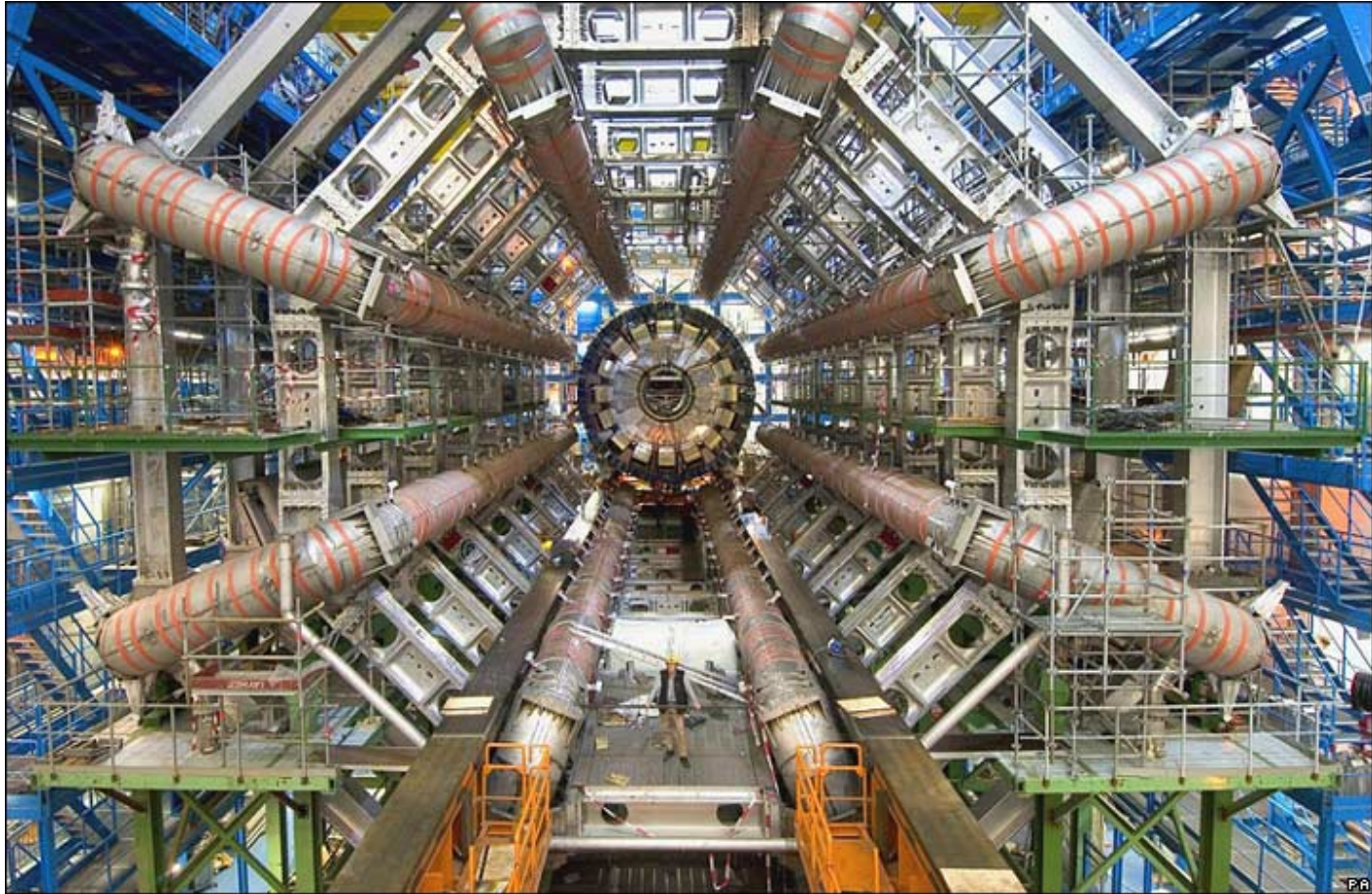# What is the Web?

