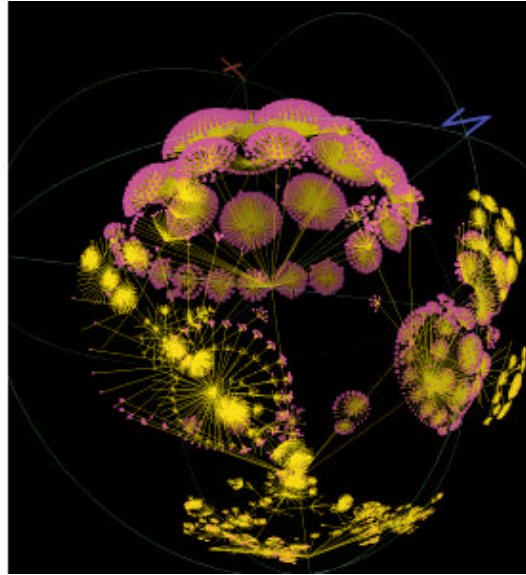


the role of maps in virtual research



Martin Dodge
centre for advanced spatial analysis
university college london

who is martin dodge ?

- social geography, computing, geographical information systems (GIS)
- researcher in Centre for Advanced Spatial Analysis and lowly lecturer in Geography dept.
- part-time phd in cybergeography
- geographies of cyberspace
- net measurement and mapping
- cataloguing of diverse range of maps
- critical appraisal of maps and visualisation
- role of software in surveillance online and offline

talk

- a bit about maps
- a bit about geography
- mapping the internet
- mapping info space
- mapping people
- problems - the power of maps

defining virtual research

- new environment (virtual, online, cyber)
- same old questions (identity, difference, power, community, etc)
- many ways to describe the virtual
- what does cyberspace look like?

defining maps and mapping

- “maps are graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world”

(Harley and Woodward, *History of Cartography*, Volume 1, 1987)

- the virtual is changing the map of course

the map is a help provided to the imagination through the eyes

Henri Abraham Chatelain, *Atlas Historique* (1705)

role of maps

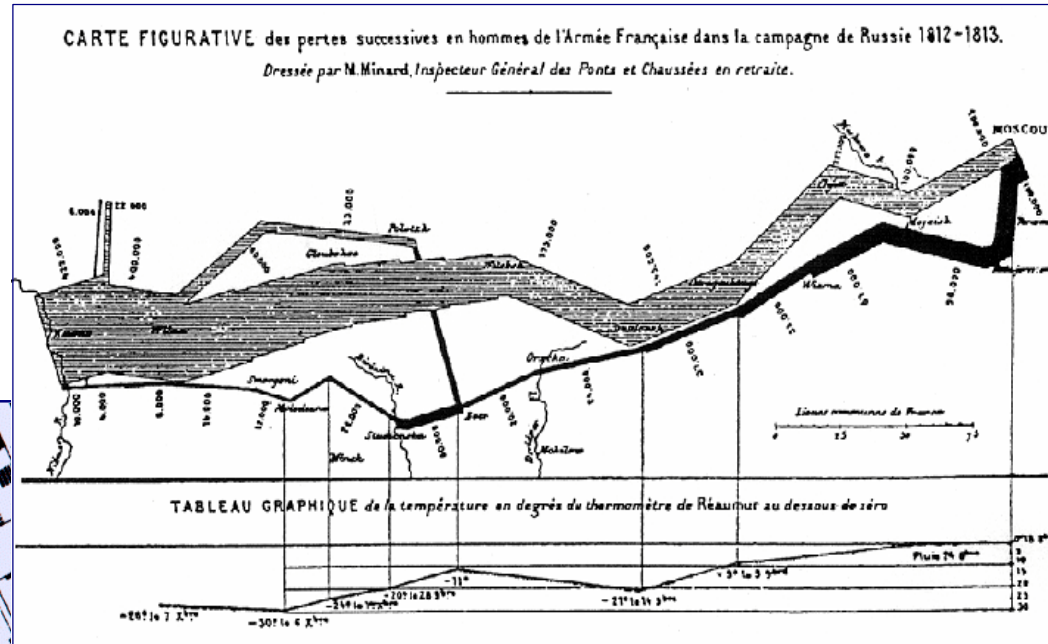
- maps for storing spatial data
- maps for thinking
- maps for communicating

the 'classics'

Charles Minard's
'Napoleon' map, from
1861



John Snow's 'Cholera' Map, 1854



'Tube' map, based on the design
of Harry Beck in 1930s

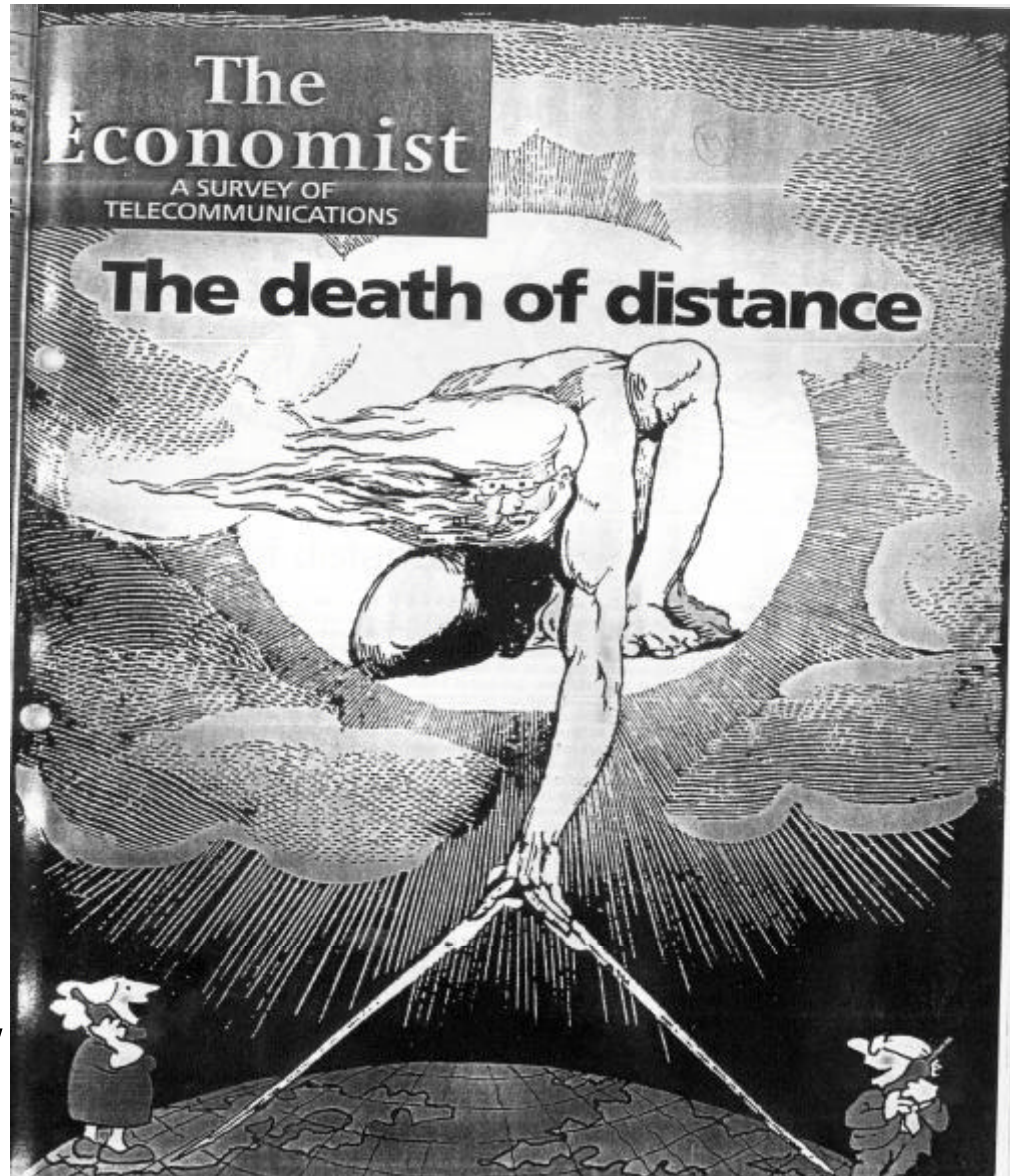
Is there a geography of cyberspace?

Bits, not atoms

Spaceless space

**anything,
anytime,
anywhere**

End of
Geography



Cyberspace
is everywhere
and nowhere

**friction-free
economy**

Cities dissolve

*Weightless
World*

30th September 1995

why geography still matters

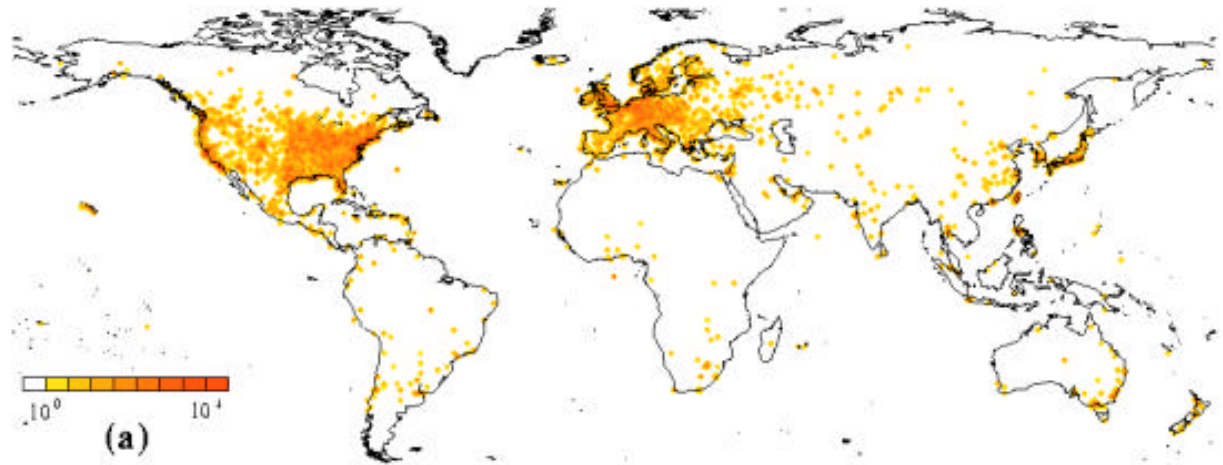
- familiar framework
- meaning in everyday life
- grounded, embodied users
- linkage. location as index key
- law
- language
- market segmentation
- rise of 'locational-media'



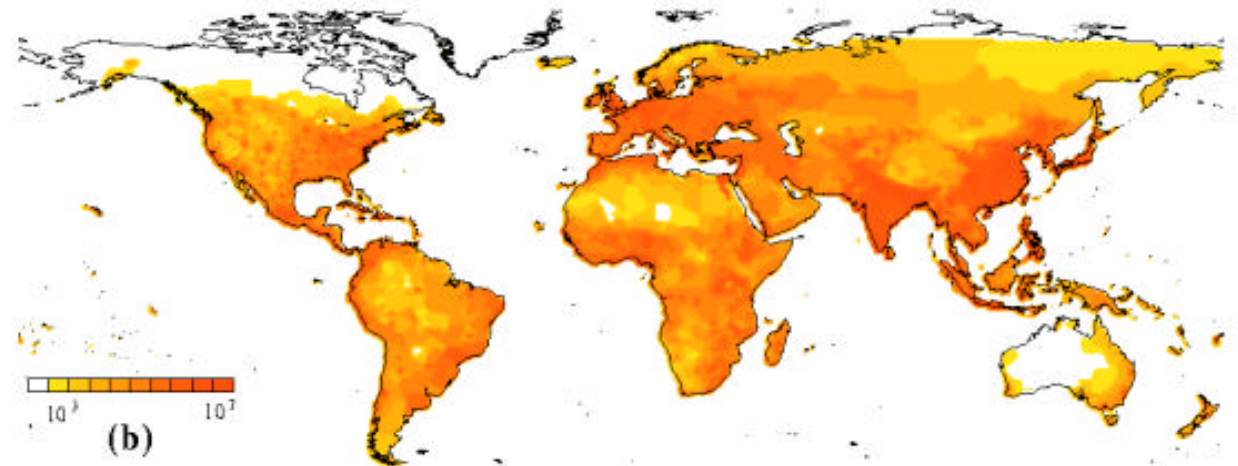
11th August 2001

'the future is here, its just unevenly spread'

