

Information Ecologies

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Today's talk

- Outline my background so you can see where I am coming from
- Talk about information ecologies
- Give you a sense of how research ideas develop
- Speculate a bit!

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A little bit about me..

- When I was young I wanted to be a linguist...
 - B. A. hons (Germanic Languages and Linguistics)
- Then I got interested in computational stylistics
 - M. A. ("A computerised analysis of characterisation in Virginia Woolf's 'The Waves'")

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Not quite there yet..

- Then I realised I needed better computational techniques...
 - Grad. Dip. Computing
- Then (much later) I found a Ph. D. topic and a supervisor I was interested in
 - Hypermedia Online Publishing - Transformation of the Scholarly Journal

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Finding the right theory

- Doctoral research needs to be grounded in theory
- But which one to choose? I picked three:
 - Constructuralism (Kaufer & Carley)
 - Punctuated Equilibrium (Eldredge and Gould)
 - Genre theory (Agre)

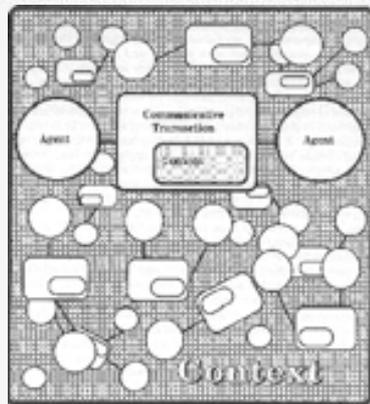
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Kaufer and Carley

- Developed the idea of an "ecology of communicative transactions"
- this communication ecology consists of
 - agents
 - communicative transactions
 - content
 - context

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- Ecological constructural framework builds on this simple communication ecology model by regarding all these components of communication as mutually defining, co-adaptive, and co-evolving



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Thinking about ecologies

- Kaufer and Carley in their book built on this model and moved on to other areas
- I decided to play with its consequences and see what happened
 - What are the characteristics of ecologies?
 - What happens to the species in them over time?

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Ecology

- Ecology is concerned with:
 - the distribution and abundance of organisms
 - how distributions are influenced by characteristics of the environment
- Key idea: Organisms influence their environment and the environment influences organisms

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Ecology characteristics

- Importance of system inter-relationships and inter-dependencies
- Diversity and ecological niches
- Co-evolution of species
- Role of keystone species
- Bound to particular localities

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Ecologies and evolution

- I was already thinking about the development of scholarly publishing in a historical context
- Moving to evolution was a natural transition
- So I started thinking about how evolution occurs...

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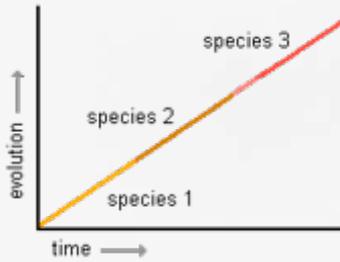
Theories of Evolution

- Despite over 100 years of research, still disagreement about evolution actually occurs
- Two main competing theories:
 - Phyletic gradualism
 - Punctuated equilibrium

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Phyletic Gradualism

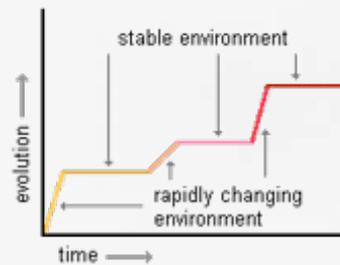
- gradual changes from generation to generation indicate that past species regularly evolved gradually into other species over millions of years.



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Punctuated Equilibrium

- Eldredge and Gould asserted that there is sufficient fossil evidence to show that some species remained essentially the same for millions of years and then underwent short periods of very rapid, major change



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How does PE work?

