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—William James, *Principles of Psychology*

A (very) brief history of "information"

Geoff Nunberg
School of Information, UC Berkeley
April 15, 2010



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Agenda

What could *information* mean, if anything?

When did *information* start to go squirrely?

A philological digressus

Why couldn't science straighten us out?

Peeling up the rug



i- : A Prefix Whose Time has Come





What puts the *i* in iSchool?



What does it mean to be a "school of information"? Is it computer science or library science? Is it social science, law, or business? Is it information architecture or multimedia design? ... Or are we concerned with "the human element" of information: how it connects, separates, affects people?

The answer to all these questions is "yes," because the study of information — how it is created, shared, and transformed into actionable knowledge — touches a wide range of issues and disciplines, just as it addresses the vast diversity of human needs, activities, and relationships.

AnnaLee Saxenian, Dean's statement



Information as a keyword

"strong, difficult, and persuasive words..."

Raymond Williams

Words as "compacted doctrines"

The surest sign that a group or society has entered into the self-conscious possession of a new concept is that a corresponding vocabulary will be developed, a vocabulary which can then be used to pick out and discuss the concept with consistency.

—Quentin Skinner, "Language and Social Change"



The scope of "information"

The McGraw-Hill Companies
BusinessWeek

... it's always there when we look for it, available wherever we bother to direct our attention. We can glean it from the pages of a book or the morning newspaper and from the glowing phosphors of a video screen. Scientists find it stored in our genes and in the lush complexity of the rain forest. The Vatican Library has a bunch of it, and so does Madonna's latest CD. And it's always in the air where people come together, whether to work, play, or just gab.

What is it that can be so pervasive and yet so mysterious? Information, of course.

John Verity in *Business Week*, special number on the "Information Revolution," 1994



Stuff n' Symbols...

... it's always there when we look for **it**, available wherever we bother to direct our attention. We can glean **it** from the pages of a book or the morning newspaper and from the glowing phosphors of a video screen. Scientists find **it** stored in our genes and in the lush complexity of the rain forest. The Vatican Library has a bunch of **it**, and so does Madonna's latest CD. And **it's** always in the air where people come together, whether to work, play, or just gab.



...that can effect mighty changes

The McGraw-Hill Companies
BusinessWeek

What gives computers such awesome potential to reshape the world? For starters, all technologies that "process information" (although they were never described in those terms in the predigital era) affect deeply the societies that use them. Johannes Gutenberg's printing press eventually helped reformers to erode the Catholic Church's political power: Books spread knowledge in ways the Vatican could not control.



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The linguistic question: What would you have to assume so that this would all make perfect sense to you??



Does "information" mean anything at all?

"Information is a high-frequency and low-content phrase that permeates our ordinary language without attracting much attention, since its meaning has long eroded."

Pieter Adriaans and Johan van Benthem

"...a sloppy, pseudoscientific catch-all — a slippery ``amoeba word," German linguist Uwe Purksen calls it, with nearly two dozen connotations."

John Verity in *Business Week*



Does "information" mean anything at all?

In ordinary usage, is *information*...

Simply "loose" or "sloppy" or "bleached"?

Vague? (like *nice* or *democratic*)

General? (like *structure* or *artifact*)

Polysemous? (like *gossip* or *instruction*)



Collocations and Semantic Fields

Collocations listed in OED:

Information revolution, society, age
digital, internet, post-industrial, service

___ science, theory
signal, entropy, document, communication

___ technology
digital, computer, electronic

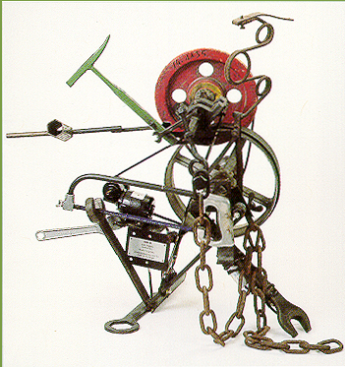
___ explosion, glut, anxiety, overload, rich, poor
knowledge, data, content, access

___ architect, officer
knowledge, technology

___ storage, retrieval, processing
data, knowledge



Gimcrack concepts

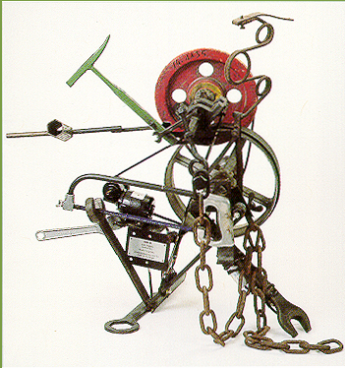


Most accounts of objectivity – philosophical, sociological, political – address it as a concept.... But if it is a pure concept, it is less like a bronze sculpture cast from a single mold than like some improvised contraption soldered together out of mismatched parts of bicycles, alarm clocks, and steam pipes.