Router
density

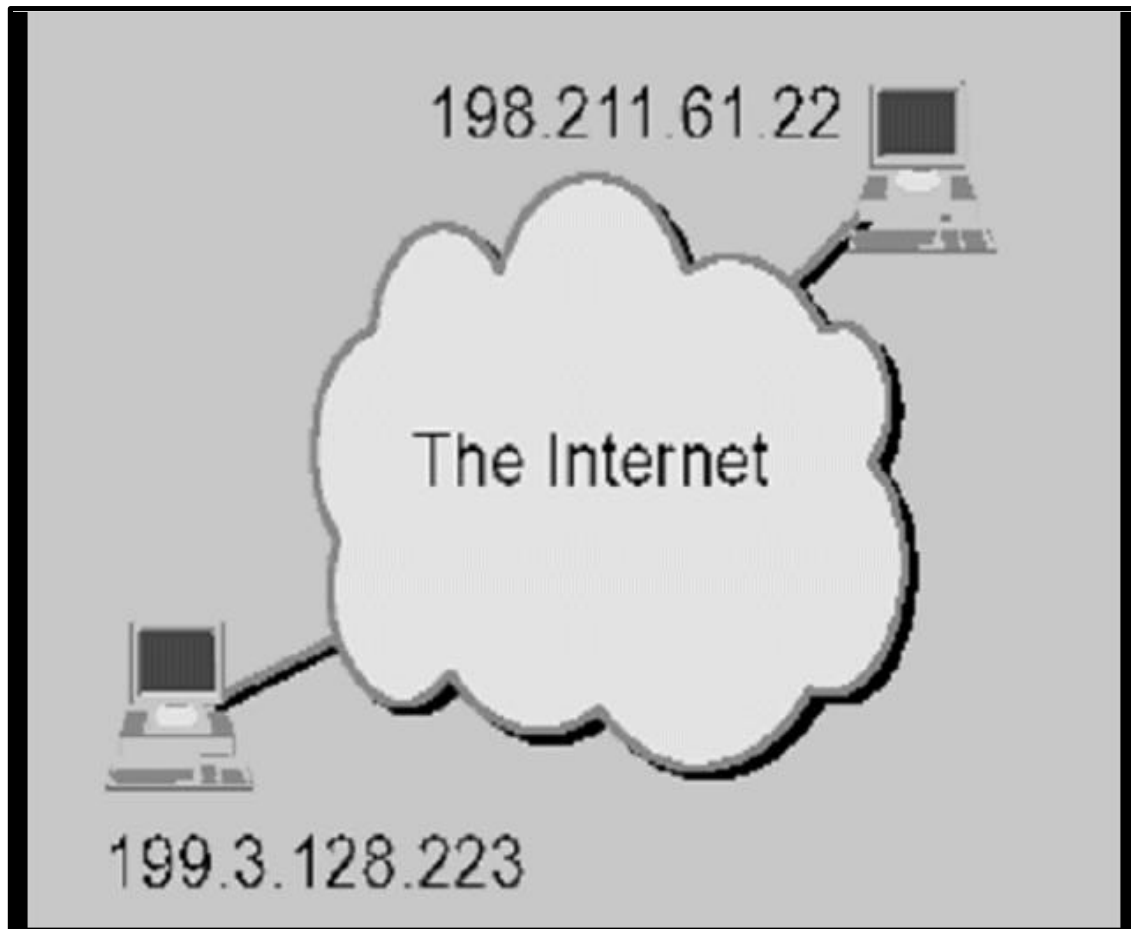


Population
density





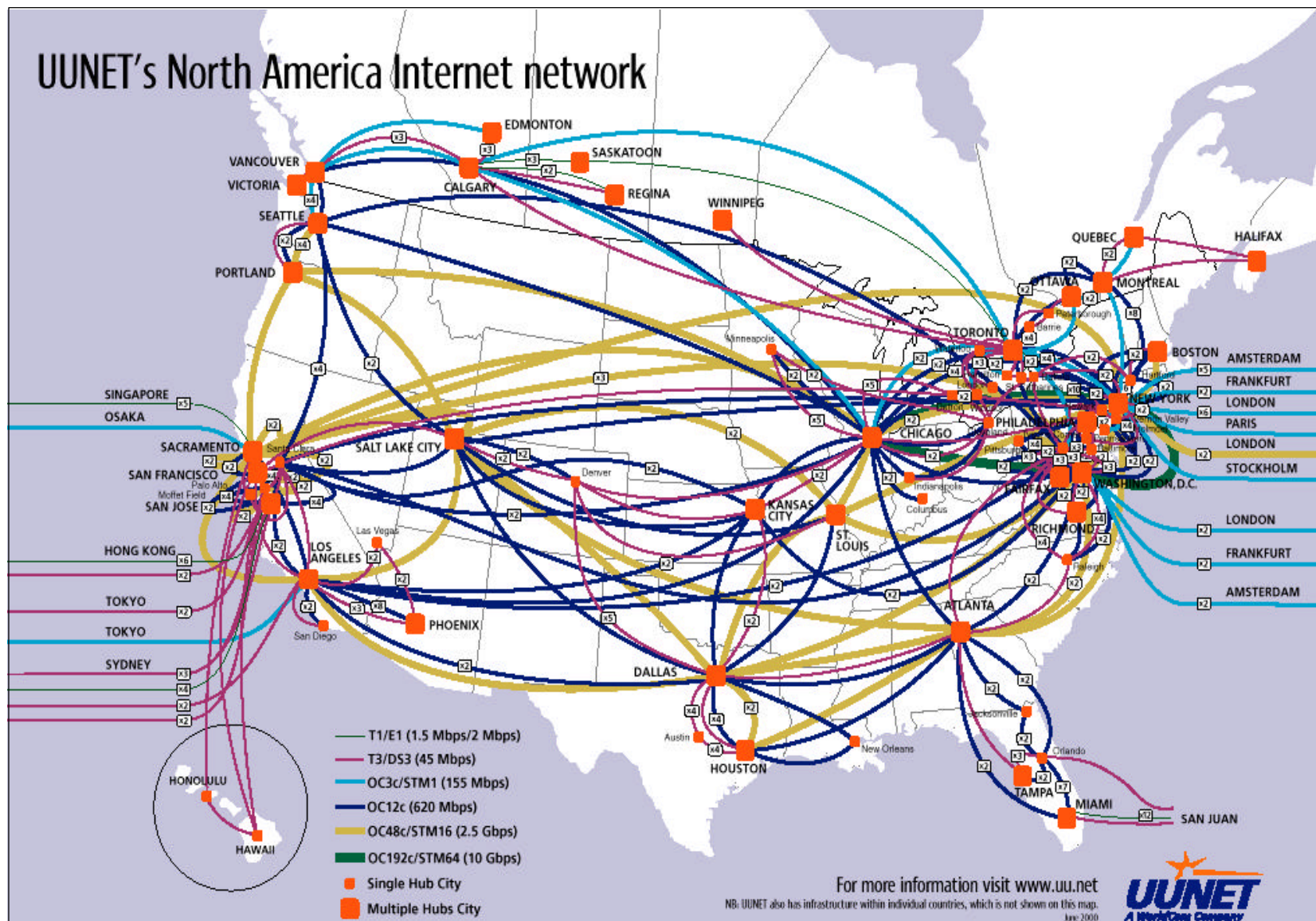
mapping the 'tin cans and string'



maps let us look inside the 'cloud'

nodes and links

UUNET's North America Internet network



For more information visit www.uu.net

NB: UUNET also has infrastructure within individual countries, which is not shown on this map.
June 2000

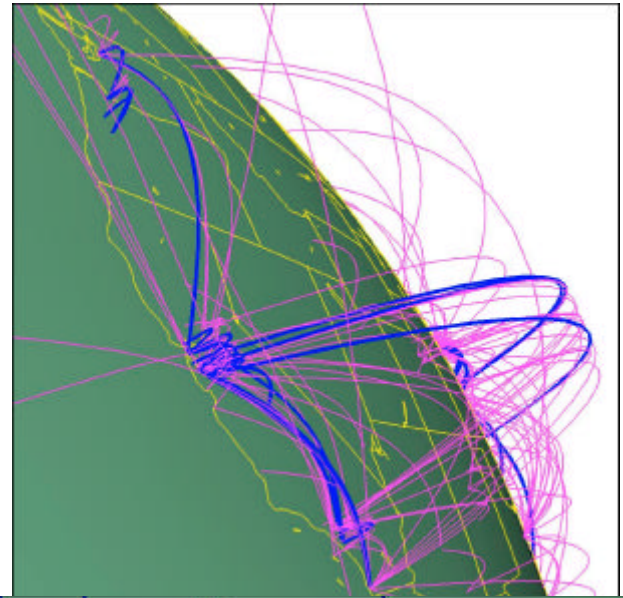
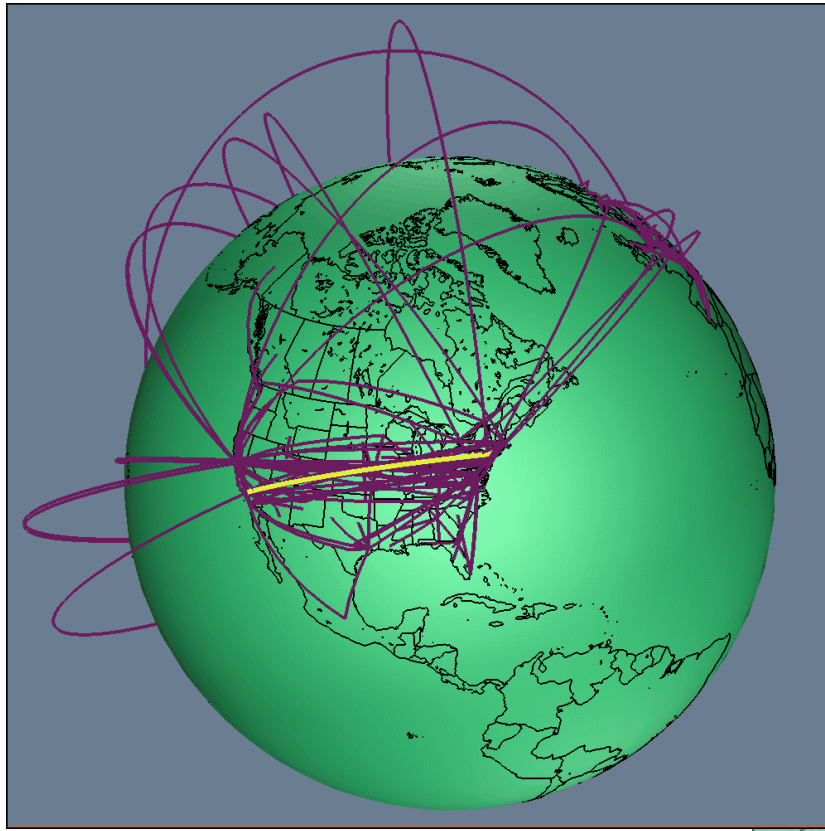


nodes and links



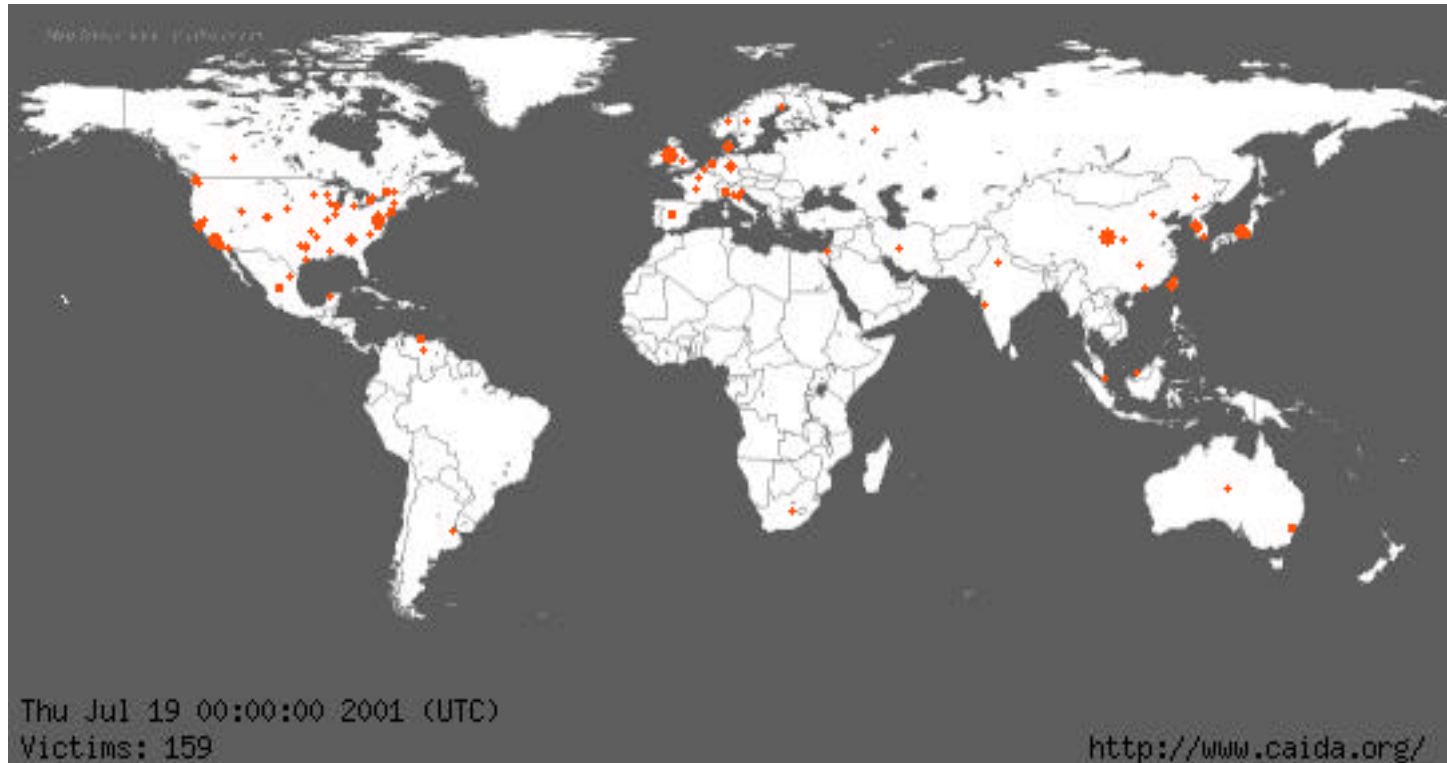
[illegible]