- Parts of the breeding population become cut off from the rest of the population in different environments
- They adapt to the new environmental challenges by evolving into new species
- If the surrounding environment also changes, pre-adapted species will quickly out-compete their ancestral relatives
- In the fossil record, this then shows up as a sudden change from one organism to another

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Information analogue

- What is the equivalent environmental change for the scholarly communication ecology?
- New developments in computing and communication technologies, changing
 - professional practices
 - intermediary processes

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Internet as ecological niche

- So what does it mean to think about a whole new ecological niche becoming available?
- When has it occurred before?
 - animals moving onto land
 - birds taking to sky
 - Cambrian explosion (530 MY BP)
 - as preserved in the Burgess Shale

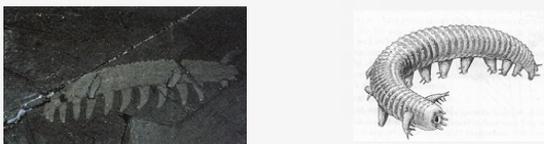
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Cambrian explosion



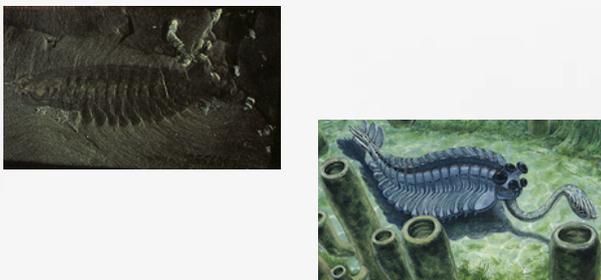
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Aysheaia



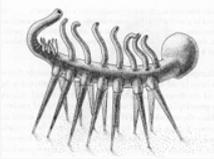
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Opabinia



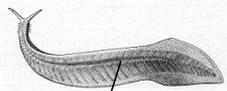
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Hallucigenia



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Pikaia



Our ancestor....
(spot the notochord)

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So what?

- According to Eldredge and Gould, Burgess Shale saw lots of phyla appear for the first (and last time)
- Any/all of these phyla could have succeeded
- Only a few did
- Picking which ones (without the benefit of hindsight) would have been very hard

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Why the Cambrian explosion?

- Three main factors:
 - first filling of the ecological barrel, providing empty ecological niches
 - a directional history for genetic systems, making significant change harder over time
 - early diversification and later locking-in as a property of all systems

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Internet as niche

- (Technically, WWW rather than Internet)
- In early 1990's was largely empty
- Lots of early experimentation
 - particularly during frenzy of dotcom boom
- Most web sites (as an example) now follow small number of patterns (locking in)

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Scholarly publishing

- Lots of early diversity, now narrowed down to a small number of forms
- HTML pages for navigation, PDF to download and print
- Most journals both print and electronic (and thus constrained by print)
- Little experimentation in form

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Where to from here?

- Currently in middle of punctuatory jump after stasis of print journal publishing
- New species of communications artifacts are evolving
- Existing players are changing roles
 - publishers, libraries, scholarly societies
 - Recent rise in influence of Open Access publishing movement
- New period of stasis coming up

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The Information Ecology Meme

- Google search for
 - "information ecology" 10800 pages
 - "information ecologies" 3240 pages
- Information Ecologies: the impact of new information 'species'
 - Conference held 1998 in York
 - <http://www.ukoln.ac.uk/services/elib/events/information-ecologies/>

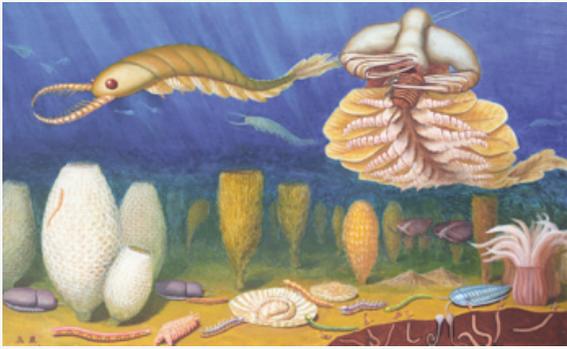
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Revisiting the Burgess Shale

- Since the original book by Gould in the early 1990s, there has been ongoing work on the Burgess Shale fossils:
- Later re-interpretation as less radical than first thought (c.f. *Hallucigenia*)
- See also recent book by Andrew Parker entitled In the Blink of an Eye

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Discoveries at Chengjian



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Questions?

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