Lorraine Gaston & Peter Gallison, *Objectivity* (2007)



Gimcrack concepts



Gimcrack concepts...

are concepts, not "pseudo-concepts" or "quasi-concepts"... they have internal structure, but it is inconsistent or incomplete.

are typically ideologically inflected, "persuasive."

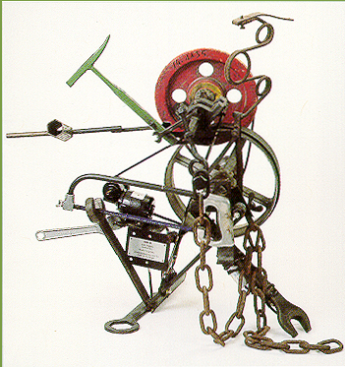
Cf Walter Lippmann on political symbols, which "stand for a truce or juncture between ideas."

Cf "values," "technology," "community," etc.

"[Terms such as] "information society"... seek to catch a fashionable wind and twist it for modish purposes." Daniel Bell



Gimcrack concepts



Gimcrack concepts...

can exist only when there are words for them

"Whenever we have made a word to denote a certain group of phenomena, we are prone to suppose a substantive entity existing beyond the phenomena, of which the word shall be the name."

—William James, *Principles of Psychology*

relating to the maintenance of a balance between producing and using carbon, especially balancing carbon-dioxide emissions by activities such as growing plants to use as fuel or planting trees in urban areas to offset vehicle emissions

carbon-neutral





When did *information* start to get squirrely?

"Until World War II, [*information*] referred to the personal act of acquiring knowledge.... But during the war, "information" got redefined as something quantifiable that could be collected, moved, and processed." *Business Week*

The traditional meanings of the "action of informing" and "knowledge communicated concerning some particular fact, subject, or event" expanded dramatically with the development of electronic computers, satellite communications, and new information disciplines in the United States after World War II." Ronald R. Kline



Looking backward



information, *n.*

I. The imparting of incriminating knowledge.

14. The action of imparting accusatory or incriminatory intelligence against a person; an instance of this, a charge, an accusation. *Obs.*
Now only as implied in senses 2 and 3.

1386 *Rolls of Parl.* III. 223/2 Thanne were such proclamacions made by the King of information of suche that wold be known to be guilty of felony. **1432** *Information* Lett. (1904) II. 38 The said Erie. maye not. lette malicious and untrewse men to make anye such information against the kyng though Informasyon of lyes and fals lyeing that they maye do. **1548** *R. Cawtey* (1886) An information and Petition agaynst the said Dunstons aide. laying before him what informations were put vp against the said Dunstons aide. **1609** *Commons Jnl.* in *Milton Orig. Papers* (1859) 27 Ordered, That Mr. Attorney General do cause effectual proceedings to be forthwith had, by way of indictment or information, against John Milton, in respect of the two books by him written.

II. *Latin.*

- **II.** The imparting of knowledge in general.
- **4. a.** The shaping of the mind or character; communication of instructive knowledge; education, training; advice (*obs.*). Now *rare*.
- **a1387** J. TREVISA tr. R. Higden *Polychron.* (St. John's Cambr.) VI. 33 Fyve bookes comdoun from heven for informacioun of mankynde. **a1393** GOWER *Confessio Amantis* (Fairf.) VII. 1. 1780 A tale, which is evident Of trouthe in comendacioun, Toward thin enformacion. **c1425**(a1420) LYDGATE *Troyes Bk.* (Augustus A. 4) II. 1. 6202 Agamenoun Hath be counseil and informacioun Of wyse Calchas made sette vp on e londe, In-to an Ile. **?a1430** T. HOCLEVE *Clothing of Virgin* (Huntington) l. 9 in *Minor Poems* (1970) 290 This man had a yong sone, Vn-to which he yaf informacion, Euery day. **1526** *Bible* (Tyndale) Eph. vi. 4 Brynge them vppe with the norter and informacion off the lorde. **1597** R. HOOKER *Of Lawes Eccl. Politie* V. xx. 36 Their [*sc.* apocryphal books'] fitnessse for the publike information of life and manners. **a1629** W. HINDE *Faithfull Remonstr.* (1641) xxxi. 97 For their better information in the way of God, and more effectuall reclaiming of themselves. **1663** J. SPENCER *Disc. Prodigies* (1665) 20 To lead them to the light by a faithful information of their Judgments. **1736** BP. J. BUTLER *Analogy of Relig.* II. vii. 257 Our Reason and Affections, which God has given us, for the Information of our Judgment and the Conduct of our Lives. **1813** T. JEFFERSON *Writings* (1830) IV. 182 The book I have read with extreme satisfaction and information. **1851** U.