arcs around the globe



Tamara Munzner
<http://graphics.stanford.edu/papers/mbone/>

mapping virus diffusion - Code-Red

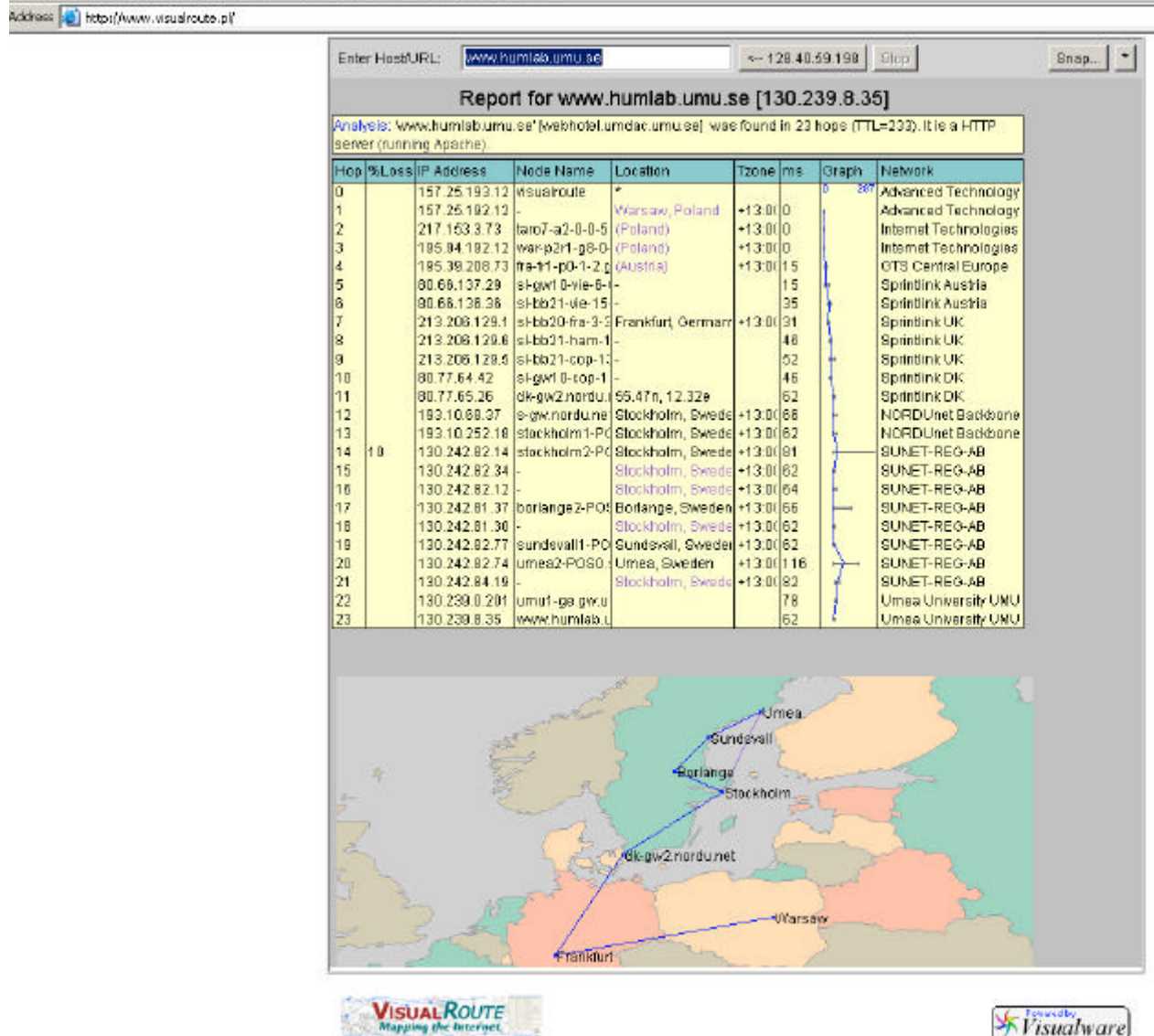


Caida, www.caida.org/analysis/security/code-red/

one of the big unknowns - traffic

- there are no traffic maps
- no one can tell you how much traffic is flowing across the Internet. no one knows how much, or from where to where
- power of internet to measure itself
- dynamic maps. real-time conditions
- traceroutes and weather maps

geographic traceroutes



Enter Host/URL:

www.humlab.umu.se

<-- 128.40.59.198

Stop

Snap...

*

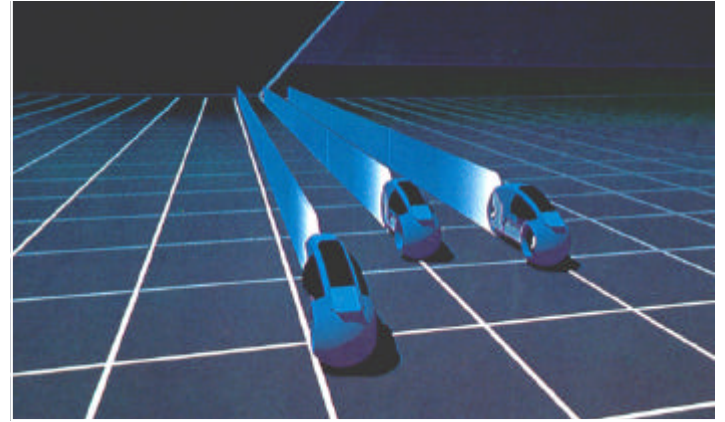
Real-time report for www.humlab.umu.se [130.239.8.35] (80% done)

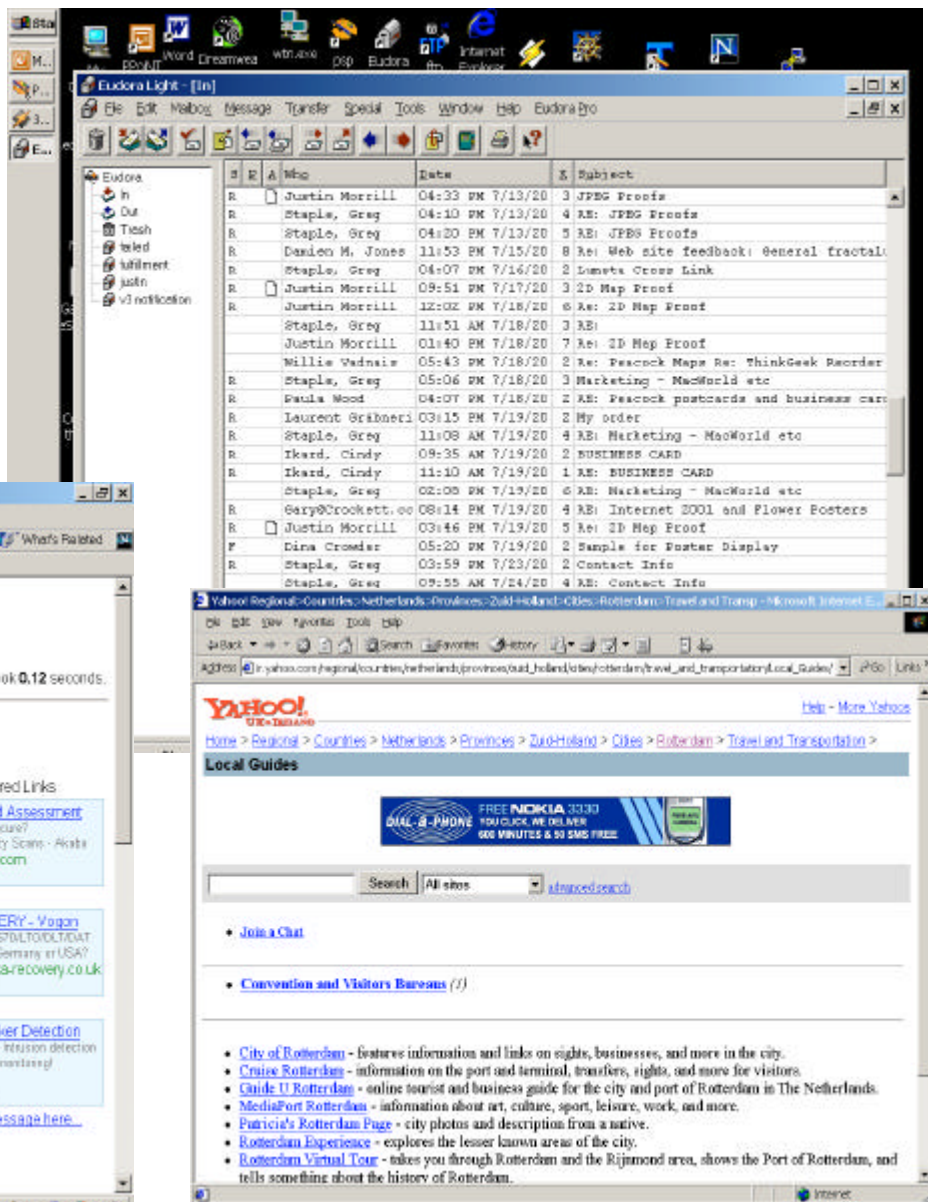
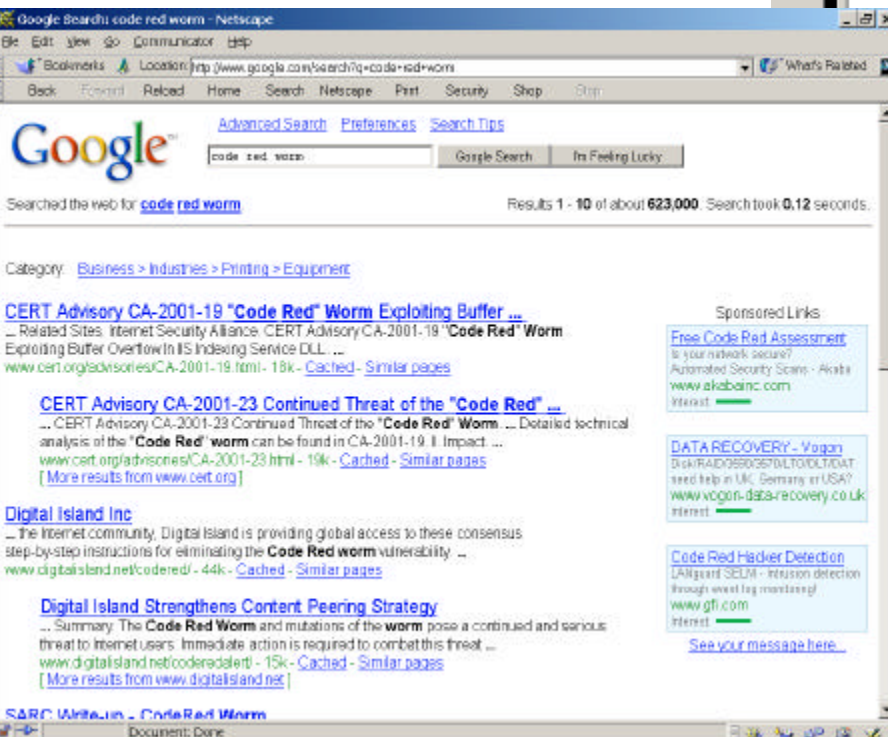
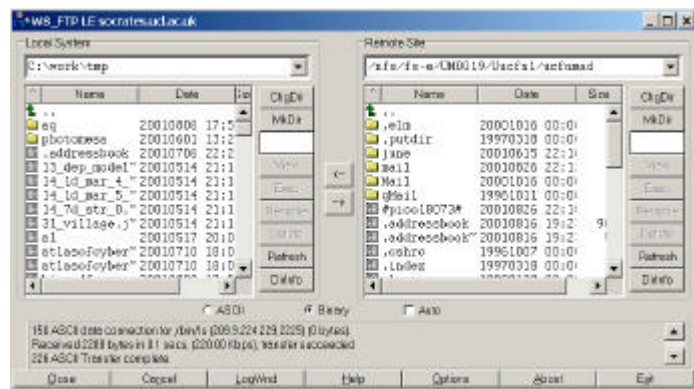
Analysis: 'www.humlab.umu.se' [webhotel.umdac.umu.se] was found in 26 hops (TTL=233). It is a HTTP server (running Apache).

Hop	%Loss	IP Address	Node Name	Location	Tzone	ms	Graph	Network
0		202.85.153.19	super-1	*			0 578	NEWSBOOK LIMITED
1		202.85.153.2	-	(Hong Kong)	+08:00	0		iAdvantage Limited
2		202.85.129.57	fe1-1-0-cor130	Hong Kong	+08:00	46		iAdvantage Limited
3		202.85.129.21	-	(Hong Kong)	+08:00	35		iAdvantage Limited
4		203.192.137.1	ge0-1-0-879-1	Hong Kong	+08:00	37		Asia Global Crossing
5		203.192.134.1	pos1-1-622m	Hong Kong	+08:00	44		Asia Global Crossing
6		67.17.68.174	pos1-0-2488r	Los Angeles, CA, U	-08:00	178		Global Crossing GBL
7		67.17.68.149	so1-0-0-2488r	Los Angeles, CA, U	-08:00	180		Global Crossing GBL
8		209.0.227.61	pos1-1.core2	Los Angeles, CA, U	-08:00	172		Level 3 Communicat
9		209.247.9.149	so-5-3-0.bbr1	Los Angeles, CA, U	-08:00	176		Level 3 Communicat
10		64.159.1.158	so-0-0-0.bbr2	Washington, DC, U	-05:00	234		Level 3 Communicat
11		212.187.128.1	so-0-0-0.mp2	London, UK	*	307		Transatlantic cable sy
12		212.187.128.2	so-0-0-0.mp2	Stockholm, Swede	+01:00	344		UK-LVLT-990820
13		213.242.68.20	pos11-0.hsipa	Stockholm, Swede	+01:00	348		Stockholm Infrastruct
14		213.242.69.22	-	Stockholm, Swede	+01:00	364		Stockholm Customer
15		193.10.252.13	s-gw.nordu.net	Stockholm, Swede	+01:00	348		NORDUnet Backbone
16		193.10.252.18	stockholm1-PC	Stockholm, Swede	+01:00	346		NORDUnet Backbone
17		130.242.82.14	stockholm2-PC	Stockholm, Swede	+01:00	327		SUNET-REG-AB
18		130.242.82.34	upsala2-POS	Uppsala, Sweden	+01:00	335		SUNET-REG-AB
19		130.242.82.12	upsala1-pos	Uppsala, Sweden	+01:00	338		SUNET-REG-AB
20		130.242.81.37	borlange2-pos	Borlange, Sweden	+01:00	344		SUNET-REG-AB
21		130.242.81.30	sundsvall2-po	Sundsvall, Swede	+01:00	359		SUNET-REG-AB
22		130.242.82.77	sundsvall1-po	Sundsvall, Swede	+01:00	354		SUNET-REG-AB
23		130.242.82.74	umea2-pos0.s	Umea, Sweden	+01:00	344		SUNET-REG-AB
24		130.242.84.19	umu1-srp1.su	-		351		SUNET-REG-AB
25		130.239.0.201	umu1-ge.gw.u	(Sweden)	+01:00	343		Umea University UMU
26		130.239.8.35	www.humlab.u	(Sweden)	+01:00	348		Umea University UMU



what does info space look like?





but can you map info spaces?

