigrants

the Adams family

"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]
1854, or was it 1847?

“the age is remarkable for scientific research. ... The ancients saw nothing like it. The moderns have seen nothing like it till the present generation. We see the ocean navigated and the solid land traversed by steam power, and intelligence communicated by electricity. Truly this is a miraculous era.”

—Daniel Webster, “Dedication of the Northern Railroad,” 1847.
generational paradox?

who’s wrong?

and what’s odd?
The "age of information"

- What's in an age?
- Getting from one age to another
- Intergenerational revolution

Why history matters
how do we know?

"What should they know of England
Who only England know?"

-- Rudyard Kipling, "The English Flag," 1899

what should we know of our "age" who …?

"You can't connect the dots looking forward, you can only connect them looking backwards."

-- Steve Jobs,
Stanford Commencement, 2005
"The real history of communications, in showing us the contradictions, shows us also the need to choose between genuinely alternative directions for the future"

— Raymond Williams, *Communications*

---

**how do we know?**

"What should they know of England
Who only England know?"

-- Rudyard Kipling, "The English Flag," 1899

**what should we know of our "age" who ...?**

"You can't connect the dots looking forward, you can only connect them looking backwards."

-- Steve Jobs,
Stanford Commencement, 2005
dangerous pastime?

"Mao urged the emulation of ... an emperor [Qin Shi Huang] who had advocated eliminating anyone who used history to criticise the present. .... [Huang] 'buried 460 scholars but we buried 46,000.'"


**hence?**

talk of revolution, transformation, rupture, coupure, .... 2.0
and a challenging pastime?

like learning cricket?

"The past is a foreign country. They do things differently there."

--L.P. Hartley, The Go-Between, 1953
in other countries

**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
coming up:
what’s the role of tech?

tech change — 50 years on

24 Jan: Technological Revolutions

In this class we will look at arguments that suggest or contest the idea that technologies (and particularly information technologies) are capable of changing the world by themselves. Such claims are common today, but as we shall see, they have a long history.

Required Reading

Read: "Preface to Third Printing" (pp. v-x), and "Introduction" & "The Medium is the Message" (pp. 3-21).
Source: Course reader

Read: Chapter 1, introduction and sections a & b, pp. 1-11; & chapter 5, section c, pp. 119-127.
Source: Course reader
"what people felt about it"

“very large structural changes that are occurring today... data classification yields to pattern recognition ... 'information overload' ... The young student today grows up in an electronically configured world.”

— Marshall McLuhan, 
Understanding Media, 1964

Why then?

“Television has now been a ... service for a whole generation”

— Raymond Williams
Television and Cultural Form, 1974
McLuhan writes that "social life is totally threatened by the electric technology" [17] and that, where "print created individualism and nationalism" [19-20], the "electric implosion" [5] by "abolishing both space and time" [3] now "compels commitment and participation" [5] that will ultimately lead to us all living in an interconnected "global village" [111]. Williams, in response, asks whether it is "reasonable to describe any technology as a cause." [9]

Some see our "information age" as the result of another "implosion" beyond McLuhan's dreams. Does McLuhan's or Williams's argument best account for what got us here?