

THIRD MILLENNIUM PROBLEM-SOLVING

Tackling *accelerating change* through
tools of visualization, collaboration
and citizen empowerment

David Brin - October 2008

”(The online world) has broken down barriers...between people and information, democratizing access to human knowledge. This has made us much more powerful as individuals.”

- Eric Schmidt

Progress in Visualization, Memory, Attention

Singularity? Renunciation?
Muddle-along? Crisis?

Knowledge Mesh

Advanced modelling & AR

Omni-veillance

Personal creativity tools

A.I.

Linked databases

Advanced gaming & VR

World Wide Web

Entertainment

Art

Speculative Mindset

Speculative Fiction

Internet

Telecommunications

Perspective

Personal & business
Computing

Radio Television

Representation

Abstraction

Gaming

Cinema

Symbolism

Non-western
Art

Simulation

Global
Interaction

Mass Culture

Schools/libraries

Non-narrative

Scientific models

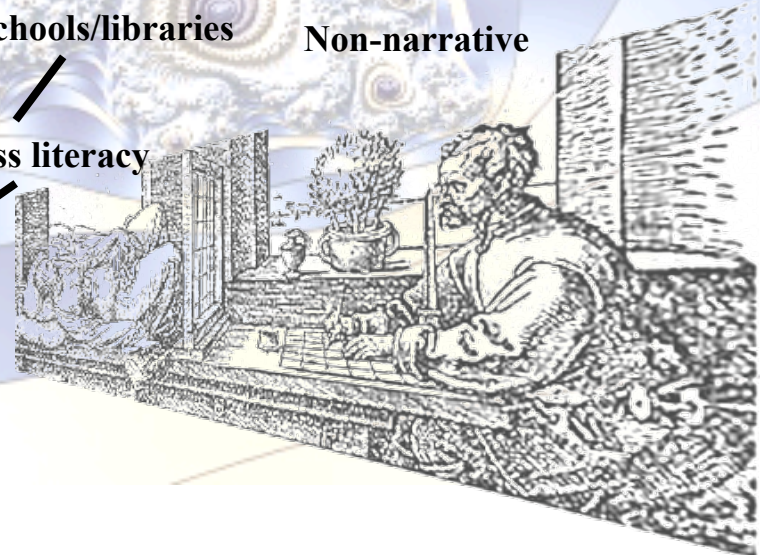
Lenses
telescopes, microscopes

Photography

Perspective

Printing
Press

Mass literacy



Disruptive Techs Provoke “Crises of Progress”

by transforming or augmenting *vision, memory and attention*.
Each time, the new info-surfeit seems overwhelming, scary, unmanageable.

- **15th - 17th Century**
 - Printing (*augments Memory*) →
 - Glass Lenses (*augment Vision*) →
 - Perspective (*augments Attention*) →

Crisis: Religious Upheaval (e.g. 30 Years War)
Quandary: Renaissance vs. rigid doctrine
Concepts: The notion of progress. Value of individual
- **18th Century**
 - Mass Literacy (Memory) →
 - Printed illustration (Vision) →
 - Science, Democracy (Attention) →

Crisis: Bourgeois Revolution
Quandary: Enlightenment vs. old hierarchies
Concept: Commerce = unsupervised generative process
- **19th Century**
 - Mass Education, public libraries →
 - Photography, cinema →
 - Global Connection, closed frontiers →

Crisis: Nationalism-Colonialism-suffrage
Quandaries: Industrialism vs. Nostalgia, Centralization.
Concepts: Evolution. Plural viewpoints
- **20th Century**
 - Computing, databases (memory) →
 - Television, mass media (vision) →
 - Abstraction & immersion (attention) →

Crisis: Dogmatic ideologies
Quandary: Modernism vs. Subjectivism
Concepts: Individual autonomy. Diversity.
- **21st Century**
 - *Knowledge Mesh* (super-memory) →
 - *Omni-veillance* (super-vision) →
 - *Visualization, simulation & gaming* (super-immersion) →

Crisis: Breakdown in coherency/confidence
Quandary: Singularity vs. Renunciation
Concept: The future as a human-wrought construct

With each new tech wave:

=> “godlike” expansions of **vision, knowledge, attention ... and reach.**

☒ fear of **hubris** or **self-destruction.**

☒ calls for **renunciation** or control by a **trusted elite.**

Yet we **never refuse** new tools/prosthetics.

Always... people adapt to “godlike powers” ->**accustomed norm...**

...expanding creative commerce, education and citizenship.

So... what new “godlike powers” will tempt us, this millennium?
And can the **arts of visualization & discourse** help us to cope?

Anticipation = daydreams
of a future that never happens.

“*Gedankenexperiment*”
hard-wired in prefrontal lobes.

At best -

we spot mistakes to avoid.

At worst -

we weave satisfying delusions.



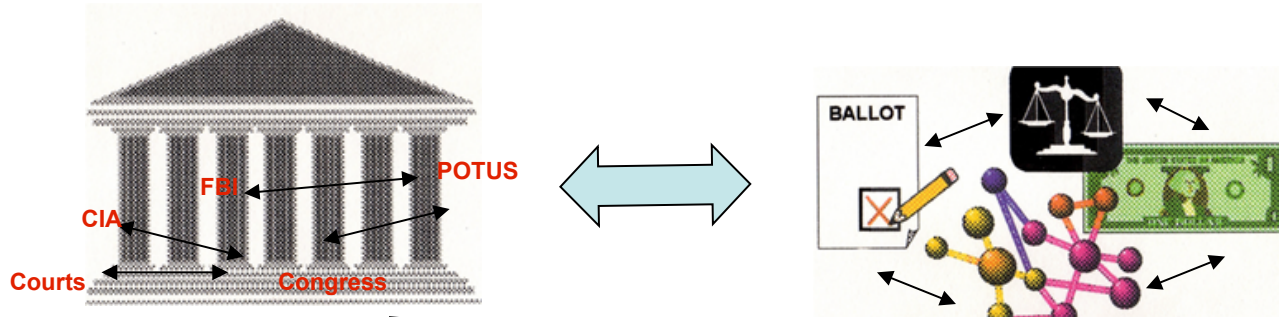
Efforts to systematically improve anticipation:

- Data mining, sifting, pre-analysis and visualization.
- Advanced analytics.
- Exploit diversity through prediction markets (betting) or polling (voting).
- Prediction *registries* aim to distinguish between good/bad forecasters.
- Enlightenment “accountability arenas” (markets, democracy, science...)
- Artificial intelligence may augment prefrontal lobes...

Information flow *among* society's levels... and *within* each level.

Formal/hierarchical Institutions
Protective agencies: e.g. FBI, CIA

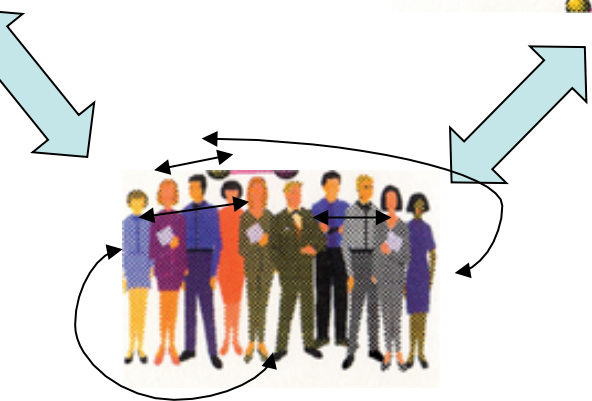
Arena-Markets for creative competition:
Democracy, science, enterprise & courts.