- a common question, based on 2 misconceptions
 - maps have to be geographical
 - cyberspace is non structured
- mapping is much wider than the OS, Times Atlas and A-Z street maps
- why is it hard to do?
 - cyberspace is new, its rapidly evolving, its fluid and its diverse. a lot of it is (increasingly) private space
 - breaks Euclidean conventions
 - the map and territory are one (in some cases)
 - we have few good examples! but its still early days

spatialisation

- turning data into maps!
 - application of spatial metaphors as 'sense-making' tools for abstract data (esp. text)
 - distance and location are based on semantic meanings - similarity of content
 - key spatial properties used:
 - area
 - position
 - proximity
 - scale
- + graphic properties of colour, shape, label, etc

the power of information maps

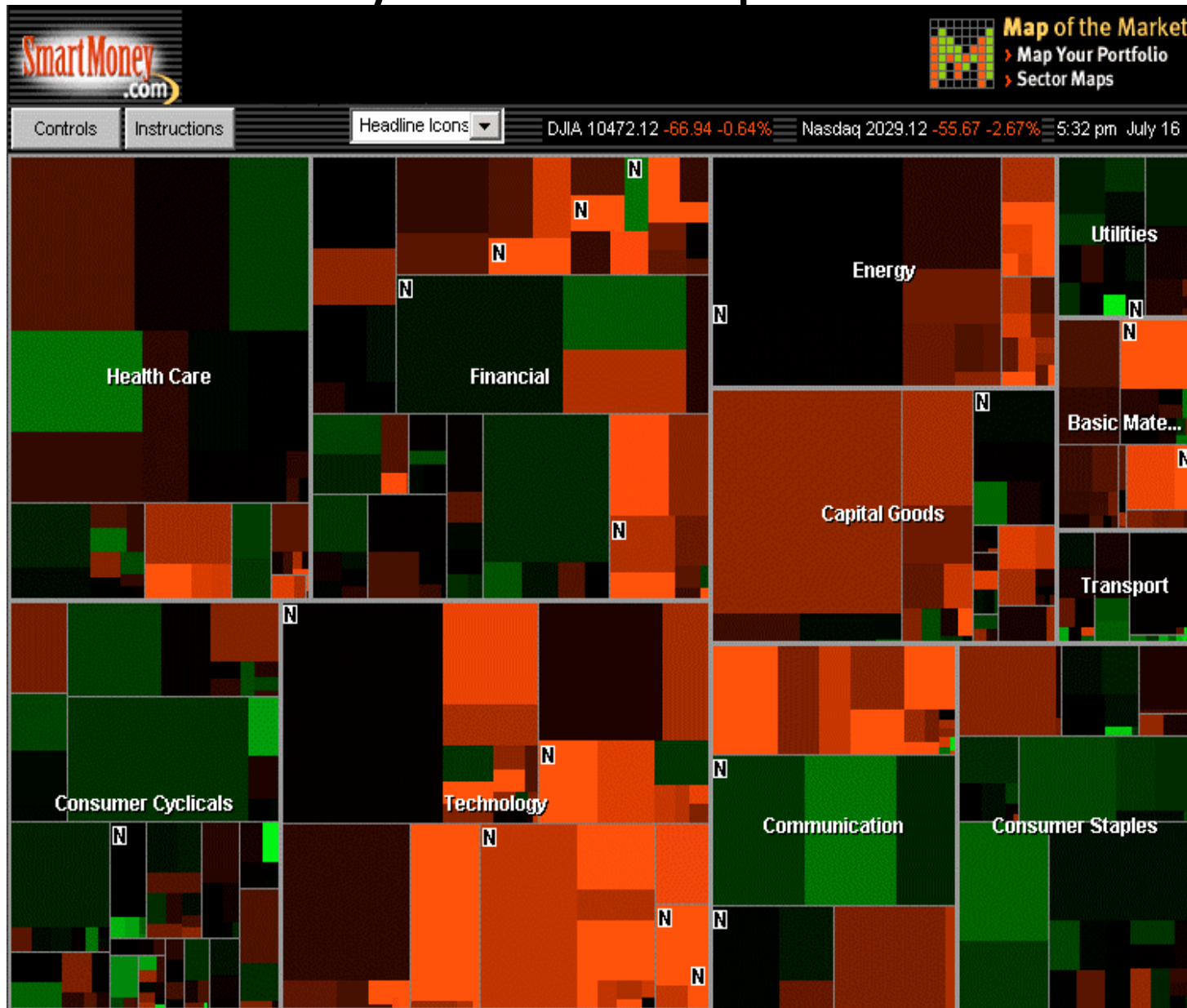
- the missing 'up button' on the browser
- intelligent summarisation and generalisation
- 3 key advantages:
 - a sense of the whole (the 'birds eye view' / 'big picture overview')
 - revealing hidden connections
 - support interactive, unstructured browsing

Where is the wisdom we have lost in knowledge?

Where is the knowledge that we have lost in information

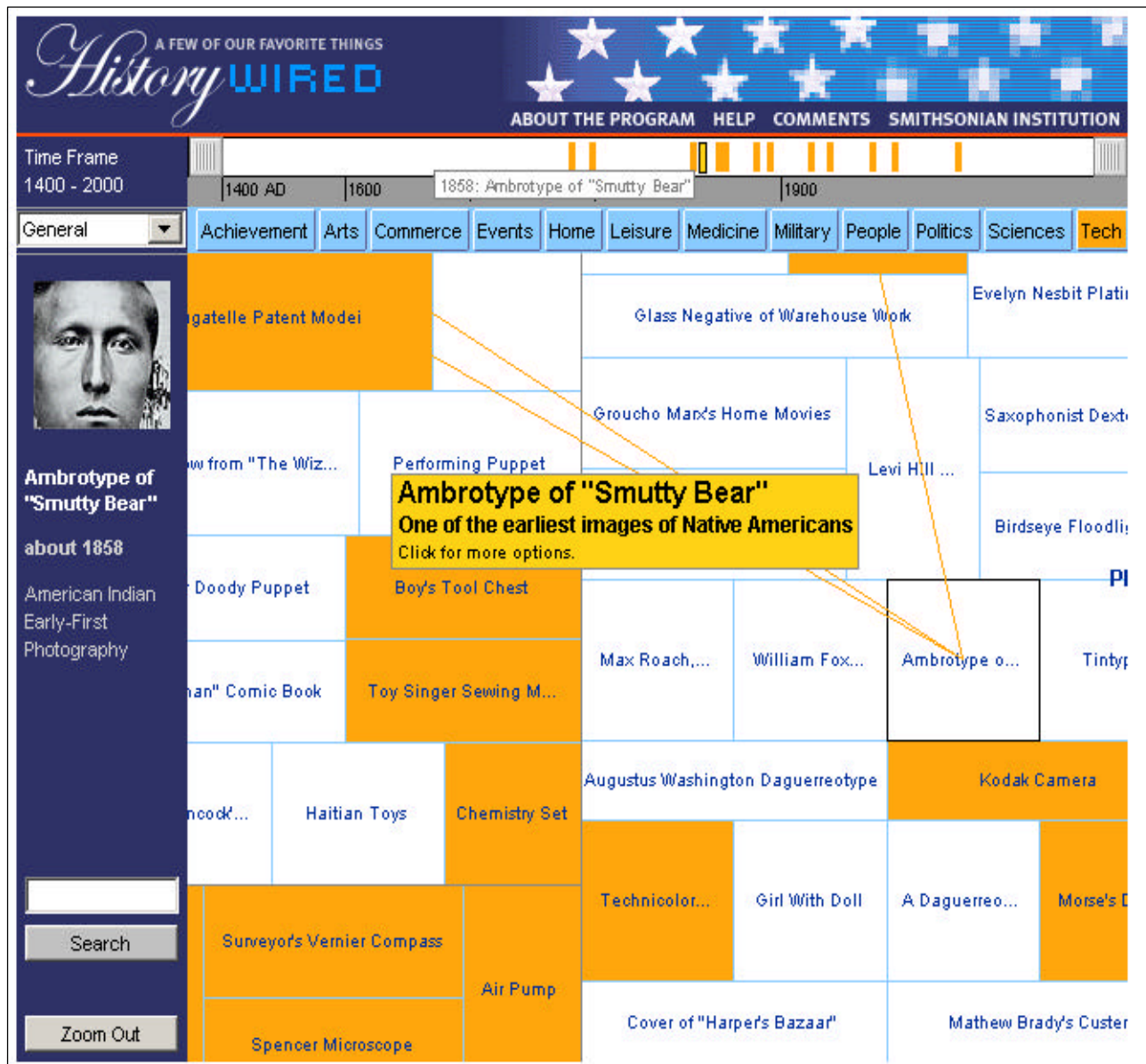
T.S. Elliot, The Rock (1934)