"Information" defined



"Information" in the 19th c.

Relevant Definitions around 1800-:

1. The shaping of the mind or character; communication of instructive knowledge; Now rare or Obs. [1387] < *inform* "give form to, shape" ("**Bildung**"/"education" sense)
- 2 Knowledge communicated concerning some particular fact, subject, or event. [1450] < *inform* "tell") ("**particularistic**" or "**news**" sense)
- ~~3. The action of informing.~~



"Information" in the 19th c.

1. The shaping of the mind or character; communication of instructive knowledge; education. Now rare or Obs. [1387] < *inform* "give form to, shape" ("**Bildung**" sense)

A woman of mean understanding, little information, and uncertain temper. Jane Austen, Pride and Prejudice, 1813

[The Germans'] object in the university course is not information or education, but training. Scribner's Magazine, 1879.

(cf "for your information," etc.)

2. Knowledge communicated concerning some particular fact, subject, or event. [1450] < *inform* "tell") ("**particularistic**" or "**news**" sense)

(but not really knowledge, and only when new)



A new facet of information emerges?

1. The shaping of the mind or character.
- 2 Knowledge communicated concerning some particular fact, subject, or event.
3. Records of a factual nature, either published, or collected and maintained by public entities or institutions. [GN] ("autonomous"/"mass" sense)

Vote 6 has always contained about 12 times as much information as it does this year. The detailed information in Vote 6 this year is all put in the form of appendices.
Hansard's Parliamentary Debates, 1887

Business must lay hold of modern library methods if they were to keep up with the steadily growing and important mass of printed information. Bull. of the Am. Lib. Assoc. 1913



What makes information-in-the-mass different?

Why isn't information-in-the-mass just particularistic information in the large?

A. IITM doesn't include spoken utterances etc.

Cf. "A copy of the daily New York Times contains more information than that the average 17th c. Englishman came across in a lifetime." (*"It is estimated that..."*)

B. Senses translate differently in other lgs

According to my information

Selon mes informations/ secondo le mie informazioni (pl.)

The information age (society etc.)

L'age de l'information (not l'age des informations)

L'età dell'informazione (sg.)

We need more reliable information.

Ci vogliono informazioni più attendibili. (pl.)



What makes info-in-the-Mass different?

Why isn't IITM information just particularistic information in the large?

C. They aren't the same kind of thing. Cf

How much information is there in the world?

How much truthful information is there in the world?

"This isn't just the age of information but the age of reliable information."



Features of Information-in-the-Mass

- litM usually belongs to public, commercial, or institutional life.

"A letter from your old acquaintance, the housekeeper at the Grange," I answered.... She would gladly have gathered it up at this information, but Hareton beat her. *Wuthering Heights*, 1847

Cf "personal information"

- litM generally presumes a fixed medium of storage or transmission: "present" in the world; can be transferred from one medium to another.
- litM is morselized/measurable



Features of Information-in-the-mass

litM is "plausible in itself" –

The intelligence that came from afar possessed an authority which gave it validity. Information, however, lays claim to prompt verifiability. The prime requirement is that it appear 'understandable in itself....' It is indispensable for information to sound plausible. Walter Benjamin, "The Storyteller"



Where did the new "information" come from?

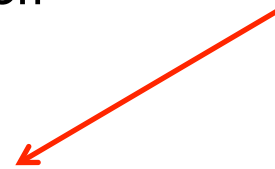
The natural assumption:

information1

"Bildung/education"

information2

"particularistic/news"



information3 InfoInTheMass/public



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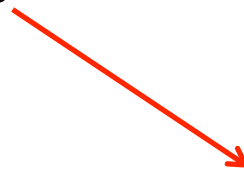
What actually happened:

information 1

"Bildung/education"

information 2

"particularistic/news"



information 3 InfoInTheMass/public

Cf "a horror," "a curiosity," etc.