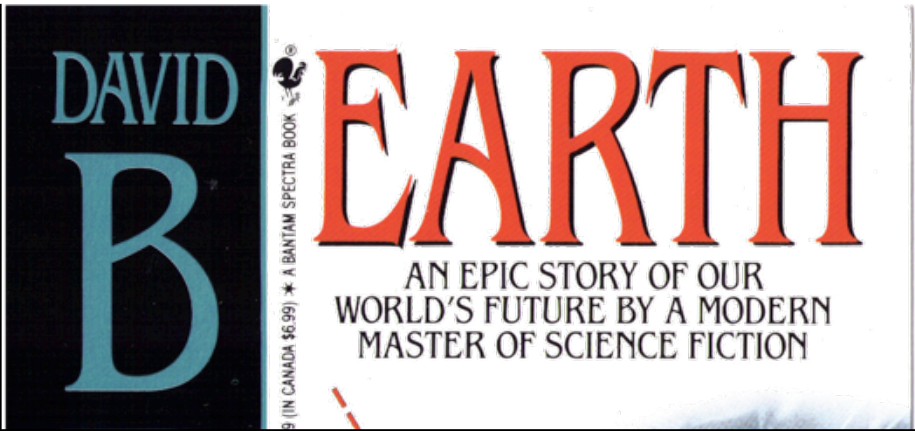
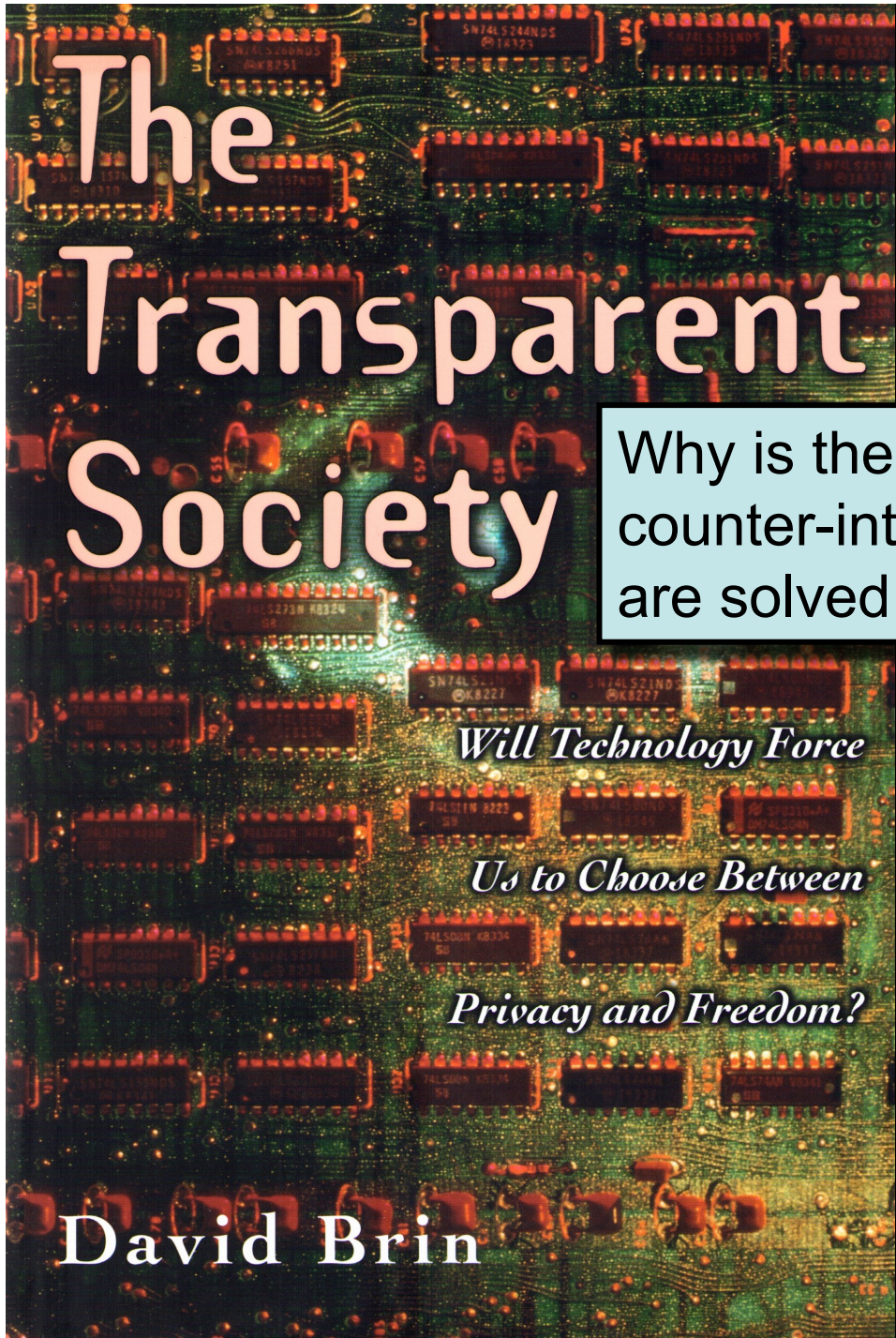
Trap of human nature:
Rivals need accountability.
(Foreigners, other social levels, or within our level...)
But **we** need secrecy!

Our civil bargain relies on **information flowing**.
Like oxygen.

The true test of maturity?
"Light must shine, even on me."

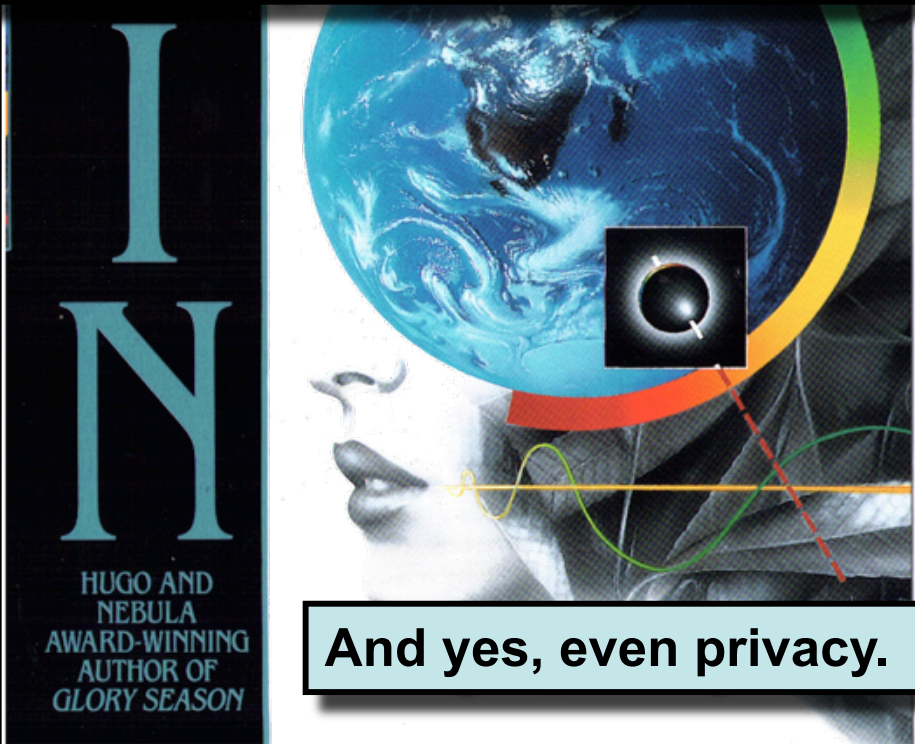


The People: chaotic and flighty, but ultimate source of creativity, resiliency, accountability and sovereignty.