smartmoney.com - map of the market



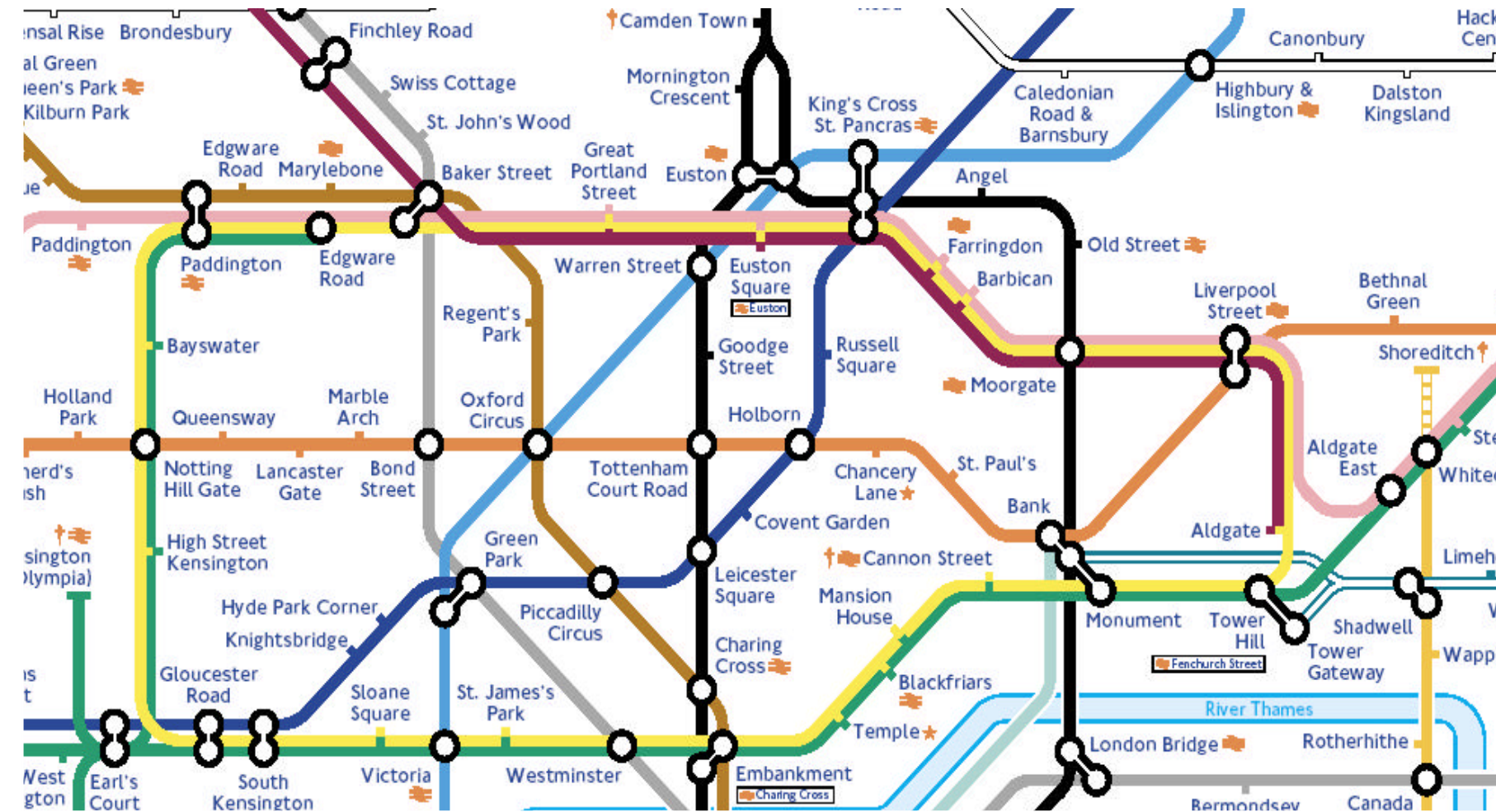
<http://www.smartmoney.com/marketmap/>

the work of Martin Wattenberg



<http://historywired.si.edu/>

the power of topological graphs

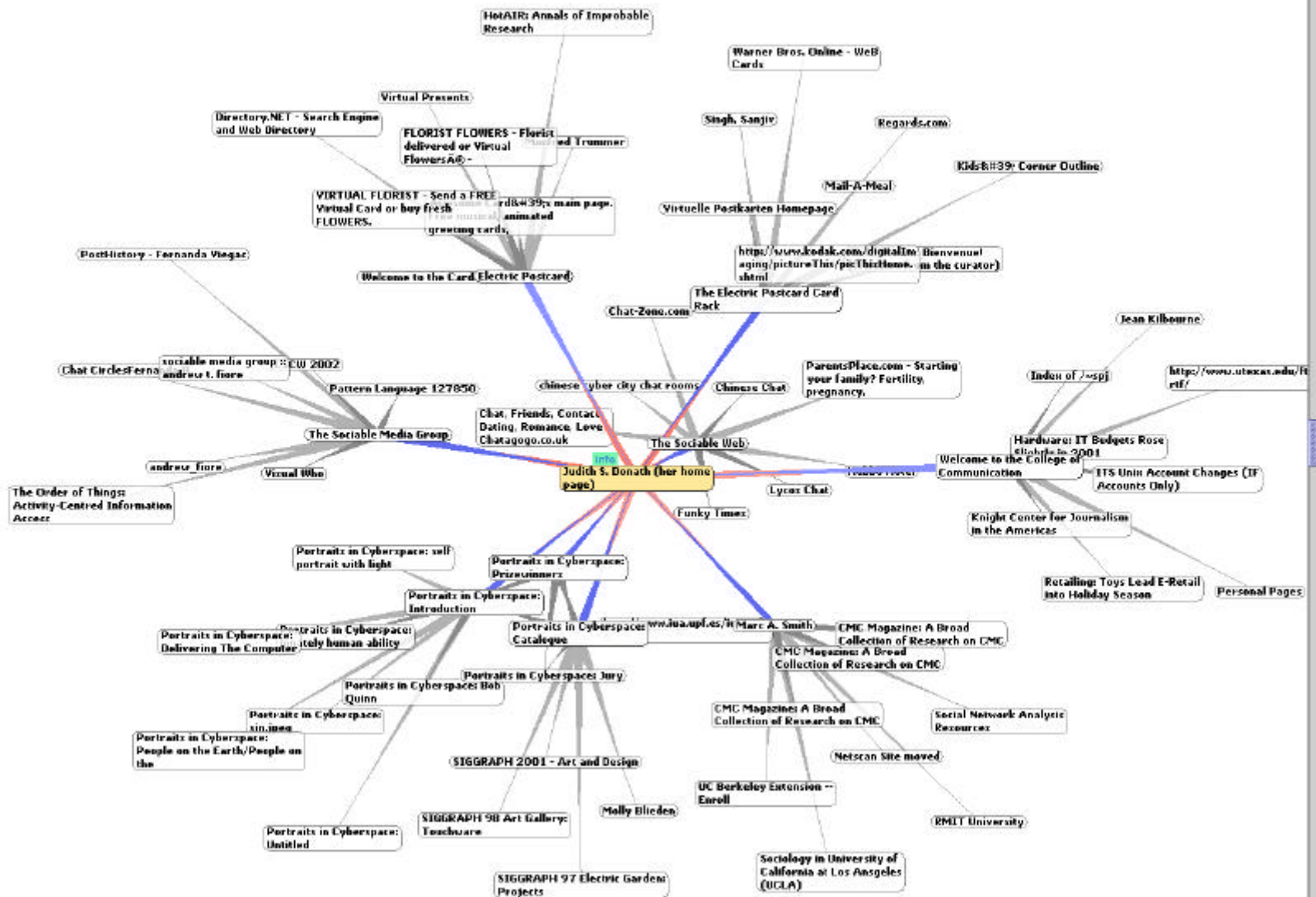


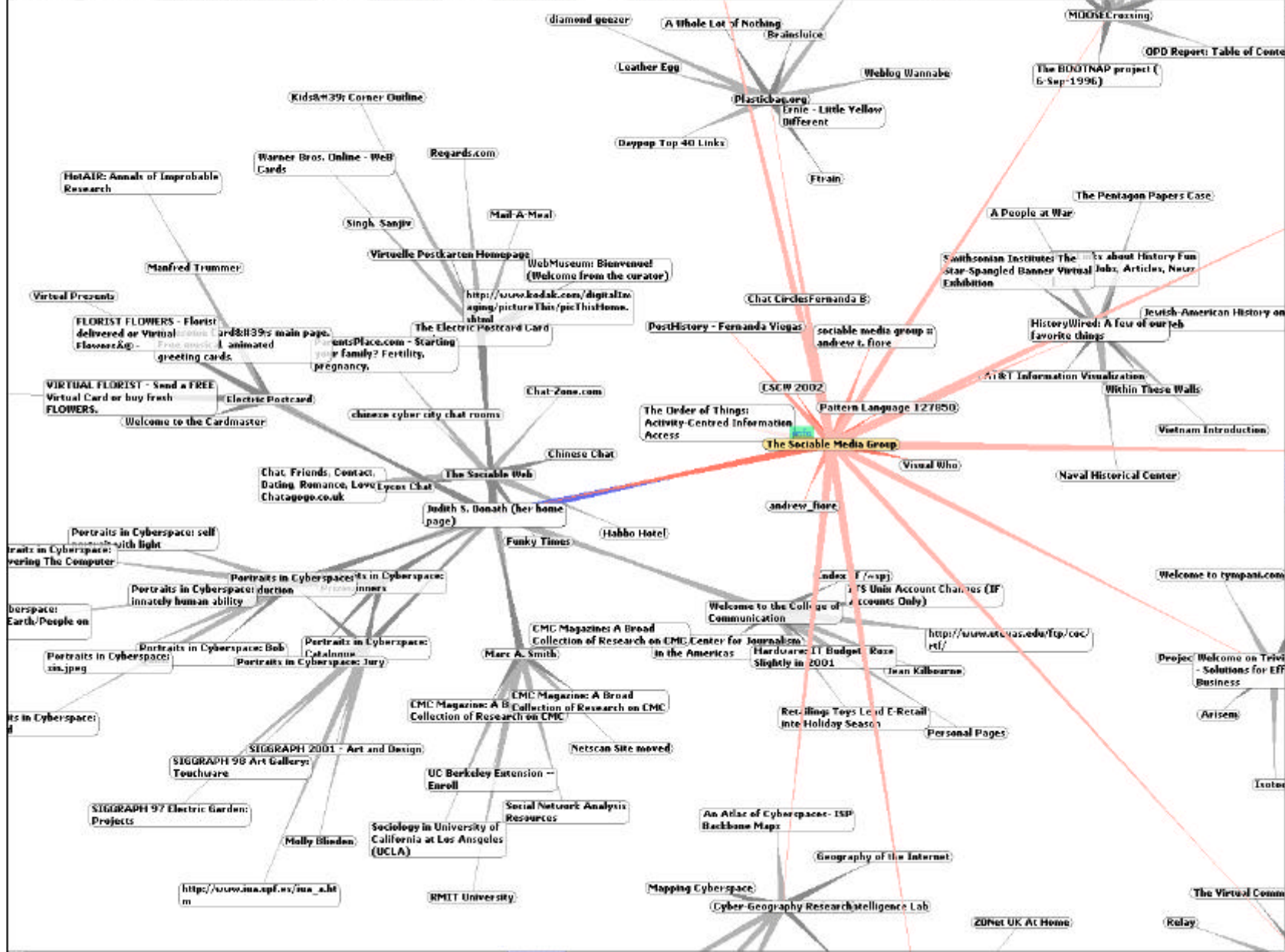
find related web pages, browse links

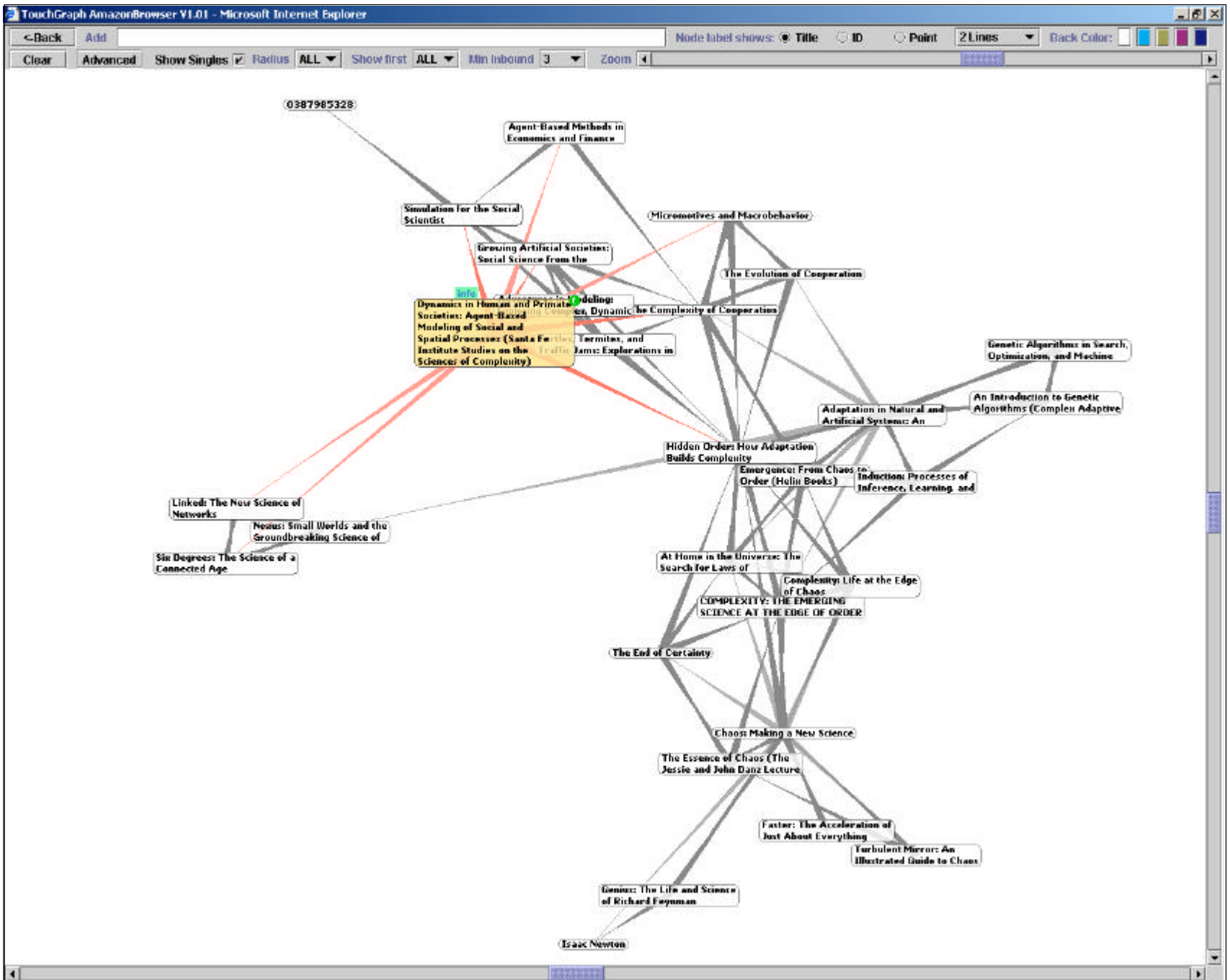
The screenshot shows a Mozilla browser window with the title "Google Search: related:www.humlab.umu.se/patrik/ - Mozilla {Build ID: 2002072104}". The address bar contains the URL "http://www.google.com/search?hl=en&lr=&ie=UTF-8&q=related:www.humlab.umu.se/patrik/". The search bar shows the query "related:www.humlab.umu.se/patrik/" and the "Google Search" button. Below the search bar, a blue banner indicates "Searched for pages similar to **www.humlab.umu.se/patrik/**. Results 1 - 10 of about 30. Search took 1.48 seconds."

The search results are as follows:

- [Patrik Svensson](#)**
Patrik Svensson Director of HUMlab, Umeå University Senior lecturer in the humanities and information technology Ph.D. in linguistics. ...
www.humlab.umu.se/patrik/ - 6k - [Cached](#) - [Similar pages](#)
- [mamamusings: live! in person! it's jill/bt](#)**
mamamusings. elizabeth lane lawley's thoughts on technology, academia, family, and tangential topics. ...
mamamusings.net/archives/2002/11/20/live_in_person_its_jilltxt.php - 27k - [Cached](#) - [Similar pages](#)
- [Humanist.Archives.Vol.17: 17.112 streaming video](#)**
17.112 streaming video. From: Humanist Discussion Group (by way of Willard McCarty willard.mccarty@kcl.ac.uk) Date: Sat Jun 21 2003 - 03:49:24 EDT. ...
lists.village.virginia.edu/lists_archive/Humanist/v17/0108.html - 11k - [Cached](#) - [Similar pages](#)
- [Humanist.Archives.Vol.17: 17.110 research on blogging?](#)**
17.110 research on blogging? From: Humanist Discussion Group (by way of Willard McCarty willard.mccarty@kcl.ac.uk) Date: Sat Jun 21 2003 - 03:48:20 EDT. ...
lists.village.virginia.edu/lists_archive/Humanist/v17/0106.html - 7k - [Cached](#) - [Similar pages](#)
- [Personal - Humanistisk fakultet](#)**
Humanistisk fakultet "Pärmen" - här finns det du letar efter, logga. På den här sidan samsas länkar till dokument, policies ...
www.umu.se/humfak/internt/lparmen.html - 22k - [Cached](#) - [Similar pages](#)
- [Patrik Svensson](#)**
Project Web Site. Linguistic consequences of virtualization: Digital English. Patrik Svensson. [Project description] [Time plan] [Dissemination]
<http://www.humlab.umu.se/patrik/>



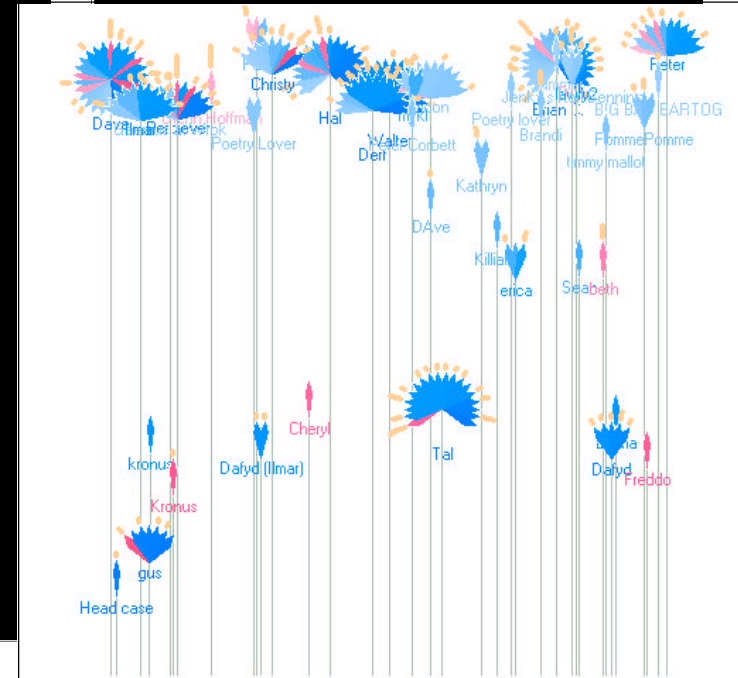
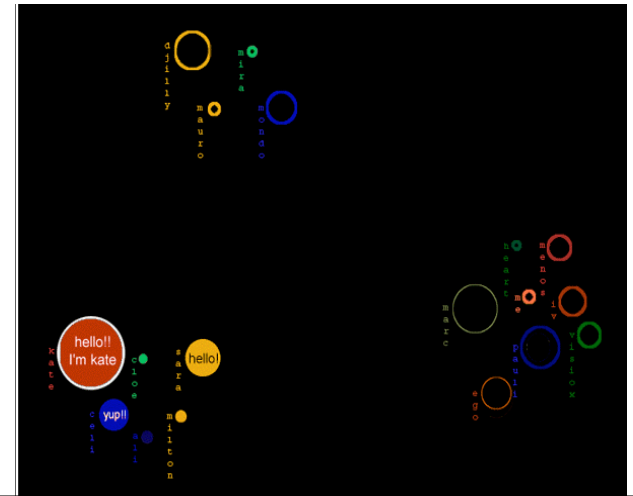
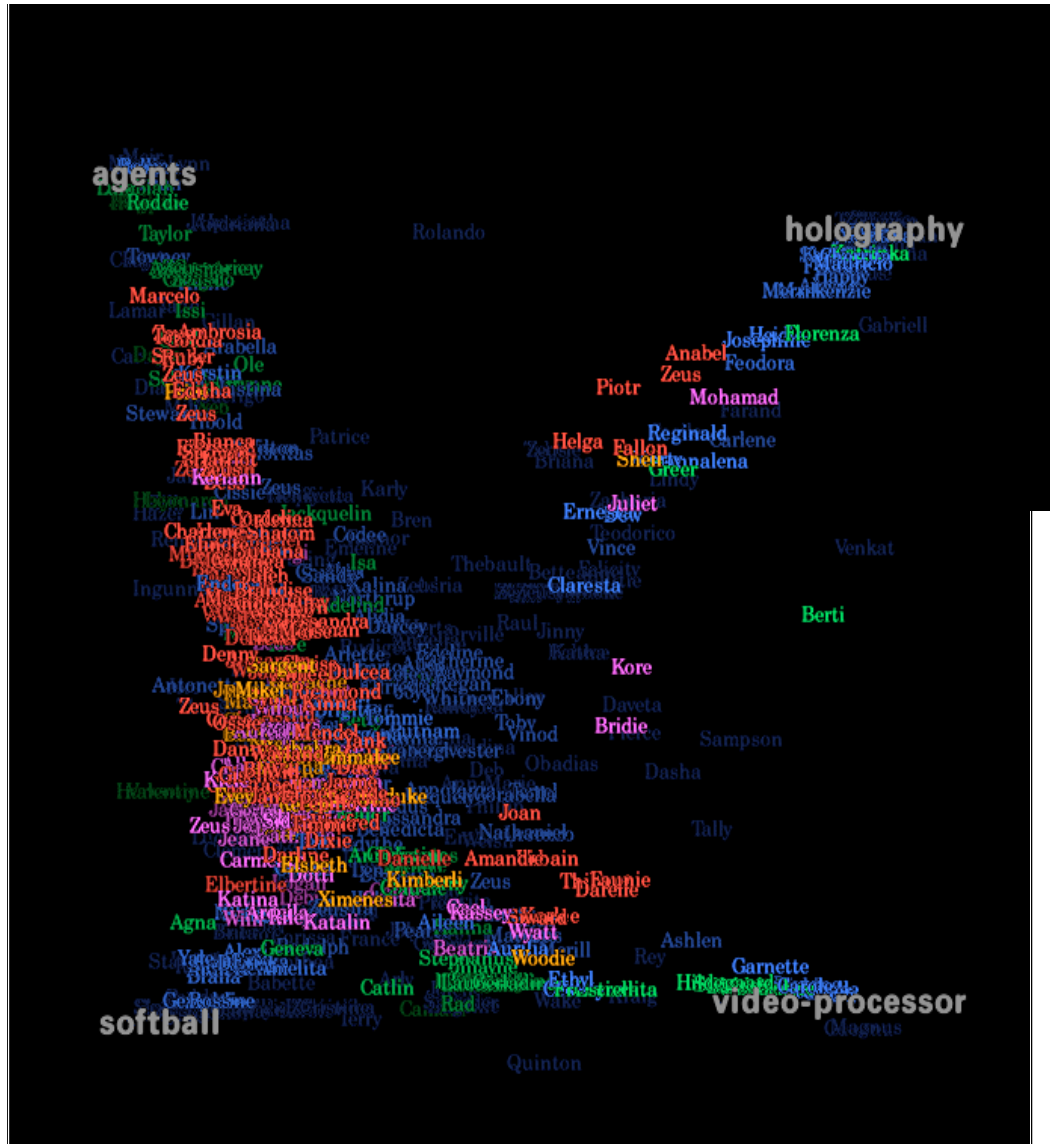