Leslie Carr, Web and Internet Science,

University of Southampton, UK
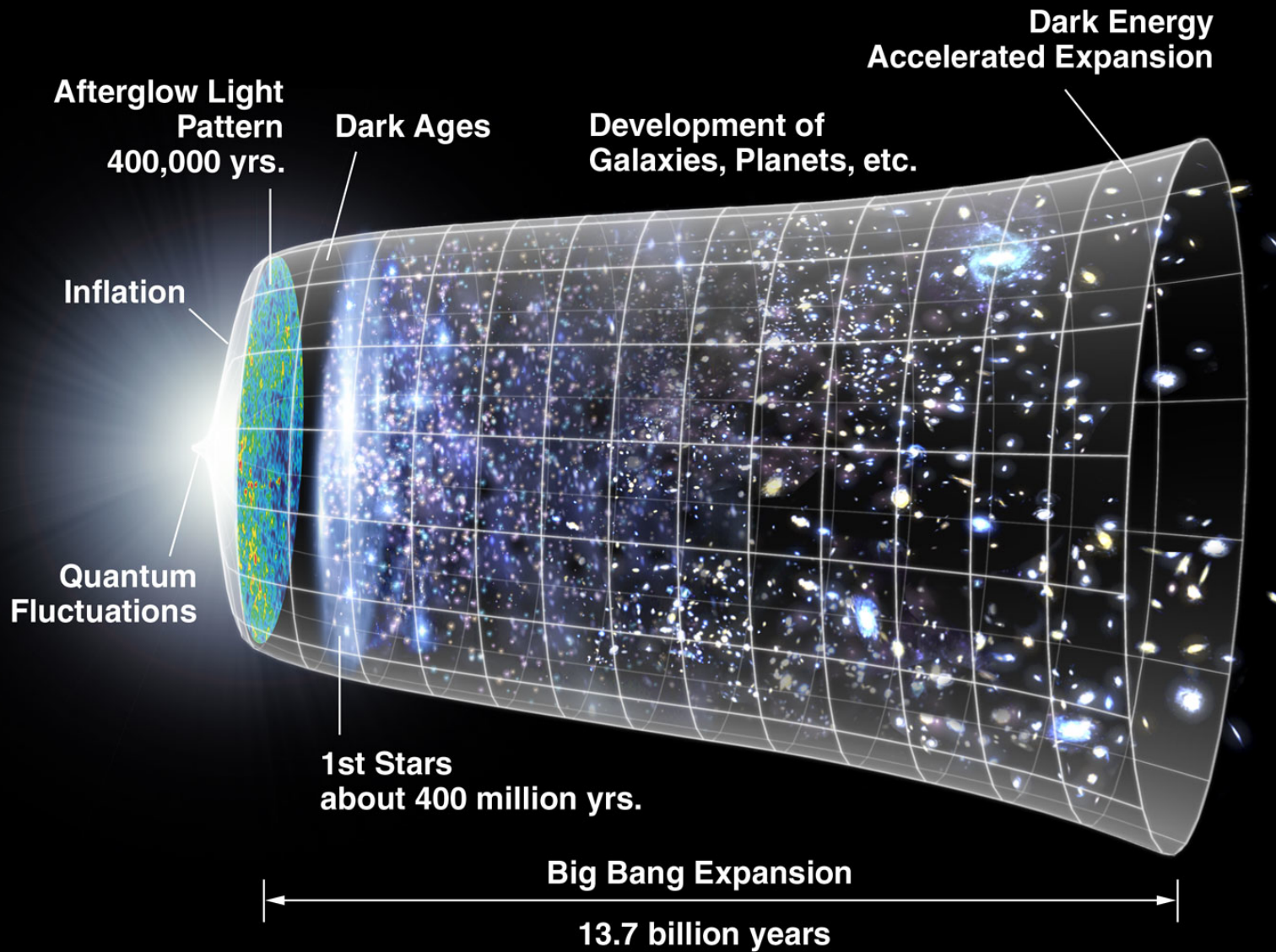
Where's This?