Why is the core Enlightenment innovation counter-intuitive? Most info-age dilemmas are solved by more light, not less.

*Will Technology Force
Us to Choose Between
Privacy and Freedom?*



And yes, even privacy.

Potential Foes #1: Super-empowered Angry Young Men

Samples from an infinite supply!

Near-term/probable: Arson

Aim: Spread chaos & economic damage by low-tech means.

Agents: Amorphous bands of grudge-motivated harm-doers (HD). Not easy to profile. (e.g. Columbine.)

Method: Burn forests, buildings, crops. Innumerable very soft targets. Backers supply untraceable, effective ignition devices (e.g. timed or laser). Easily avoid official protective measures.

Potential harm: economic disruption, fear. Danger

Special variants:
wide variety
Leverage S
Stimulate a

Specific projects:
Massive in

General social

- * Raise citizen omni-awareness. (Technological and social.)
- * Combat nihilism/cynicism through cultural and political means.

* HD = Harm-Doers.

Medium/plausible: Classic Terror

Aim: Inflict pain. Draw attention. Ruin morale. Demonstrate West is weak/corrupt.

Agents: Classic "terrorists" & backers

Methods: Disruption. Casualties. Fear, Intimidate & exhaust. Lure unwise reactions.

Potential harm: Vast supply of soft targets.

A myriad variants:

- * strike super-soft schools, malls, transit.
- * hit critical bridges, tunnels, choke points.
- * NBC death-producing attacks.
- * NBC denial of territory attacks

risk and cost. (The "UA93 Effect.")

Key Conclusion:

- *Supply of scenarios/targets limitless!**
- *We could go on all day. All century.**
- *More than "protection" is needed.**

Far-devastating: New Gods

Aim: Create tailored pathogens via bio, chemical, or nanotech processes.

Agents: Almost any angry person in 2025. (Grievances raise % of HD*, but even pampered classes generate some.)

Method: When biologists, chemists and molecu-fabs offer "desktop" capability (the way cyberneticists shrank computers), all methods will be in reach of modest skill. Outbreaks may approximate today's *computer viruses*, but targeted at real life.

Equilibrium.

...and all failed

* HD = Harm-Doers.

**What about the "tradeoff" of safety vs freedom?
Mustn't power and knowledge consolidate into
an elite Professional Protector Caste?
All prior civilizations did that...**

Potential Foes #2: rival state scenarios

Despite fresh memory (the Cold War) & historical ubiquity, this category is seldom mentioned post 9/11.

Near: Subornation

Aim: Exploit divisions in America by finding clades that can be suborned.

Agents: Skilled state operatives.

Method: Subornation is ancient. *Always* attempted vs rivals.

Harm: Subset of elite or protector caste surreptitiously helps rival agendas.

Recent Variants:

* 1941- *crony-elitism-naïveté* (Lindbergh)

* 1947- *naïve socialist*

*post 1947- *cash-sello*

*always - *blackmail* (M

...all (and many more) r
likely. Patterns can be h
eyes are on *other* dange

Prevention: Counter
track patterns of div
conflict of interest. U
Time spent in servic
Inexplicable decisions/appointments.

Solutions: *Counter*-subornation occurs when American society has clear high ground + culture-allure. Rivals grow more worried about defections than we are. *This pattern won the Cold War.*

Intermediate/plausible: Coolwar

Aim: Ruin U.S. competitive ability through acts of well-targeted sabotage.

Agents: Trained saboteurs make careful use of local recruits & resources, while avoiding exposure. (e.g. *blame "terror."*)

Method: Target weak/vital arteries, choke points. Pipelines, tunnels, infrastructure, chemical/medical stores, Internet, phone system, trust networks.

Harm: Economic damage, loss of

**Scenario-building exercises
reveal a daunting variety of threats.
No combination of dollars and skill
can address them all.**

Solutions: * Citizen omni-awareness.

* *Culture-suborn rival citizenry* so that secret coolwar becomes impossible.

Illustrated in fiction:

The Cool War, by Frederik Pohl.

Stand on Zanzibar, by John Brunner

Earth, by David Brin

Far/devastating: Tuned Genocide

Aim: Achieve conquest by threatening mass death via technological means.

Agents: Overt attack or surreptitious.

Methods: *Terrifying unidirectional death.*

* microwaves tuned to disrupt specific genetic/ethnic groups.

* diseases ethnically targeted or else curable only by restricted vaccine.

* nano-mites that infest, then await signal to commence lethal work.

* *Culture-suborn* enough of *rival populace* so secret development is impossible.

Illustrated in fiction:

Jitterbug, by Mike McQuay

**All of these methods have
copious historical precedent.**

Potential Foes #3: Overconfident innovators/enthusiasts

Near: BioChimeras & Zoonoses.

Aim: Improve food supply, better health, cure disease.

Agents: well-intentioned bio-engineers.

Example: Today's protein (meat) factories create vast human-animal contact. SARS, H5N1, Ebola all crossed human-animal boundary.

Harm: Pandemics. Or fear of same may limit biological science.

Variants: Biological skill to "mine" every genome, to birds, for cool human i

Preventions: Relentless precautions and supervisory bigger bio/CDC infrastruc

General solutions: Break might reduce danger:

- *meat from tissue culture not animals.
- *local (shopper-level) assay tools.
- *artificial intelligence (AI) helps model results before wetware is tried.
- *citizen omni-awareness.

Intermediate/plausible: Supervolcano

Aim: Tap unlimited geothermal power.

Agents: well-intentioned mega-engineers.

Method: Drill-access Wyoming Hot Spot, a magma needle piercing N.American Plate.

Harm: Unleash Yellowstone Super-Volcano.

Innumerable Variants:

- * Sudden release of undersea hydrates.
- * Physics experiments=> black hole or strangelet.
- * Unleash nanotechnology without precautions

plans benefit from criticism, without criticism stymieing all plans.

Illustrated in fiction: *Mother of Storms* by Barnes, *Blood Music* by Bear, *Prey* by Crichton, *Earth* by Brin, *Heart of the Comet* by Benford-Brin.

Far-devastator: A.I. Goes Wrong

Aim: Better computer & robotic servants.

Agents: Company, group, nation seeks advanced tech & competitive advantage.

Harm: Some fear "Fermi" extinction of old-style humanity.

Innumerable Variants:

- * SETI (Search for Extraterrestrial Intelligence) has, without consulting anybody, switched to "active" beaming: hope to draw attention to Earth.
- * More clever devices populace/elites ability to possibilities. (Many more...)

continue to develop the intelligence and anticipatory professional protective castes.

Foster rising perception, resiliency on the part of citizens, citizenry, so that all

plans benefit from criticism, without criticism thwarting all plans.

Illustrated in fiction: by countless dire warnings from *Terminator & Collosus* to *The Matrix*. More subtle: Asimov's *Foundation/Robots* series and Williamson's *The Humanoids*.

But they reveal that harm-doers share a common weakness. A fatal allergy to light.

Grist for many Hollywood films, this category gets very little attention from threat-analysis or scenario exercises. Yet it could lead either to great harm or overreaction and innovation-suppression.

Potential Foes # 4: Opportunists

All that's needed is for human nature - and 99% of history - to repeat itself...

Near-likely: Privatized Force

Aim: Maintain ferment as a source of demand for lucrative services.

Agents: Various. Some rationalizing good intent. (See #3.)

Harm: Quiet-calm-efficient means of achieving national goals get replaced by noisy-frenetic-inefficient ones that offer opportunities for parasitism.