mapping people

- understanding the formation of virtual groups formed via conversation and other shared interaction
- asynchronous - email groups, listserv, news
- synchronous - messaging, chat, muds, avatar worlds, games, IM
- what structures do the communities build
- can mapping the social life help the community
- many important privacy issues. ethics of identifying individuals and social surveillance

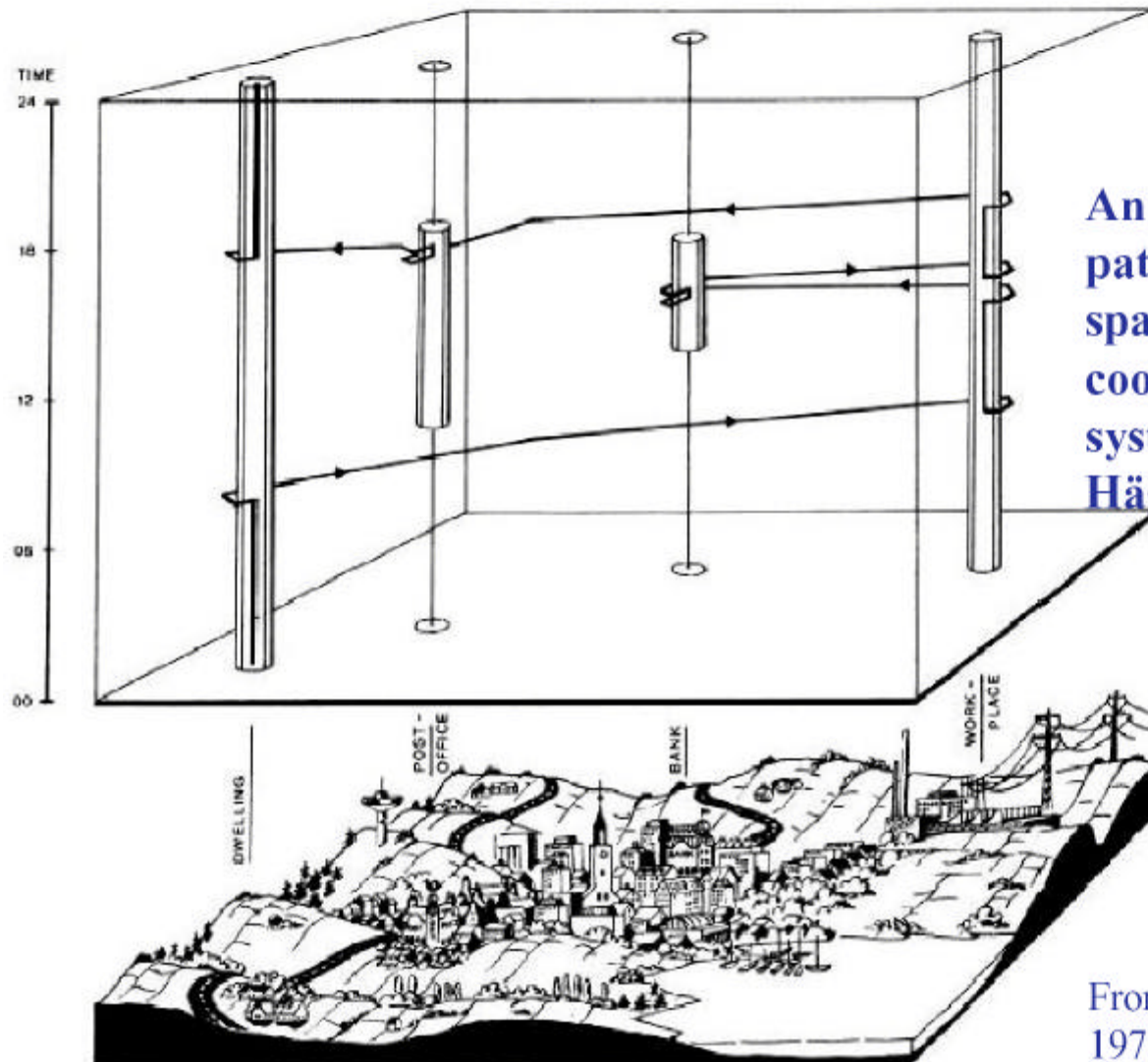
Judith Donath, media lab



<http://smg.www.media.mit.edu/>

who is Sweden's most
famous geographer?

Torsten Hägerstrand

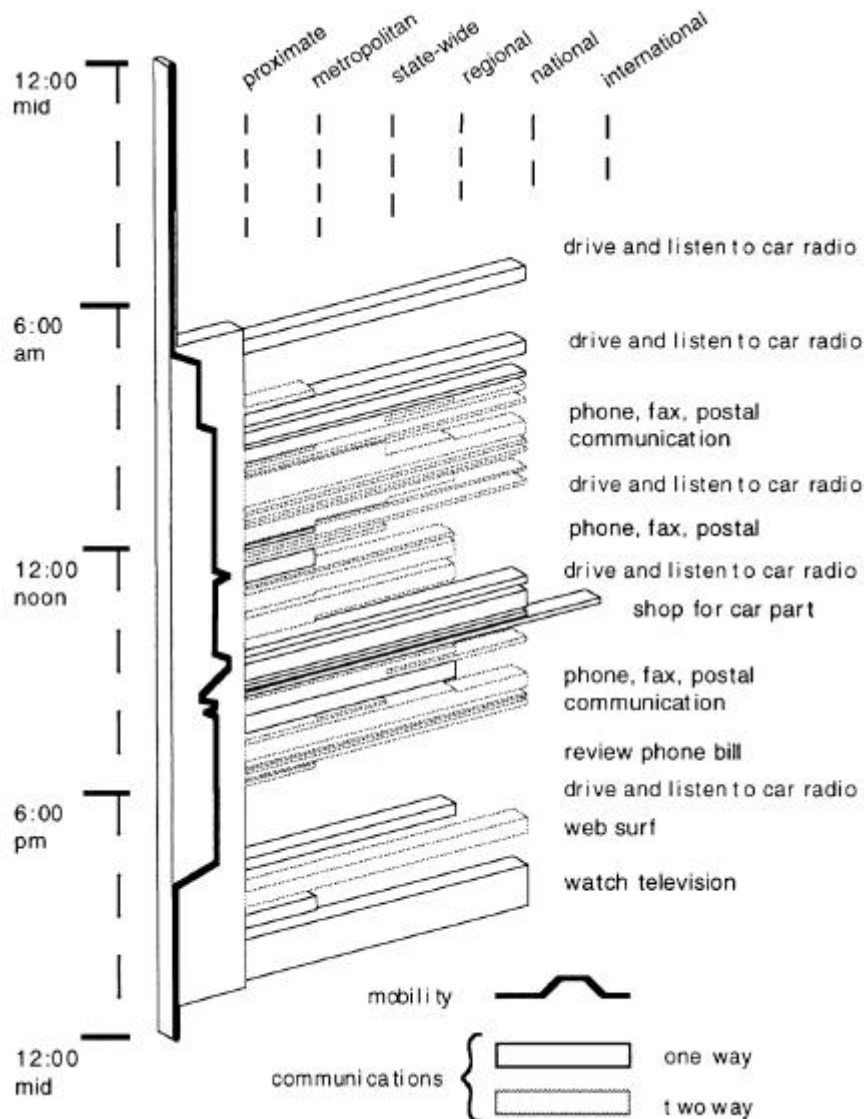


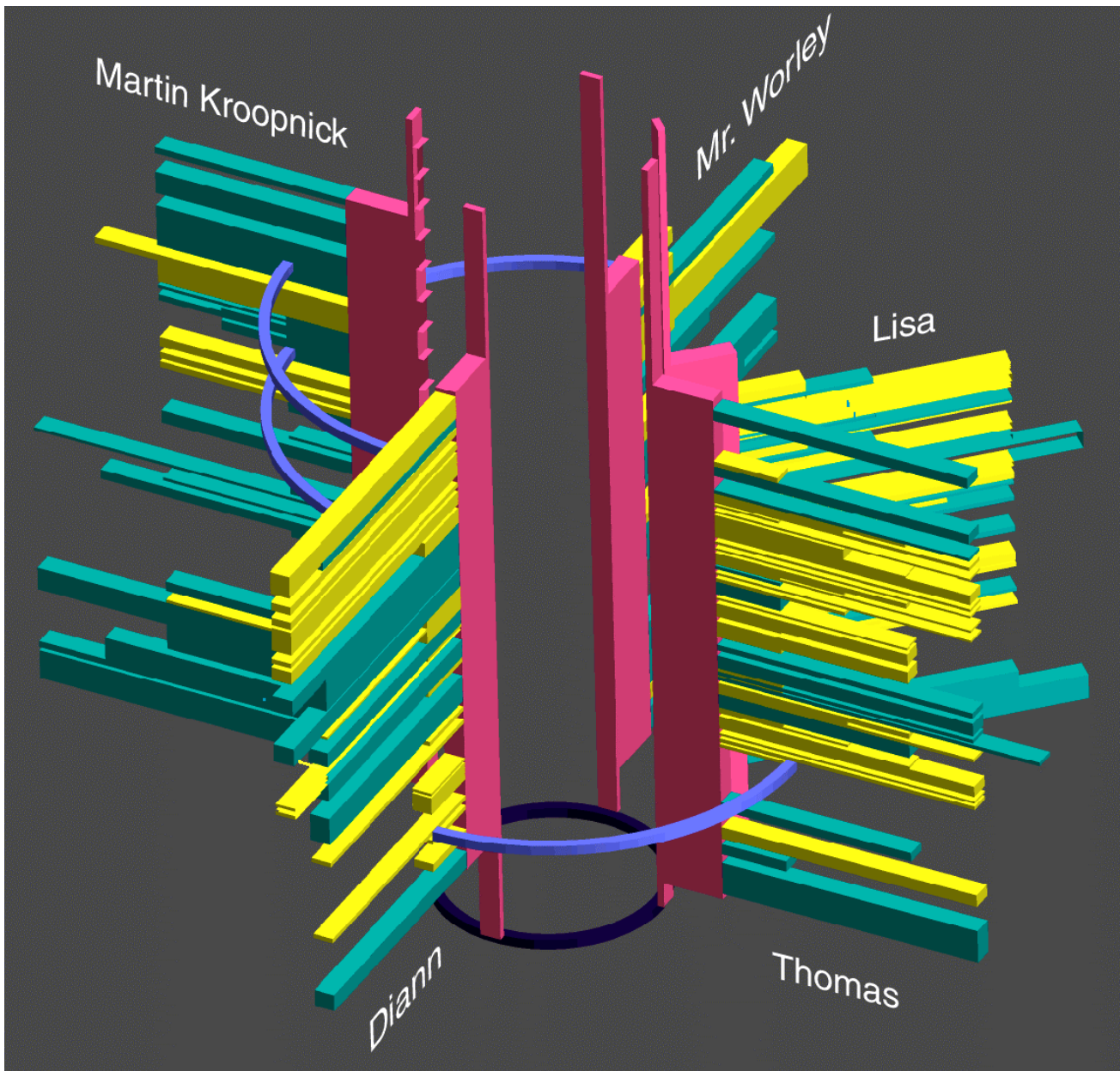
An individual's
path in time-
space
coordinate
system -- after
Hägerstrand