What's This?

Remember This 2006 Headline?

Birth of the Web

- From an underground nuclear bunker on the Swiss border, something did escape

- In 1989 the Web took over the academia, industry and the world

Afterglow Light
Pattern
400,000 yrs.

Dark Ages

Development of
Galaxies, Planets, etc.

Dark Energy
Accelerated Expansion

Inflation

Quantum
Fluctuations

1st Stars
about 400 million yrs.

Big Bang Expansion

13.7 billion years

NASA WMAP Science Team
http://map.gsfc.nasa.gov/news/3yr_release.html

Expansion of the Web

- The Web spread the conditions of its initial creation throughout the whole of society as it underwent an initial inflationary phase.

- The academy
  - government patronage
  - large-scale co-operation
  - sharing of intellectual property

Society is Diverse. One Size Fits All?

Institution	Objective
Academy	Create and transmit knowledge
Commerce	Make and trade goods
Press	Investigate and report news
Media	Create and broadcast content
Police	Maintain order and public surveillance
Judiciary	Apply law and resolve disputes
Government	Control society and share resources

The development of society as a whole (nuanced and structured and refined) is inextricably related to the technology of information provision, consumption and dissemination (e.g. writing, reading, printing, education). *Different parts of society have different objectives and hence incompatible Web requirements, e.g. openness, security, transparency, privacy.*
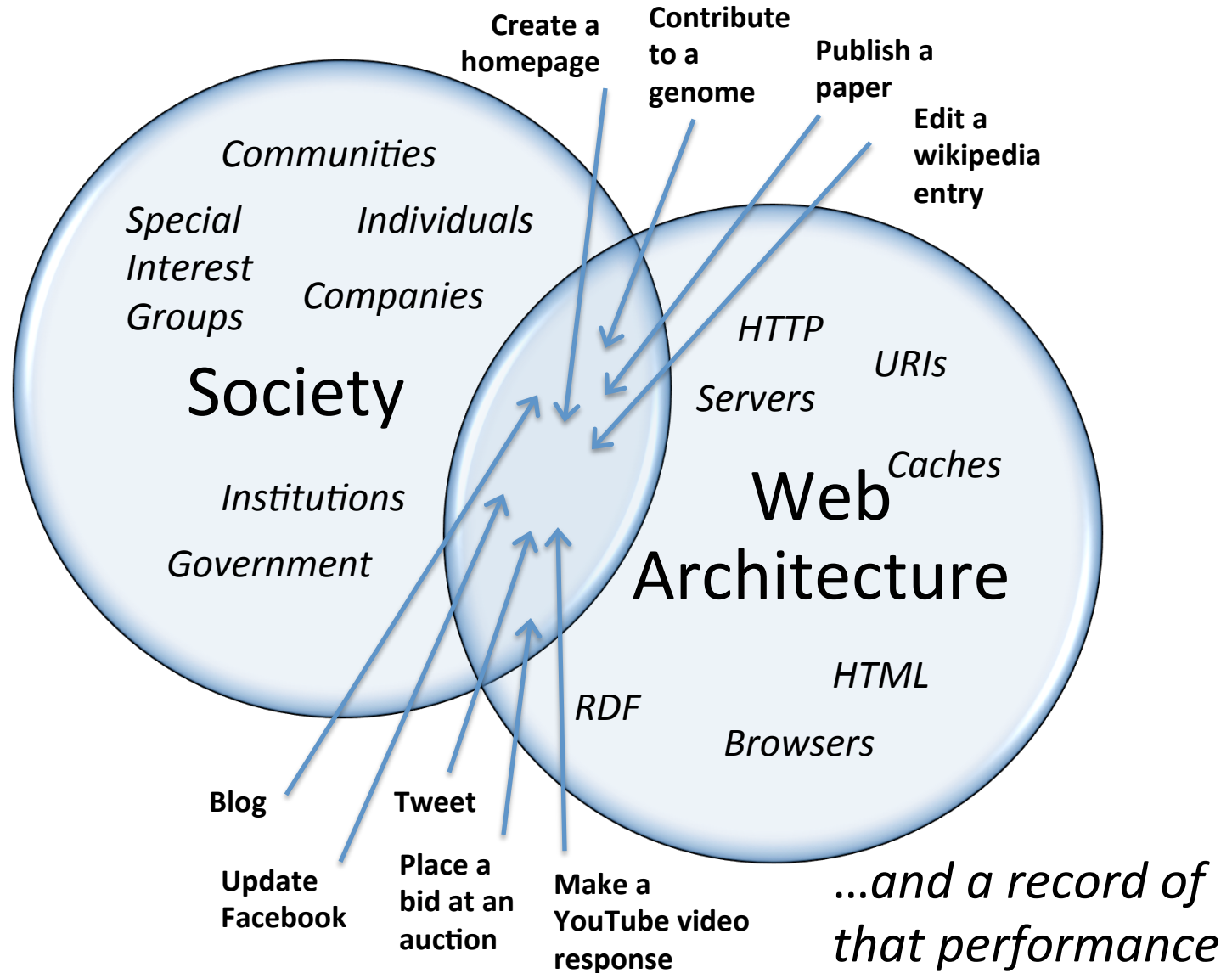
Less successful Webs from history