Variants: hypothetically innumerable -

- Courts and justice privatized.
- Mafia
- Tribal
- Private with its (e.g. p

Prevent privat
Retain thoroughly accountable government.

Solution: Recall how Founders wisely rejected the 5,000 year mercenary/private force tradition.

The alternative - citizen militia - has drawbacks, but also offers profound advantages. (See #5.)

(David Brin - 2006)

Intermediate: Globalization Fails

Aim: Keep the world *balkanized*... or else push opposite extreme - *World Government*.

Agents: Left wing activists join bank havens and local elites, in order to prevent a loose-but-effective worldwide civil society.

Harm: Shrouded territories benefit from uneven spread of light/accountability. Open societies lose competitive advantage.

Variants:

- * Balkanization culminates in local nuke wars.
- * Banking/ownership secrecy becomes world issue.

forever. Pax Americana can begin thinking about "Whatever Comes Next" (WCN) before facing a *fait accompli* that it had no part in designing. Pro-actively insist that American instincts re: individualism and dispersed authority be fundamental axioms.

Devastator: Feudalism Returns

Aim: End our recent experiment with "diamond-shaped" social structures. Restore standard human social pyramid.

Agents: Almost any group that heeds the pull of instinct, history and human nature.

Methods: Innumerable. Every society that had metals/agriculture, quickly replaced democracy/markets with command elites. (Under a wide variety of excuses.) We are the sole exception. It has taken hard work. Relentless innovation.

loyalty-duty to the Experiment, not to leaders, or to themselves.

Solution: Foster reciprocal accountability, individual agility and confident, resilient citizenship.

What GENERAL strategy plays to our strengths and adversaries' weakness?

Note: these examples leave out the *most obvious* versions of "opportunism." e.g. theft, looting, extortion, malfeasance, bribery, insider-crony manipulation.

The great trend of the 20th Century (even 500 year)...

...the Professionalization of everything.

Formerly-personal tasks are turned over to specialists. Food, safety, education, production, transport. We owe a lot to this process...

...now drawing to a close!

COUNTER TRENDS

- * Demographics - can't increase number of professionals forever.
- * Citizen education and access to knowledge.
- * Intermesh of many specialized fields.
- * Explosion of skilled avocations.
- * Powerful new ***augmentations of Vision, Memory and Attention.***

The 21st Century may shift from *professionalization* toward...

...an Age of Amateurs.

What better way to spread resilience?

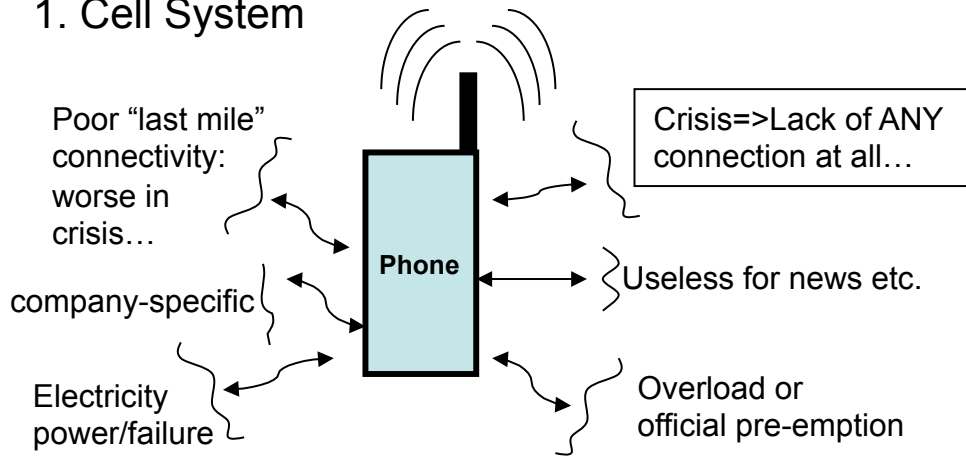
Alas, despite “smart mob” chic, it won't be easy...

The lessons of 9/11 were lost during the Katrina Crisis... how could that happen?

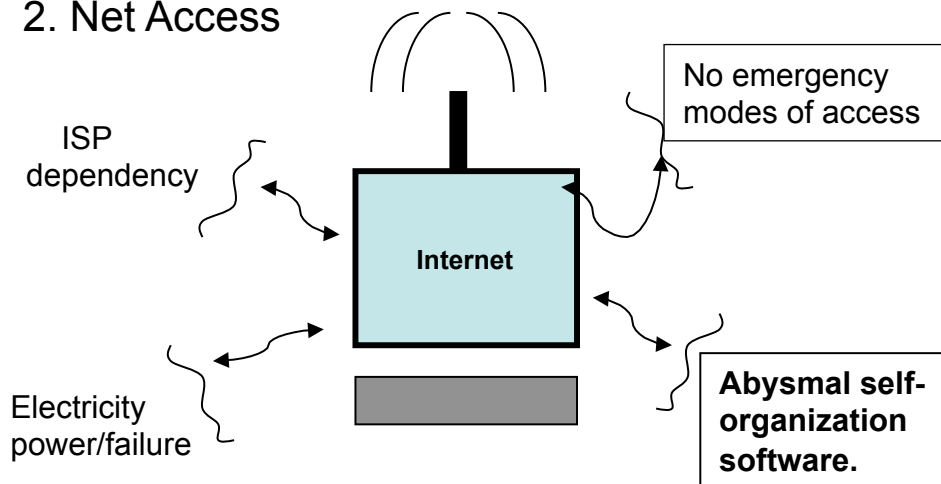
Critical Choke Points Stymie *Citizen Self-Organization* in Crises.

All of these examples were observed during Katrina. All could be repaired, if prioritized.

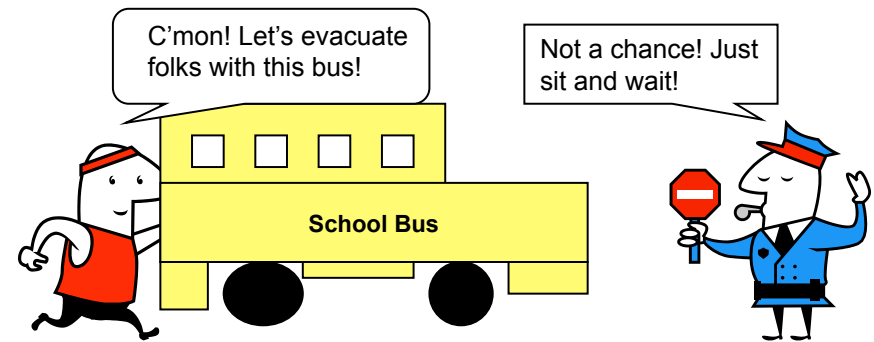
1. Cell System



2. Net Access



3. Taking physical initiative



Officially-enforced citizen passivity --

The common trait shown during Katrina by state, local, federal officials, Republican & Democrat.

Rationalizations:

- * maintain order
- * prevent crime
- * liability concern
- * peacetime procedures
- * enforce company, agency, guild privileges

But the *subtext* underlying official behavior during Katrina:

"The vigorous and effective ad-hoc citizen action that we all saw on 9/11 must never be allowed again."

Crux: Resilience faces top-down psychological resistance.