From B. Lenntorp
1978

Human extensibility diagrams, Paul Adams

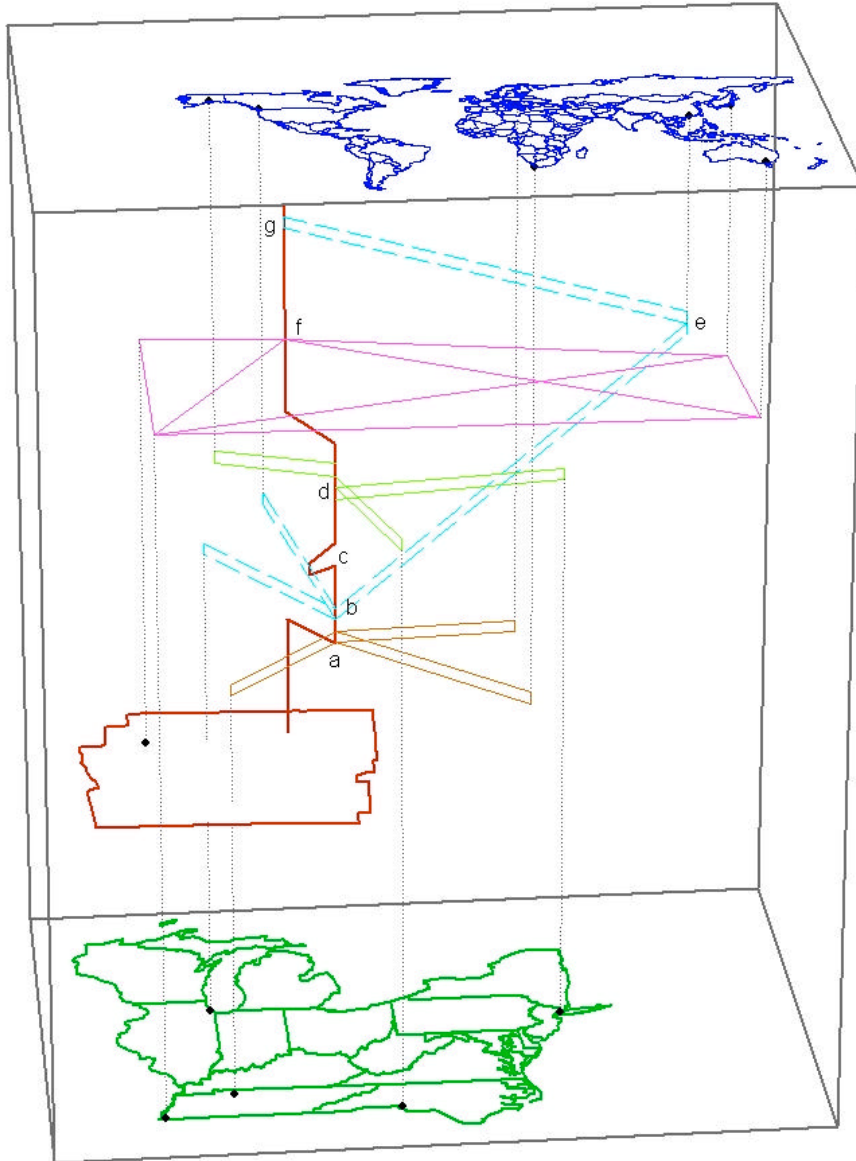
Thomas

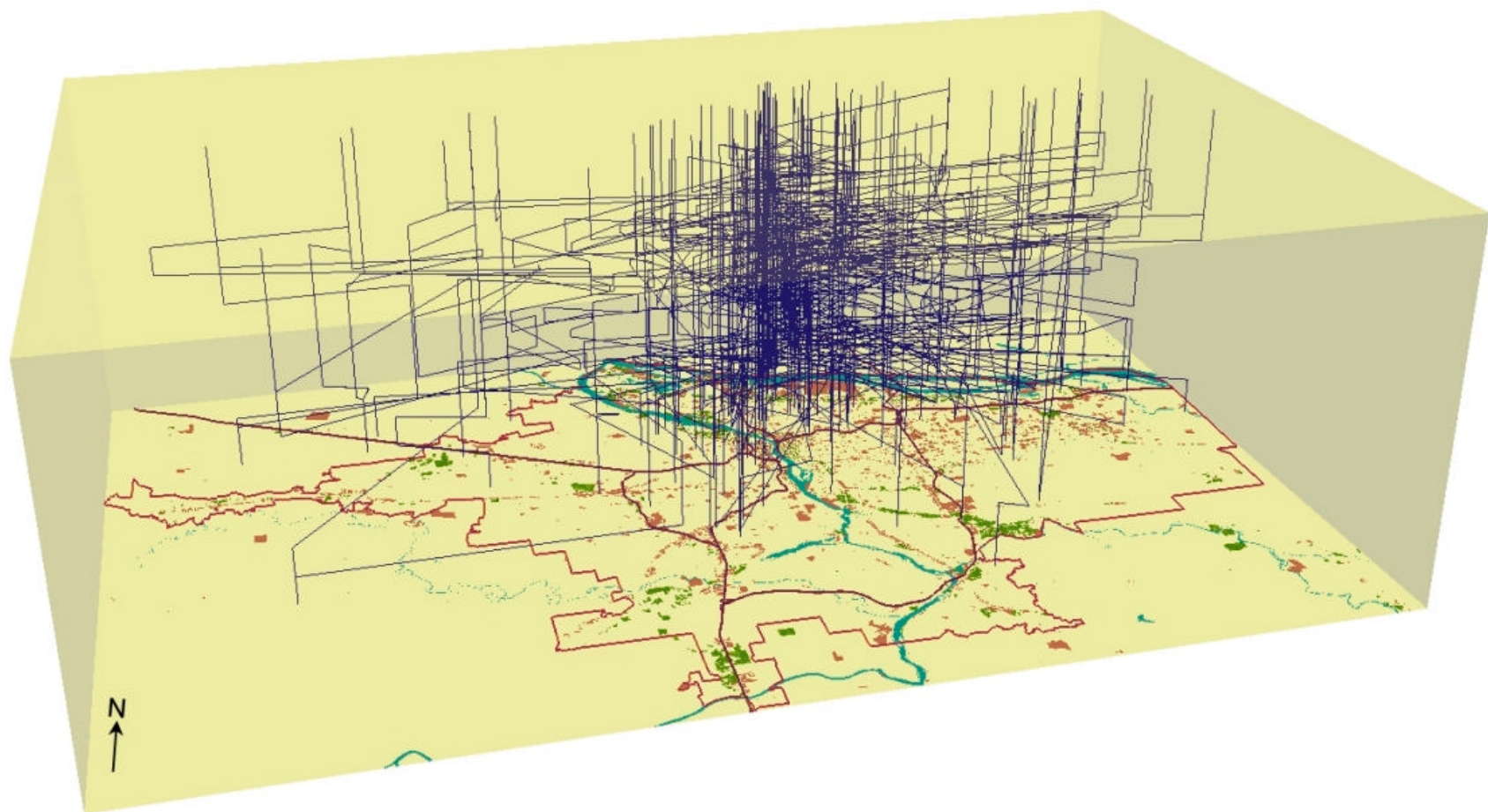


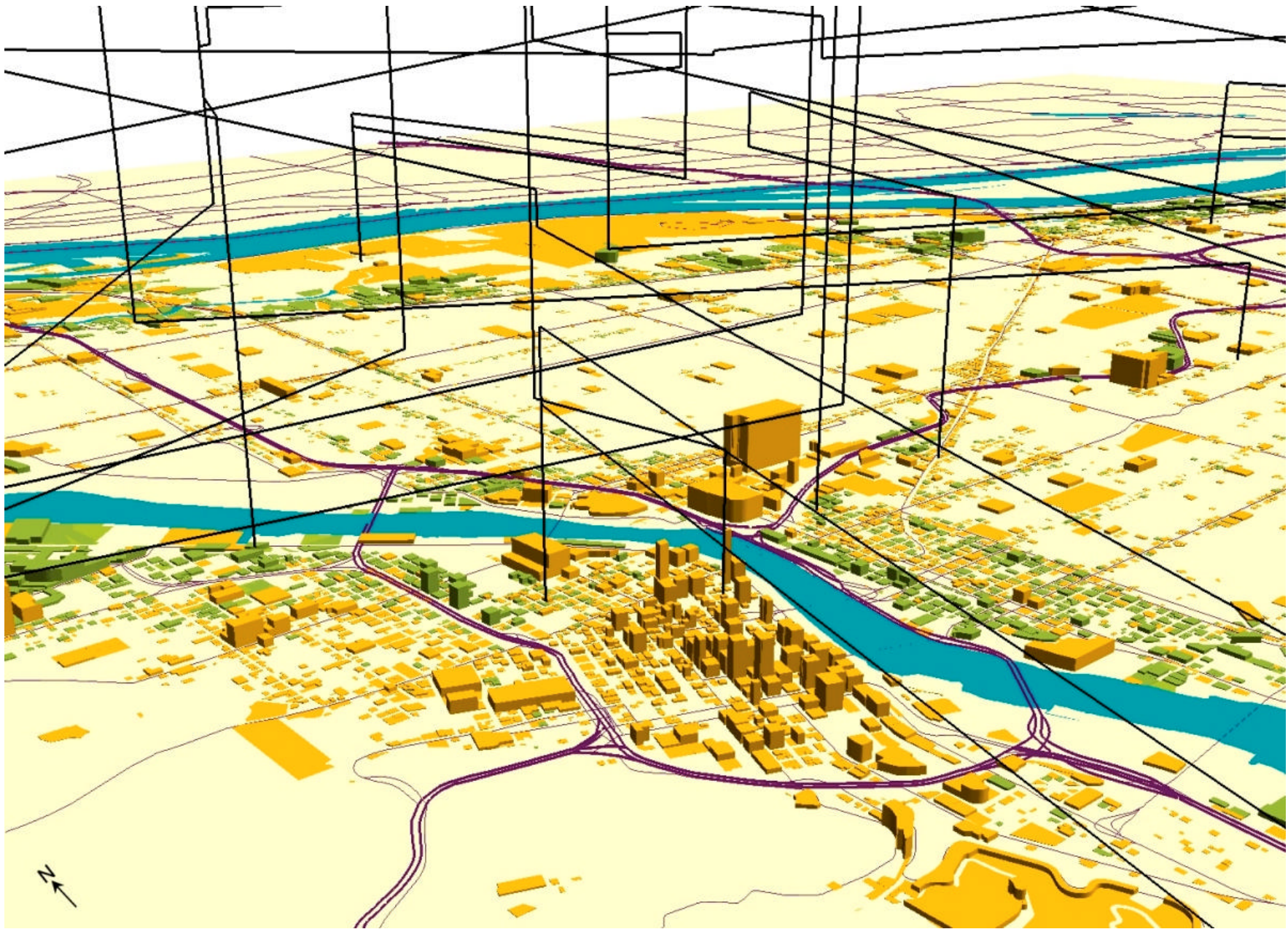


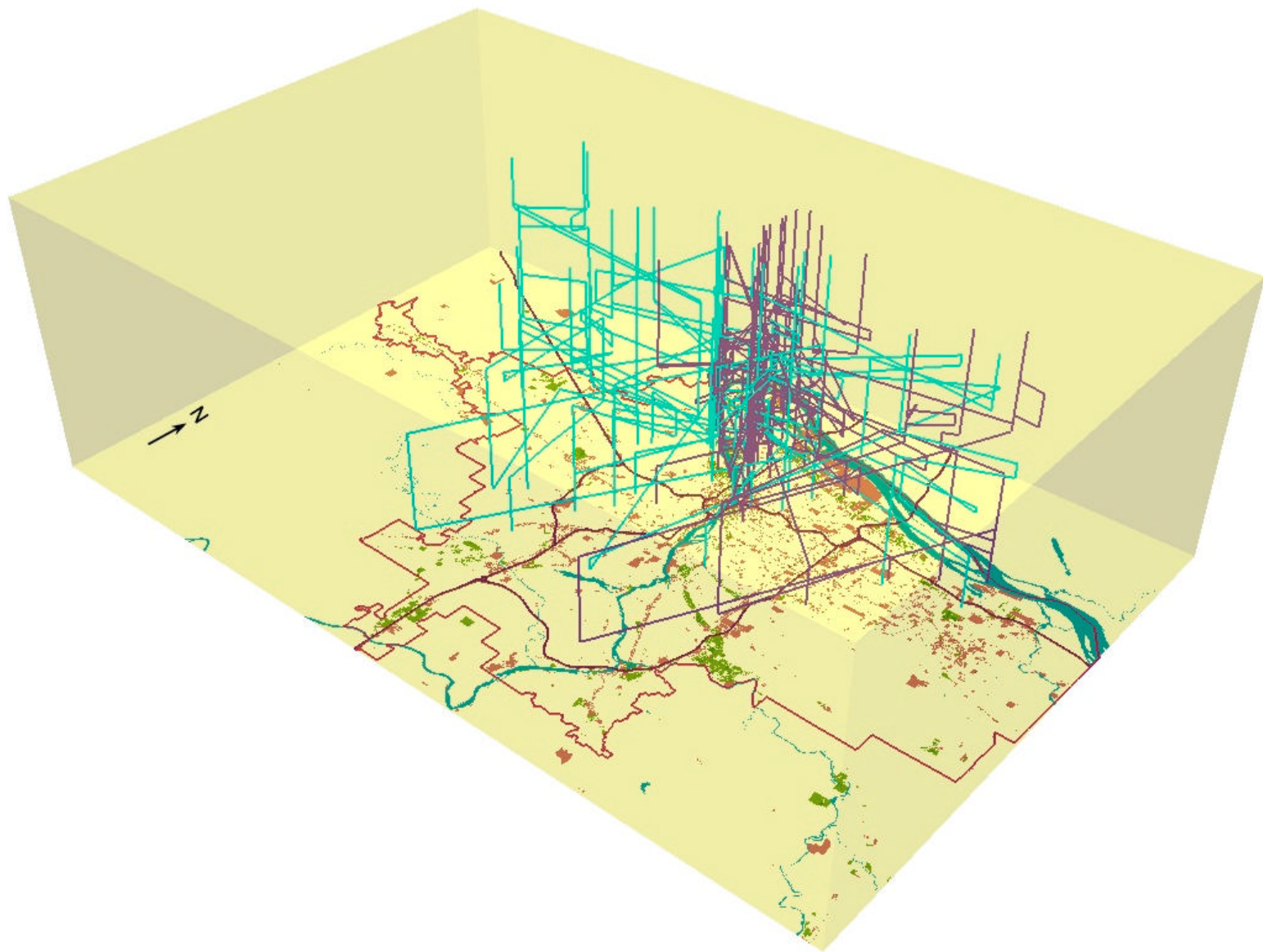
space-time aquarium, 3d vis

Mei-Po Kwan







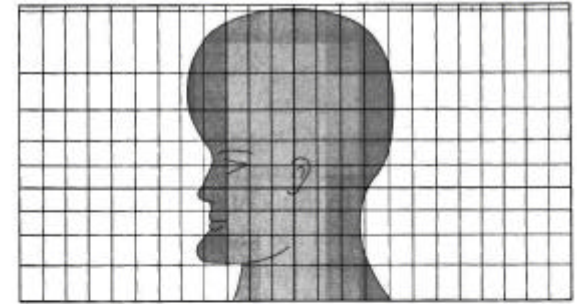
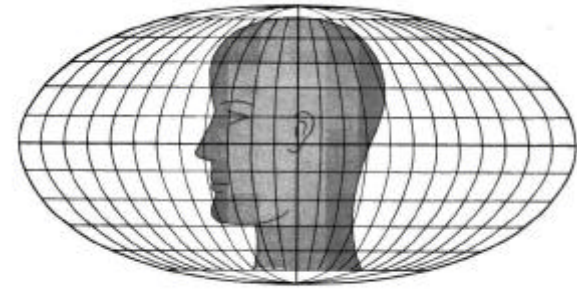


problematic maps

- who makes the maps? and what do they want to show and choose not to show?
- all maps are authored, subjective frames of space
- maps as interfaces to cyberspace are very powerful
- examine more their social implications
- what are the ethics of the maps, the map-maker and their mapping practices
- is it ethical to record and map someone's web surfing and email interactions?