An easy confusion



Examples of *information* = "edification, education"

Susan was growing very fond of her, and though without any of the early delight in books which had been so strong in Fanny, with a disposition much less inclined to information for information's sake... —Jane Austen, *Mansfield Park*.

I would not be hurried by any love of system, to underrate the Book... Great and heroic men have existed, who had almost no other information than by the printed page. — Ralph Waldo Emerson, "The American Scholar"

'Was he handsome?'—'She believed he was reckoned a very fine young man.' 'Was he agreeable?'—'He was generally thought so.' 'Did he appear a sensible young man; a young man of information?'—Jane Austen, *Emma*



"Information by the Book"

Presumption of a public passively imprinted in the image of the texts that are imposed on it. (Certeau)

An age of "informational" institutions and practices

Museums, public libraries, expositions, works of reference, newspapers...

Census and blue books





"Information by the Book"

Presumption of a public passively imprinted in the image of the texts that are imposed on it. (Certeau)

An age of "informational" genres, institutions and practices

The ideology of literacy: the "informed electorate"

"[To the free library] we may hopefully look for the gradual deliverance of the people from the wiles of the rhetorician and stump orator.... As the varied intelligence which books can supply shall be more and more widely assimilated, the essential elements of every political and social question may be confidently submitted to that instructed common sense upon which the founders of our government relied."

J. P. Quincy, 1876





Modern Times: information in its subdiscourses



Variation in conceptions of Information

Popular (folkloric) vs. technical/scientific conceptions of information — but lines are fuzzy

- "Information" as a category of everyday discourse
Can you give me some information about dehumidifiers?
- "Information" in discussions of public discourse & policy, education, journalism
- "Information" as a theoretical notion in philosophy, information theory, CS, cognitive science & linguistics, informatics, economics, political science, public policy, business & management, etc.
- "Information" as a theoretical notion in genetics, biology, physics, etc.



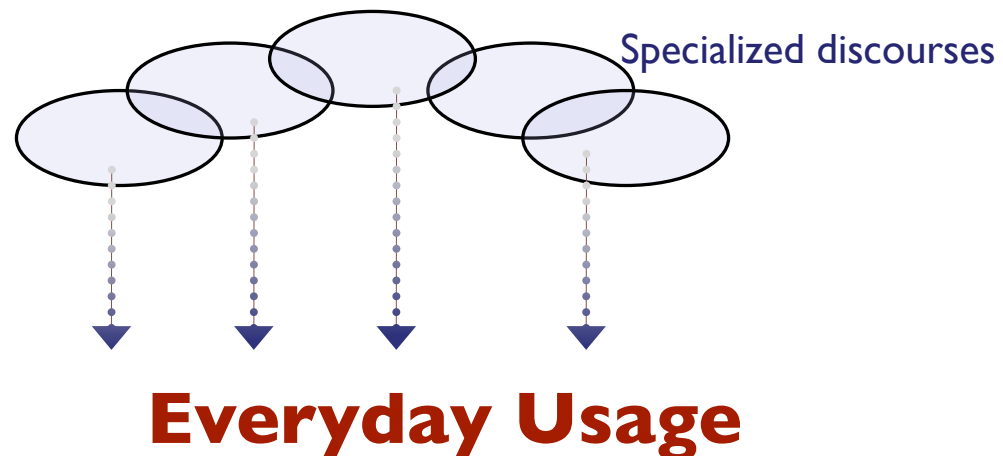
Language and its and subdiscourses



Semantic trickle-down:

Cf recent histories of *alienation, bureaucracy, conformist, ethnic, identity politics, peer-group, status symbol, economic, schizophrenic, psychopath...*

”Lately there ain't been much work on account of the economy”