Another under-recognized “choke point” -- a growing disconnect between citizens and the technologies that serve them.



salon.com

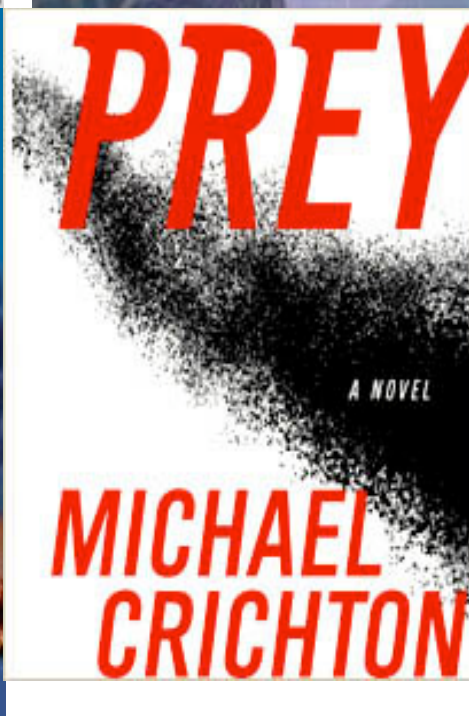
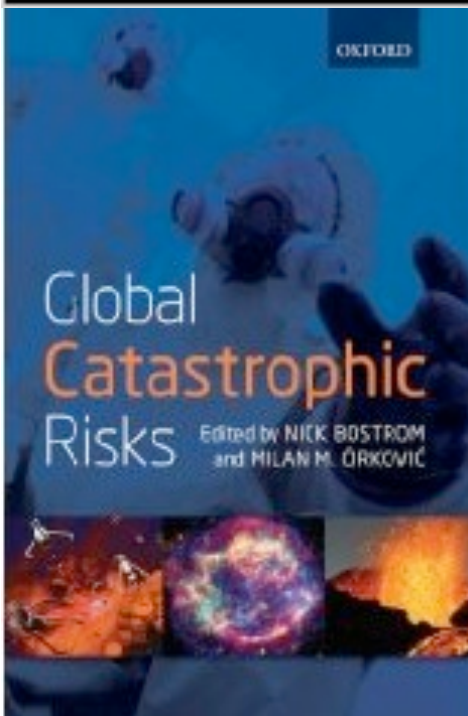
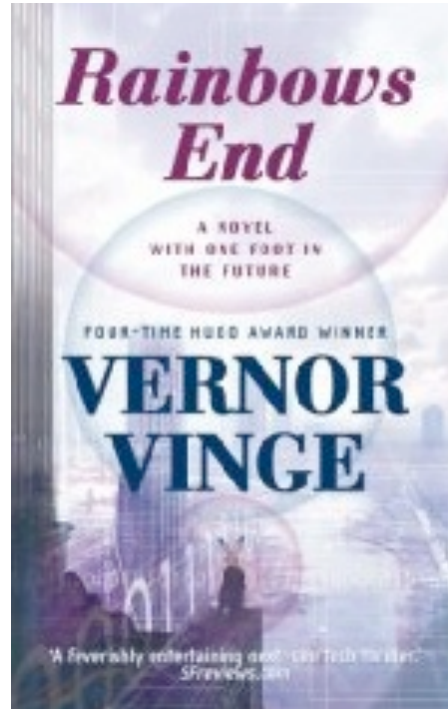
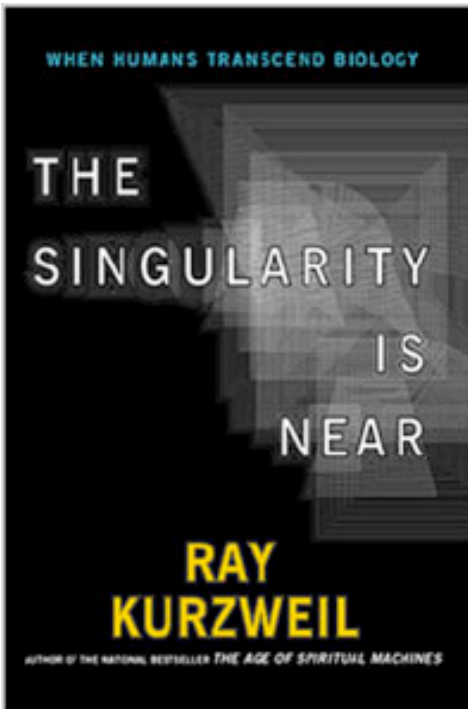


Why Johnny can't code

BASIC used to be on every computer a child touched --
-- but today there's no easy way for kids to get hooked on programming.
By David Brin



Some think we'll cope with accelerating change...
...and some think we may not.



Other generations adapted new tool sets and squeaked by.

Do we have all the tools we need?

The *Real* Digital Divide

Asynchronous Realm

web browsing
email
file sharing / downloads
search, research,
project collaboration
weblogs

Content provider & recipient
not present at same time.

Advanced interfaces assist information
flow, expression of complex thoughts.

*Useful to grownups... though
needing vast improvement.*

Synchronous Realm

chat & Instant Messaging
interactive gaming
virtual worlds
avatairing
telepresence

Content provider & recipient
are present at the same time.

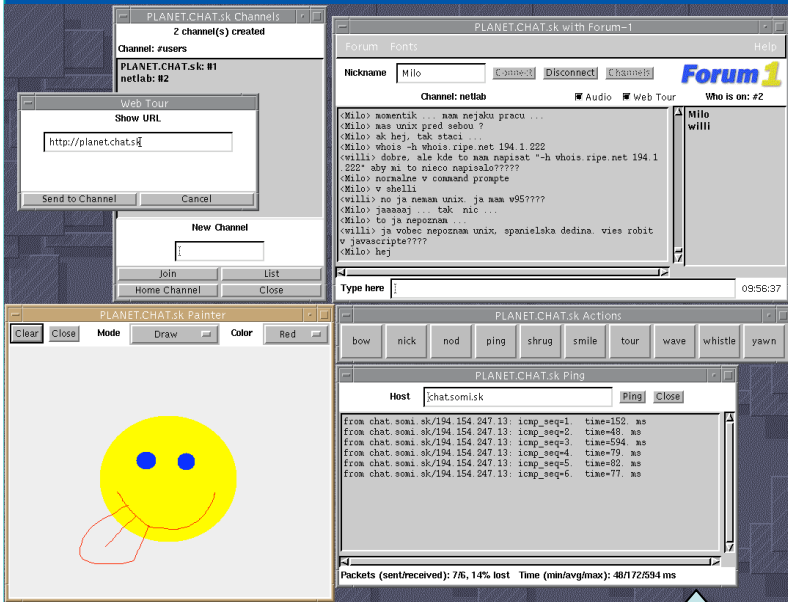
Primitive interfaces dumb-down exchanges
to the level of flirting, grunts, shooting...

*Except for meetingware, almost
useless to serious people.*

Notes:

- Despite overlap, these realms involve *different expectations*, customers, discourse.
- Both realms should benefit from advances in social networking.
- Some interactions, like instant Messaging have both synchronous and asynchronous traits. Crippled by worst combination.
- High-end collaboration & “meeting-ware” point to a future when *synchronous* presence will be attractive to adults.
- Just because high-quality is “allowed” doesn’t guarantee it happens. Still, shouldn’t quality be *possible*?

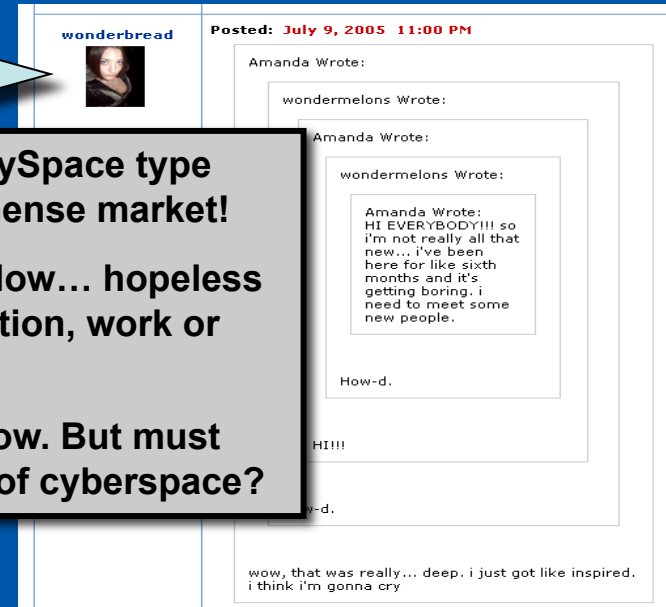
The Synchronous Realm in 2008...