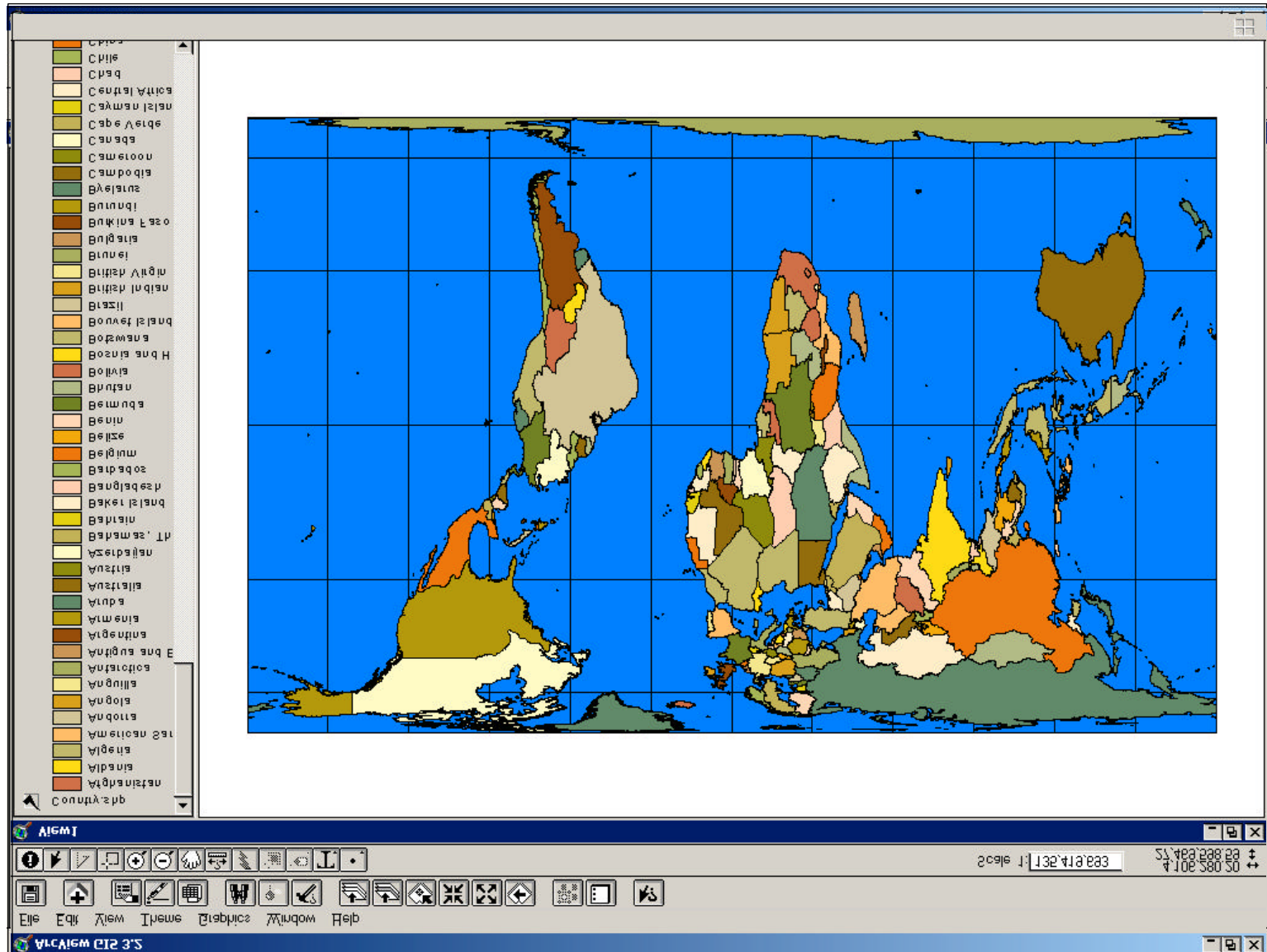
“how to lie with maps”

- most obvious being through
 - data selection/omission
 - ‘theory of silences’
- (Brian Harley)
- projections
 - how are maps of cyberspace deceiving?
 - many ways to project cyberspace onto a map

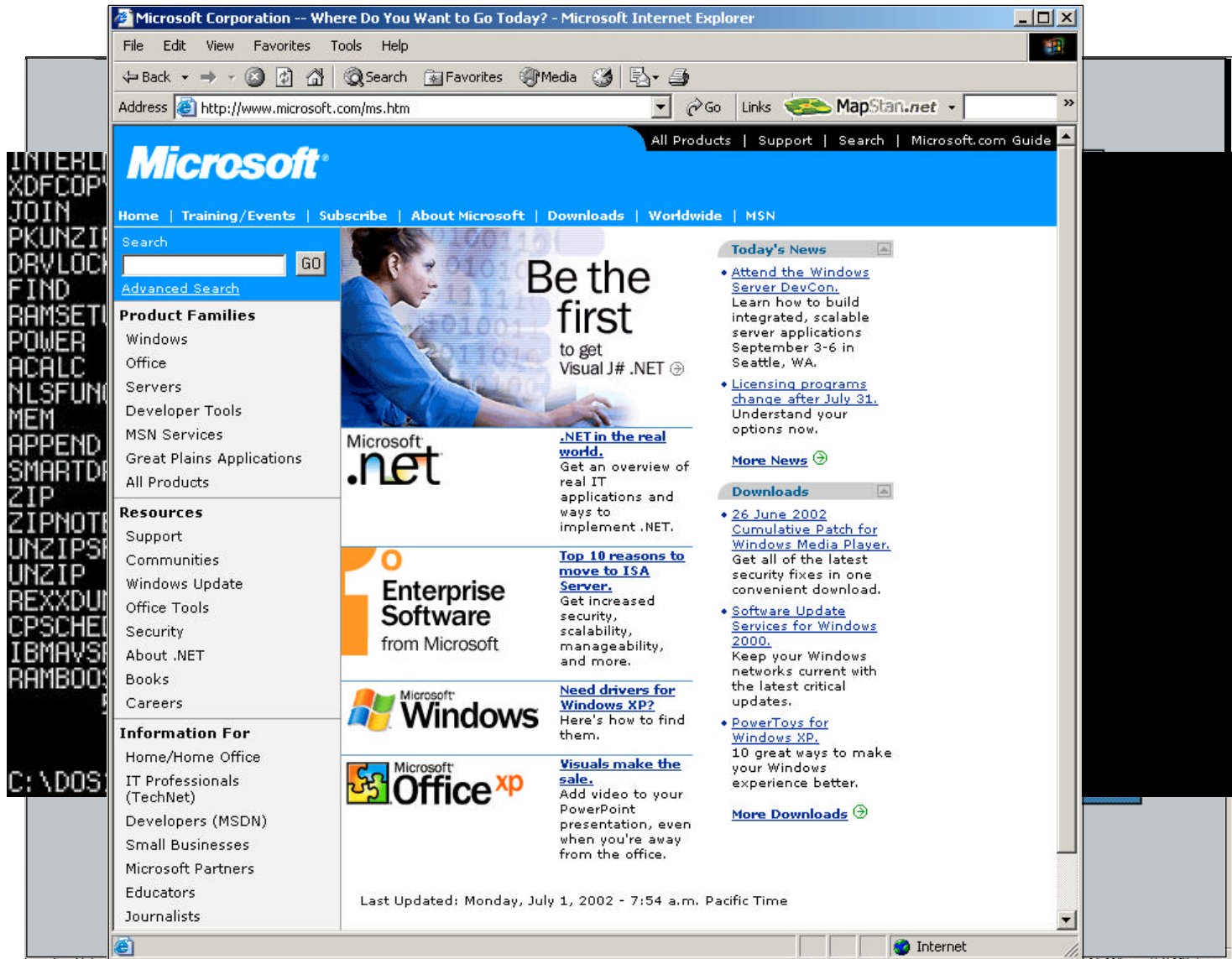


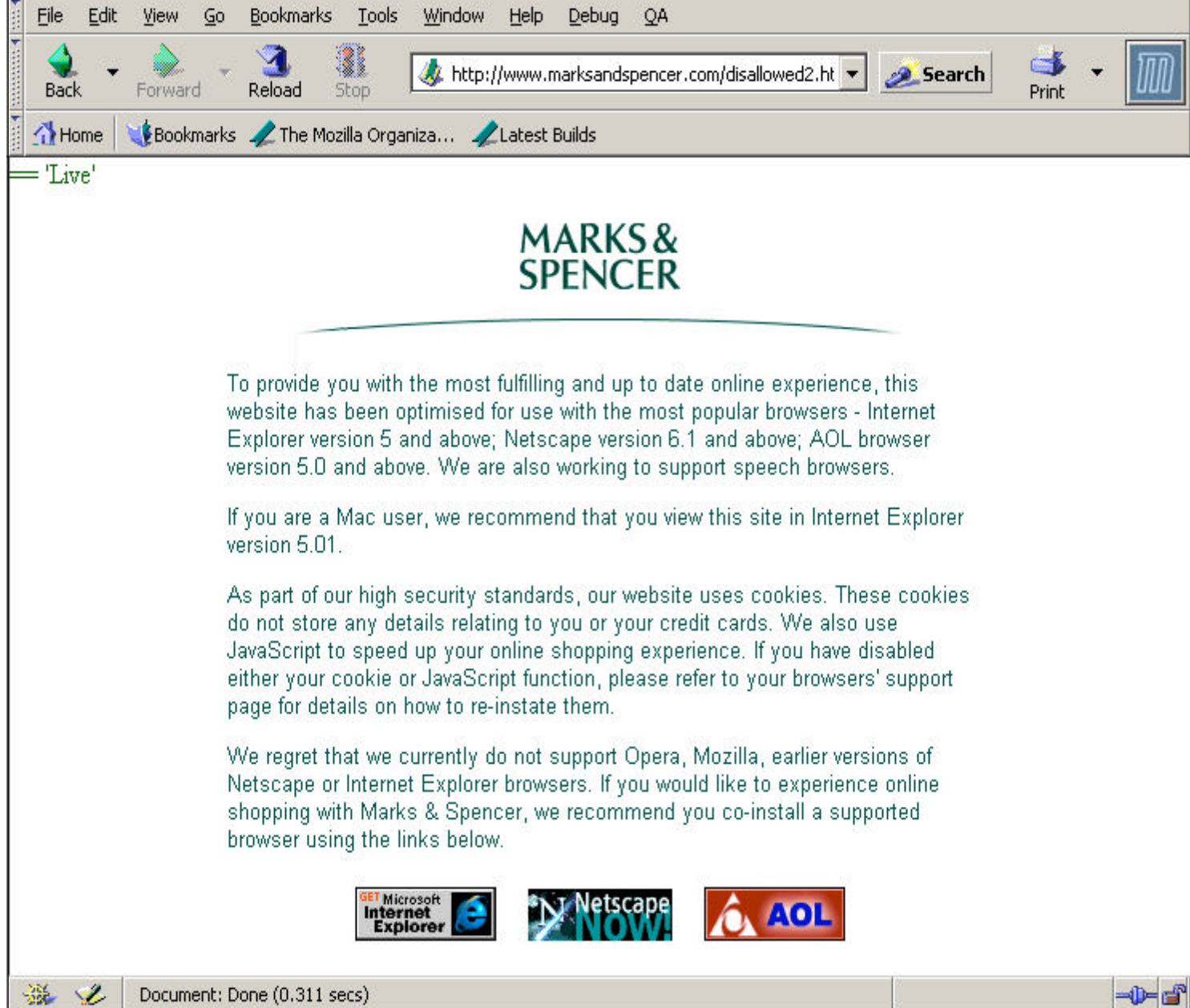
A head drawn on the Mollweide projection (top) has been transferred to Mercator's projection (center) and to the cylindrical equal-area projection with standard parallels at 30° (bottom). Just because the profile looks most natural on Mollweide's projection, that projection is not necessarily “better.” The natural profile could have been drawn on any projection and then plotted on the others.

maps as authored frames of space



interfaces as authored frames of virtual space

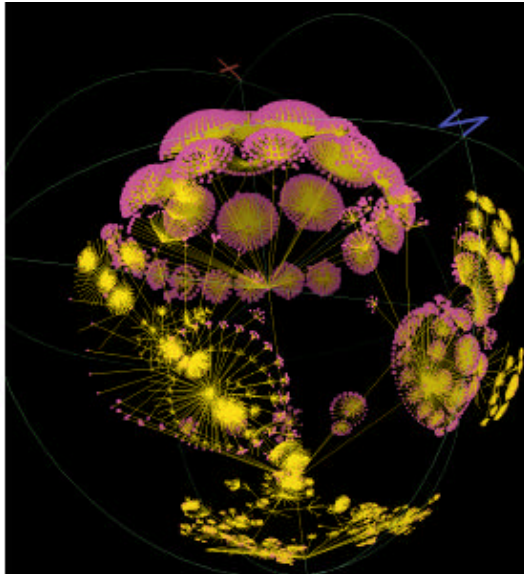




“Exclusively for Everyone” (except Mozilla users)

virtual maps make virtual space

- the map determines what we see and what we can do
 - we never know virtual space for 'real'
 - the interface is the space
 - map and the territory are one
-
- those who make the map, make the space...



browse - www.cybergeography.org/atlas