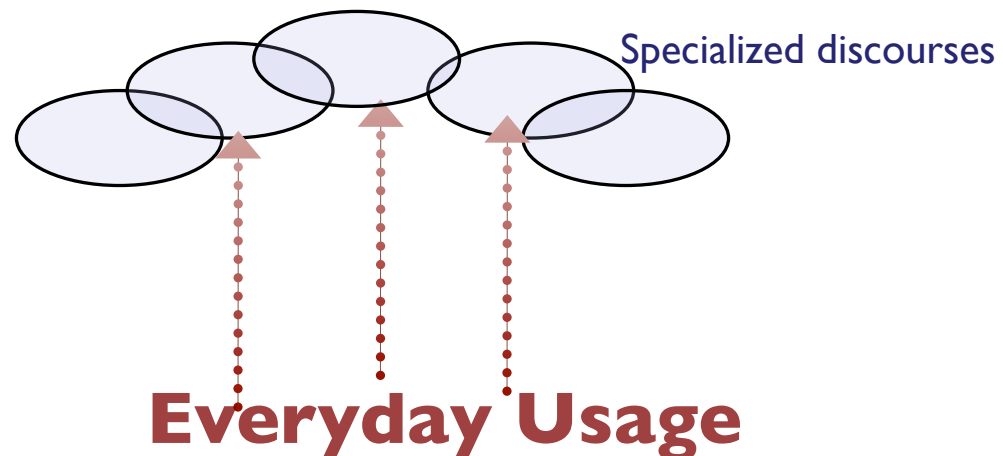
Language and its and subdiscourses



Words percolate up the ivory tower

”Technicalization” of vocabulary:

Cf modern development of *community*, *wealth*,
depression (econ. & psych.)



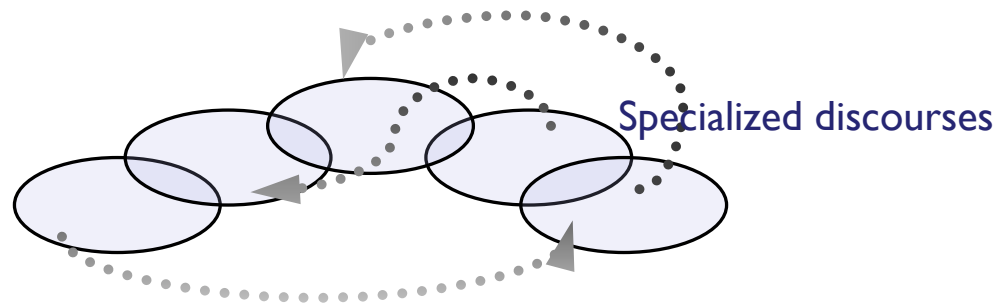


Words spread among subdiscourses



Words circle round the ivory tower
(*Wanderwörter*)

Cf recent histories of *network*, *formalism*, *community*,
information, *recursive*...

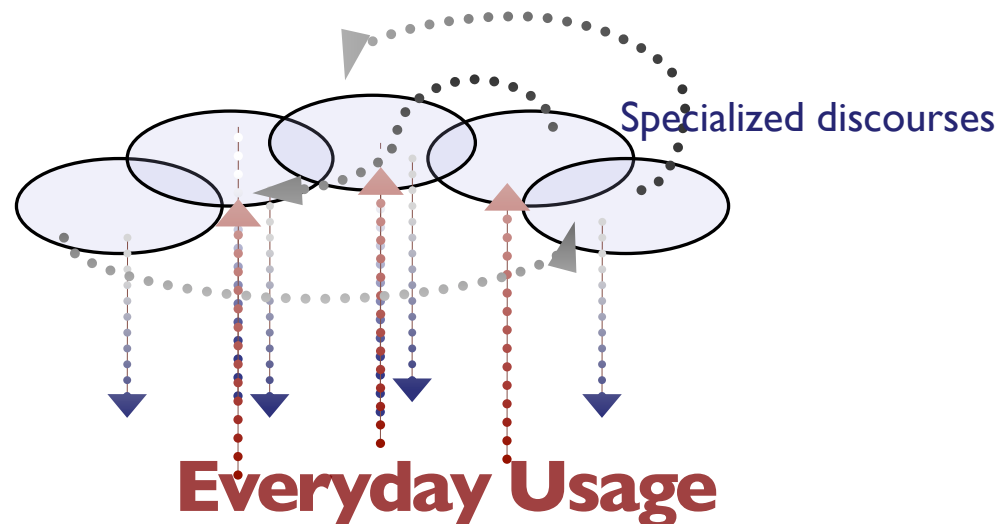


Everyday Usage



Words move in all directions at once

What does a given use of *information* owe to the requirements of the discipline, the influence of neighboring disciplines, and the general understanding of the word?