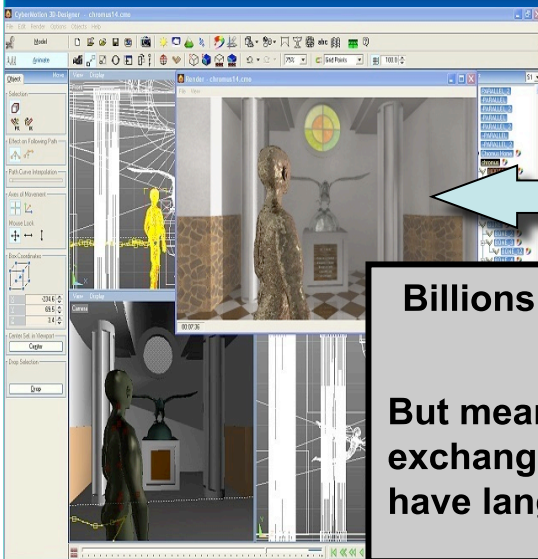
**Contemporary "chat" - dreadful!
Still using 1960s format!**

**Millions of teens on MySpace type
billions of words! Immense market!
But depressingly shallow... hopeless
for grownup conversation, work or
collaboration.**

**Yes, some *like* it shallow. But must
shallowness be a *law* of cyberspace?**



**"Avatar Worlds" like *There* and *Second Life*
limit interaction to grunt flirtation and "ROFL."**



**Billions are spent on fine rendering.
Cool stuff!**

**But meanwhile, tools to usefully
exchange thoughts and information
have languished, undeveloped.**



Discourse & Conversation - Cro-Magnon Style?

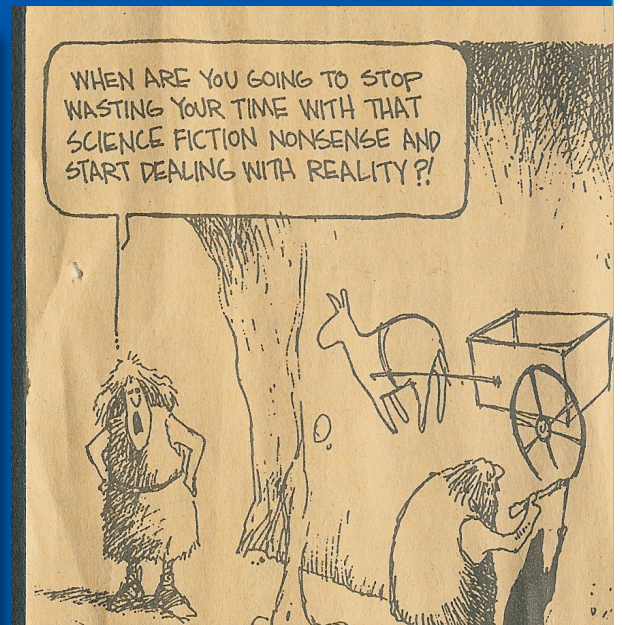


How far *back* do discourse talents go? To ancient folk who argued, chatted and planned, learning skills to get the most out of face-to-face interaction...



The “*attention economy*” isn’t new! Our ancestors practiced *selective focus* by -

- adjusting distance
- turning to or away from others
- heeding reputation
- favoring what’s interesting
- remembering what’s important
- adopting rules of courtesy
- keeping a train of thought
- staying alert for surprise.



Discourse depends on **attention, selective focus, prioritization,** and countless mental skills/tricks that we take for granted.

We still do all of those things!

We track the “gist” of conversation, but can also make careful notes.

Time has effects, but doesn't lobotomize!
Casual talk doesn't have to be shallow.

We adjust attention by many criteria - *topic, time, reputation* (global & personal), *direction, distance*.

Least attention paid to those who are away/behind.

Yet, you *notice* if folks mention your name - or other *hot words* - even far away!



We *divide* attention, shift tracks, adapt new priorities.

High priority attention goes to people you chose to face or get close to.

Rules of *courtesy* matter .
And reputation!

And this is just a cocktail party!

Inborn attention-agility skyrockets when matters seem important.

Yet, few of these *basic skills* have usefully arrived onscreen.

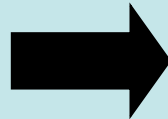
Even “social network” designers ignore basics.

A Wish List of services to boost Online Discourse

In life, we assign scarce attention by *priority*.

Traits that *affect* priority

- Orientation (attention-facing)
- Proximity
- Time
- Reputation
- Topic/syntax tagging



Attributes *affected by* priority

- Size of speech/text display
- Rendering (of avatars, video etc.)
- Gisting of contents:(font, size, sift-retain hi-impact words/meanings...)
- Semantic Services (alerts, smart-transcripts, omni-search.)
- Info & action availability.

That arrow has (mostly) never made it online.

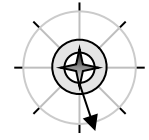
Trait #6: Priority by semantic content, tags, keywords or topic...

Here verbiage is deliberately shown **spilling out of the text box**, illustrating the **scrolling problem**. How to maintain the "gist" of what other people say, when older statements rapidly vanish out the top? Can online discourse track earlier statements?

Separating each speaker only partly solves the "dilemma of "chat." We must also provide tools for **smart transcribing**.

I head out to the bar later and the news mentions something about Westerville & an "upper albany" development, I got a little scared

why is october always such a crazy month weather wise in ohio? I've only lived here five years, so I'm still not used to it.



thank god I live within the beltway. I was thinking of a drive out to pick olives for an omlett. With butter. Have you ever tried

Can system help detect what's urgent, take *gist* notes, sift noise? **Even in faraway speech?**

I hear that John Smith was looking for his sister who was missing
Good of you to drop by weather watchers.

Are you folks discussing the strange weather? I hear there's a tornado watch in grove city. My cousin has a house there.

I weep for thee,
and yet no cause I have;
For why thou left'st me nothing in thy will:
And yet thou left'st me more than I did crave;
For why I craved nothing of thee still:
•yes, dear friend, I
•pardon crave of thee,
Thy discontent thou didst bequeath to me.
-- Wm Shakespeare

*Yup- thanks for thinking of me... I was downtown when all the sirens started last night, but all I heard was that it was grove city

there is a tornado warning for the franks county area 'til 7:30.
*Yeah, columbus parts the weather like the red sea.

How to appreciate & "memorize" useful info, while remaining compact?

**We solve all of these problems in real life conversation!
Shouldn't online conversation spaces aid discourse, as well?**



Semantic content, text, gisting & services emulate the power of real brains...

Let's solve the problems from the previous screen.

Semantic alert: someone far away (even in another world?) is discussing something important to you!

John Smith
...sister missing

Good of you to drop by weather watchers.

Transcript zone also notepads etc

Oct = crazy month
weather wise n OH?...
Im not used 2 it.

Simple **gisting:** font ageing, remove low-pri words

I head 2 the bar later & the paper news ... re **Westerville** & an "**upper albany**" development...got a little scared ...