| Sponsor	System	Scope	Real	Date	Important Properties
Press	Reuters	Professional, centralised	✔	1850	News & stock information (originally carrier pigeon and subsequently telegraph)
Private Institution	Mundaneum	Public, centralised	✔	1920	Based on indexing technology (the library card)
Military	Memex	Scholarly, individual, centralised	✗	1945	Aimed at Scientists and Technologists in WWII
Media	Xanadu	Public, decentralised	✗	1960	Focused on DRM, reuse and writing for "creatives"
Media	CEEFAX	Public, national, centralised	✔	1970	Broadcast, linked, not participatory
Government	Minitel	Public, national, centralised	✔	1980	Commercial services and information
Academy (CS & HEP)	FTP / Archie / Anarchie	Public, decentralised	✔	1985	Downloaded resources (papers, reports) to hard drives and printed them on LaserWriters.
Commerce	Hypercard, HyperTIES	Private, centralised	✔	1988	Personal applications, sometimes tied to multimedia resources on CDROMs / video disks
Academy (HEP)	WWW	Public, global, decentralised	✔	1990	Universal naming, linking, interoperability, participative. However no writing, no indexing.
Academy (CS)	Microcosm	Private, centralised	✔	1990	Sophisticated linking and openness for personal information stores
Academy (CS)	HyperG	Public, centralised	✔	1990	Extension of Web for with support for writing, indexing and consistency management.
Commerce	AOL, CompuServ	Public, centralised	✔	1990	Dialup access to email, forums, chat rooms and information resources

The Web is a Performance...