Information as a term of art

Post-WWII, *information* becomes a term of art in numerous fields, with various meanings

cybernetics, information theory & statistics
(information science & documentalism)

economics

cognitive science, AI, linguistics

sociology & systems theory

Management science, systems theory



Information as a term of art

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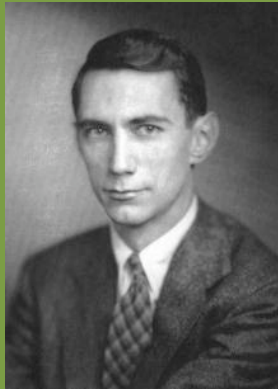
... all claiming to shed light on some aspect of the common-sense meaning of information.

Dretske: the account is intended to capture "most of what we normally or ordinarily mean by talking of some event, signal, or structure as carrying (or embodying) information about another state of affairs" but

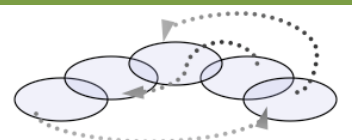
"The theory is not a candidate for *Webster's Dictionary*"



Information as a term of art



Information theory has, in the last few years, become something of a scientific bandwagon. Starting as a technical tool for the communication engineer, it has received an extraordinary amount of publicity in the popular as well as the scientific press. In part, this has been due to connections with such fashionable fields as computing machines, cybernetics, and automation ... Applications are being made to biology, psychology, linguistics, fundamental physics, economics, the theory of organization, and many others. ... What can be done to inject a note of moderation in this situation? Claude Shannon, 1993



Everyday Usage



Disputing "information"

But subdiscourses take varying approaches to defining "information"

The limited influence of information theory.

Information theory is alive and well in biology, engineering, physics, and statistics, although one rarely sees Shannon's information theory in contemporary psychology articles except to the extent of the late John W. Tukey's term *bit*, which is now a permanent word of our vocabulary. Duncan Luce, 2001

The mathematical theory of information ... is irrelevant [to computation] although computer programs are often said to be information-processing mechanisms.
Aaron Sloman



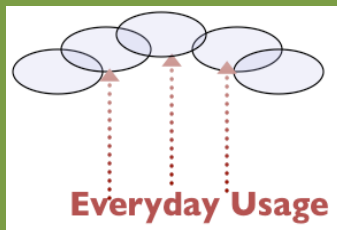
From Everyday Usage to Science...

But *which* ordinary-lg sense of "information" do researchers take as a point of departure?

Two (or so) technical understandings of *information*:

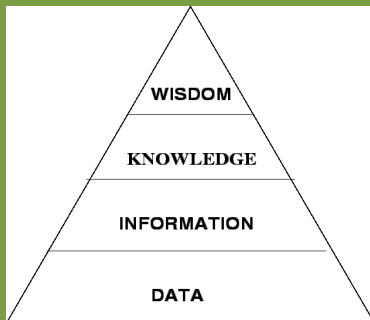
I. "Selectional" definitions of information: "that which reduces uncertainty" (Information theory, philosophical/ecological, some economists; also genetics etc.)

Drew on "particularistic" sense of *information* as "knowledge communicated"; i.e., information as "informative"; information as a given.





From Everyday Usage to Science...



But *which* ordinary-lg sense of "information" did theorists take as a point of departure?

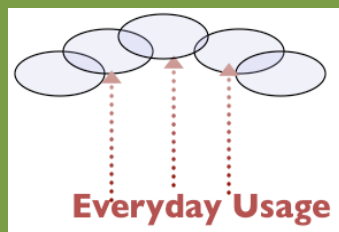
Two (or so) technical understandings of information

2. "Information processing" defs of information: AI, "Information society" research, Information systems theory, management science, other economists, etc.

Draw on "mass" sense of *information* as "constructed representations" (e.g. like published records).

Information as a product.

The particular role of "information technology"





... and back to everyday usage again

Specialized accounts of *information* in turn color and enrich the popular conception:

Information as fundamentally computational

the glowing phosphors of a video screen.

& "natural"

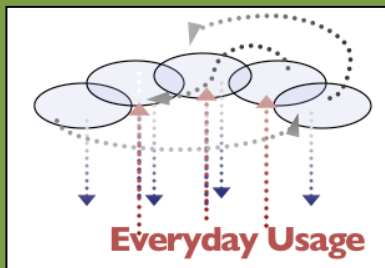
Scientists find **it** stored in our genes

Information as precisely quantifiable

Information as fungible

the computer's ability to reduce all conventional information forms into one big digital stew

Information as an index and a commodity



But the fundamental gap remains...



"the evilly compounded, vital i"*

Un-compacting "information": the problem space
How do we get from the stuff on hard drives to something that can erode the power of churches?

*Wallace Stevens, "The Poems of our Climate"