...blah...blah...
omlette...



Yup- thx 4 thinking of me. I was dntown when sirens started last nite, but all I heard was that it was **grove city**

- a **tornado warning** for **franklin county** 'til **7:30**.
- **CMH** parts the weather like red sea.

tornado watch in **grove city**

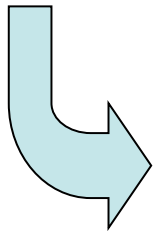
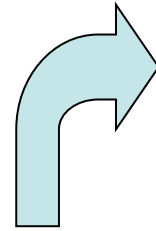
"I weep for thee"
(poem link)
W.Shakespeare

Smart services notice a quotation. Many other services.

Shouldn't you be able to go **BACK** and recall what someone said earlier?
Memory assistance services are represented here by a simple scroller.

Has anyone heard bout power outages? This lightning is crazy. Lots of multiple flashes.
Ironically I'm near downtown and it's already clearing up.

User's own words. Issue of whether they should use up screen space in center...



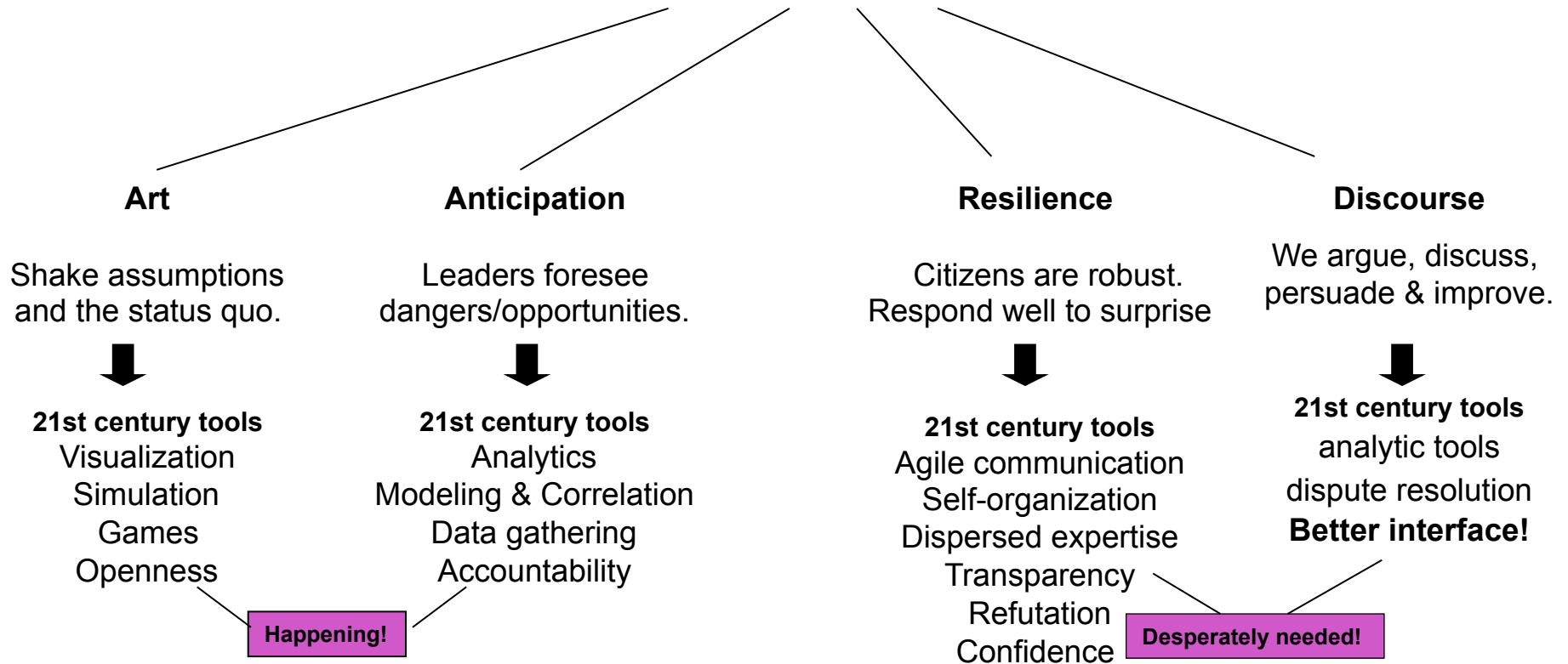
Our meandering path.

Tech advances in **{ Vision
Memory
Attention }** disrupt civilization, provoking **Crises of Confidence.**

Civilization passed every test by **empowering people** to apply **reciprocal accountability.**

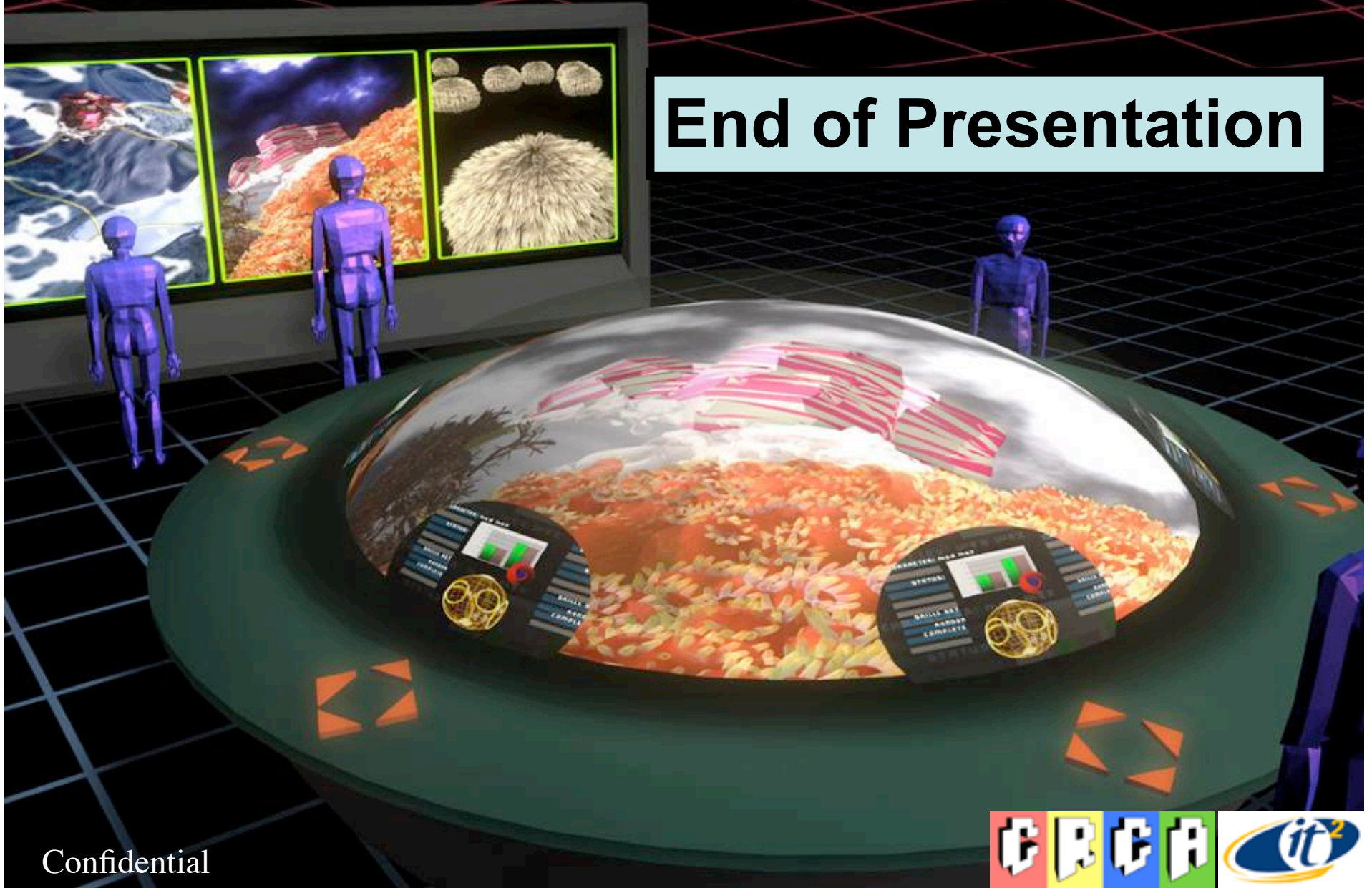
And with new **tools for problem solving.**