Create a homepage

Contribute to a genome

Publish a paper

Edit a wikipedia entry

Communities

Special Interest Groups

Individuals

Companies

Society

HTTP

Servers

URIs

Institutions

Government

Web Architecture

Caches

HTML

RDF

Browsers

Blog

Tweet

Update Facebook

Place a bid at an auction

Make a YouTube video response

...and a record of that performance

Performing on the Web

- It's something we do, not a product we buy
  - ✗ Information and Communication Technology
  - ✓ Informing and Communicating Technology
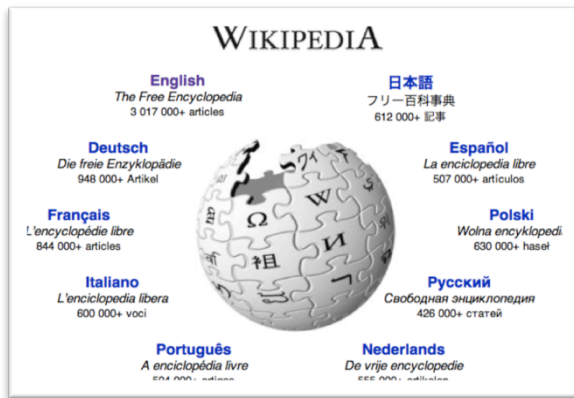
Wikipedia – new knowledge is edited and managed on the web through processes that are discussed and managed through the Web. Wikipedia only exists because of the wikipedia community; the wikipedia community only exists because of the Web. Both are a linked resource with an emerging set of values and standards.

Academia – new knowledge is created privately and sometimes presented on the Web. Centuries-old processes and values pre-exist in academic organisations and are re-interpreted for the prevailing technology.

Different parts of society have different needs to communicate for different ends.

…so is the Web a bad thing?

- or rather, an inappropriate thing
- A useful thing that is overapplied
- What does it give us except gossip, chatter, porn, entertainment?
- Can it really improve our lives?

We Are Cyborgs

- Social theorist Donna Haraway emphasises the role that technology plays in creating our humanity

- Union of human & technology makes a new kind of human
  - What sort of thing is human + smartphone ?
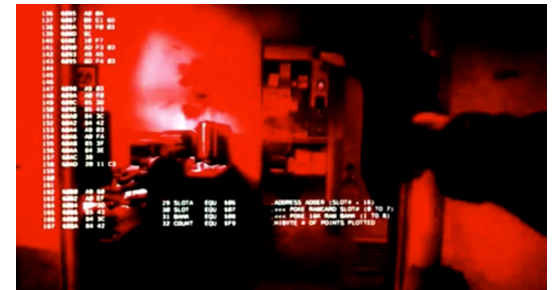
The web is not a thing acting alone. Computers cause nothing, but humans and computers together remake worlds.
paraphasing Donna Haraway, Social Theorist

Cyborgs in the Pub

- Lam, S., Pennock, D.M., Cosley, D. and Lawrence, S. (2003) *1 Billion Pages = 1 Million Dollars? Mining the Web to Play "Who Wants to be a Millionaire?"* in Proc. of the 19th Conf. on Uncertainty in Artificial Intelligence, 2003

Bloom's Taxonomy and the Potential of the Free Exchange of Knowledge

- Educational outcomes / Cognitive competencies?

- Everything is built on knowledge/recall

- **The only thing** the Web provides is knowledge/recall

...then can we have this?

Evaluation
judge, critique, compare, justify, conclude, discriminate, support

Synthesis
combine, create, formulate, design, compose, construct, rearrange, revise

Analysis
differentiate, diagram, estimate, separate, infer, order, subdivide

Application
demonstrate, compute, solve, modify, arrange, operate, relate, adapt, apply, implement

Comprehension
classify, explain, summarize, convert, predict, distinguish between

Knowledge
define   describe
repeat   identify
record   match
list   select
recall   outline
name   write

If the Web can give us this...

Web Science Questions

- How would the world change if one of the previous Web systems had been in the right place at the right time for success?
  - What if the commercial, creative Web had succeeded (Xanadu + AOL) instead of the open, academic Web?

- How will the world change as other parts of society impose their requirements on the Web?
  - What if the requirements of security and policing take future priority over free exchange of information or unrestricted transfer of knowledge?

Urgent Web Science Questions

- Are the *public* and *open* aspects of the Web **fundamental constants** of its operation?

- Are they a permanent change in our society's information processes, or just a temporary mistake?

  – Are open source, open access, open science & creative commons efficient, effective and sustainable alternatives to fee-based transfer of knowledge-bearing artefacts?

Summary

- We take for granted a Web that provides free and unrestricted information exchange

- But the Web is under pressure to change
  - to respond to issues of security, commerce, criminality, privacy

- Web Science needs to
  - explain how the Web impacts society
  - predict the outcomes of proposed changes to Web infrastructure on business and society.