21st Century Problem Solving requires:



Exorarium Concept by Sheldon Brown and David Brin

End of Presentation



Confidential



**Proof that these traits, properties, services and methods never made it online...
No significant "prior art." These gaps in online discourse are real!**

United States Patent Application 20030001890

January 2, 2003 - Filed: June 12, 2002

United States Patent No: 7,124,372

Date of Issuance: October 17, 2006

Interactive communication between a plurality of users

Inventor: Brin, G. David

Abstract

A novel system, method, and computer program for interactive communication among a plurality of users. The invention, called Holocene Conversation Mode ("HCM"), takes advantage of the observation that human beings have developed or utilize a number of real-world characteristics to participate in, perceive, control, and glean subtleties from conversations. These characteristics include **proximity** and **orientation** of a listener to other speakers, **memory ageing**, **emphasis** by a speaker, relative **importance** of a speaker to a listener, **reputation** of a speaker, and the unique human ability to **"filter"** words of special interest to a listener from overheard conversations. HCM includes a suite of techniques, including **spatial and content compression** as a function of some of such characteristics, that can be implemented in various combinations in computer software. HCM supports **other forms of user interaction**, such as allowing a user to give or **send an object** to another user, or to allow a user to take an object from another user. In addition, HCM supports "kiosks", in which users can interact with non human resources in the context of a host-defined environment.

Inventors: Brin, Glen David; (Encinitas, CA)

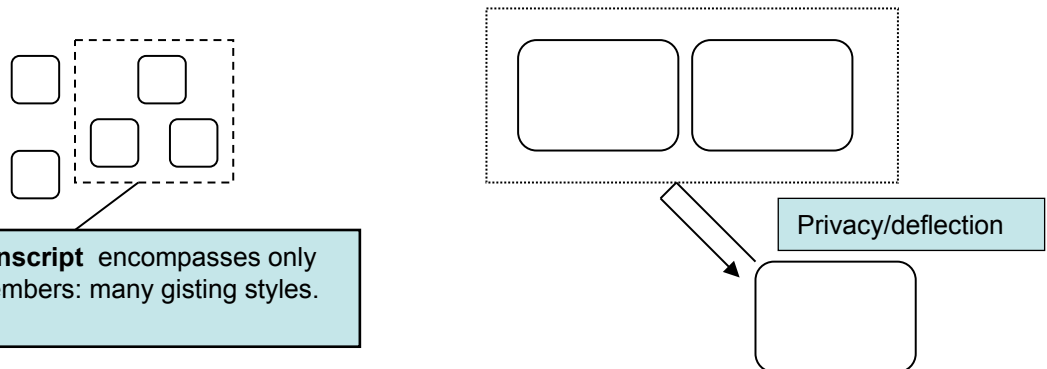
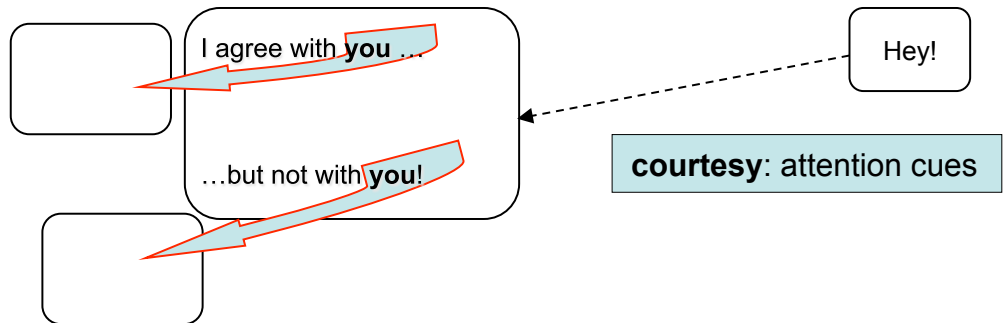
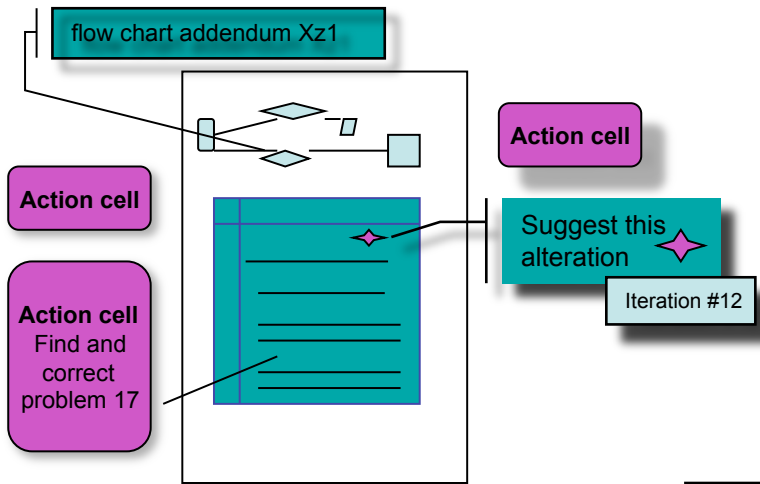
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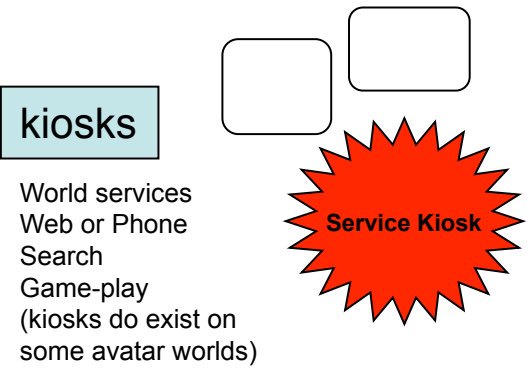
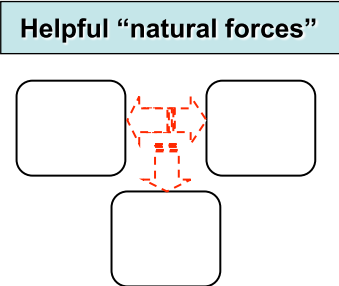
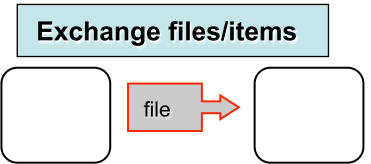
126 claims. covering a vast range of potential onscreen representation and communication methodologies.

Real Life suggests *Additional Services* ...

“Bricki” project whiteboarding:
Both synchronous meeting and asynchronous collaboration.



Smart-Transcript encompasses only chosen members: many gisting styles.



Also: VOIP, video, analytic tools, self-cloning, teleportation...
...all the way to new-style game methods, environments, formalisms...
...and rapid Augmented Reality overlays.