The Terrain and Main Components of Debate

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Session 4

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The Concept of Niche

We each have our “niche” in life’s matrix (whether we know it or not)...

How do you define your “niche?”

How can we define it more generally in ecosystemic terms?

“That niche used to be the cigarette-machine niche, then it was the water-cooler niche, and now it’s Mr. Pendleton’s niche”

(Booth)
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Or a “stage” in the flow of energy through biomatter.
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Geological systems condition the emergence of life forms, but, over time, life forms can also alter geology. Our atmosphere is the result of the waste of bacteria. The “Cliffs of Dover” are rock that used to be “alive.” Coral reefs are still alive … let’s hope.

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Human behavior can be a direct assault on the earth’s structure and Earth “responds” according to the laws of physics…plates.
Consider the activity of the “extractionists”....
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Furthermore, behavior can accelerate ice and glacier melting, and that can, in turn, have seismic implications along unstable plates.

Do humans cause earthquakes? Silly question, right?
Humans can have an enormous and highly disproportionate impact in a dynamic system that is characterized by...

**Tipping Points:**

Glacier Melt + Glacier Movement
Climate change will shake the Earth

A changing climate isn't just about floods, droughts and heatwaves. It brings erupting volcanoes and catastrophic earthquakes too.

McGuire, Bill

2012 "Climate change will shake the Earth," The Guardian - U.K., (26 February 2012 14.59 EST Sunday).

Tim Weiskel - 12
The Concept of Niche

….But … let’s turn to the biosphere and our “niche” within it.

What is a “niche?”

“That niche used to be the cigarette-machine niche, then it was the water-cooler niche, and now it’s Mr. Pendleton’s niche”

(Booth)
An abstract but more accurate way to define a niche is to say…
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A Niche is an “N-dimensional hypervolume”
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All species have a *potential* niche and *realized* niche
Other species can find their realized niche in our “potential niche” but not share our “realized niche”
A species realized niche can change over time.
What happens when realized niches converge?
Remember, niches abstractions (reflecting real behavior)
Niches can be “shared,” leading to commensualism or symbiosis.

Symbiosis, mutualism
But species can also “move” to a different portion of their potential niche.
In addition, the “shape” of the realized niche can change because of the new relationship with another species.

parasitism ==> predation ==> annihilation
Patterns of population variation in biological species.
How have human beings grown over time?

What have been the patterns of human growth in evolutionary time?

How do we find out?

We look for traces of human activity….starting with the non-random (or patterned) arrangements of enduring objects like stones….
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Some explanations do not involve humans…
But on examination, other kinds of improbable "rocks" seem to involve humans.
If we look carefully at what seems to be piles of rocks in many parts of the world we will find non-random, patterned rocks, whose existence is improbable and therefore prompts us to seek an explanation.

But other improbable patterns can only be explained by human agency.

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Over time, there are marked changes in the types of “tool kits” that humans use, and these point to different forms of behavior and social organization.
Early humans followed the coast

By Paul Rincon
Science reporter, BBC News

Learning how to live off the sea may have played a key role in the expansion of early humans around the globe.

After leaving Africa, human groups probably followed coastal routes to the Americas and South-East Asia.

Professor Jon Erlandson says the maritime capabilities of ancient humans have been greatly underestimated.

He has found evidence that early peoples in California pursued a sophisticated seafaring lifestyle 10,000 years ago.

Anthropologists have long regarded the exploitation of marine
Some new “tool kits” are more efficient in assisting populations to capture new energy sources ~ population growth.
Human as Foraging Species Distribution - 12,000 BP
Humans as Foraging Species Distribution - 2,000 BP
Humans as Foraging Species Distribution - 75 BP
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Agriculture represents a new means of capturing solar energy and this leads to a population ‘spurt’ in growth. As does the ‘energy spurt’ provided by the industrial revolution & fossil fuels...
Along with a “new” set of stone tools that were more technically advanced and durable, the “neolithic” or “new stone age” is distinguished in the archaeological record by the appearance of several nearly simultaneous technologies that emerge along with sedentary agriculture – notably pots.
Sedentary life patterns combined with storage technologies and record keeping technologies (writing, in particular) allow for a rapid, largely simultaneous burst of social and cultural invention leading to....
Language made visible

Researchers celebrate writing’s ‘diverse oneness’

Visible Language Series Begins
The State

Town ==> City ==> City State ==> League of States ==> Empire

Extraordinarily rapid social evolution...
Strikingly similar forms appear around the world.…

Is this Middle-Eastern or Mayan Architecture?
The gradual displacement of foraging societies (hunter-gatherers) by expanding agricultural societies leads to a whole new calculus of the domestic sphere.
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This, in turn, kicks off an enormous “positive feedback loop” in all subsequent human history.
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Don’t produce or acquire more than you can carry.
Logic Changes with Agriculture

The logic of production and reproduction changes dramatically with the emergence of sedentary agriculture.
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Land becomes valued, needs to be worked with labor, the more labor the better, especially if it needs to be defended, the more defenses are needed, which require more agricultural surplus to support and therefore require people to acquire more land upon which to grow more food, etc. etc.
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This is an ever escalating “positive feedback” loop - an escalating “vicious circle.”
More is better…. 

However much is produced, with new storage technology and desiccated grains, it is possible to accumulate ever more -- multi-annual surpluses. Record keeping allows for inter-generational inheritance of both surpluses and debts.

The larger one’s family is, the greater the domestic labor force that one can command.

Unskilled, repetitive and boring work needs to be done and women and children can be pressed into service.
Growth is good…. 

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The positive function of child labor as a tractable labor force in the newly organized system combined with the sedentary settlement pattern gives a whole new dynamic to the domestic domain. Production is geared up to expand reproduction, which in turn fuels further production with the application of child labor. Growth becomes a “good thing” as opposed to something that ought to be avoided.
Neolithic Ethnocentrism

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We have co-evolved with our domesticates.

We have gained many things in the process

AND we have lost many things as well….
Our culture has trained us to think of social evolution as if it were a progressive process, leading to refinement and improvement of the human condition....this may not be so in the long run.
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We will need to overcome this neolithic bias in our outlook if we wish to survive.
Remember, collectively our species *has* changed its *realized* economic niche over time. Agriculture represents a new means of capturing solar energy and this leads to ==> a population ‘spurt’ in growth.

As does the ‘energy spurt’ provided by the industrial revolution & fossil fuels...
Humans are now the biggest “natural” “problem,” destabilizing systemic functions in the Earth system.
If human populations are to stabilize within the system, their net growth rates will have to return to zero.
Global Population May Surpass 13 Billion by End of Century

Posted on September 19, 2014 | Leave a comment | Edit
…..and then there’s the problem of our stuff….
We need above all to remember that evolution is NOT a morality play…

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How long will the human species be “left standing” when its life support system collapses?

**ANSWER:** Not long.
Both our Anthropocentric and our Neolithic Bias Contain Some Important Implicit Theories in our Ethical Discourse

A Theory of Community
A Theory of System
A Theory of Authority
A Theory of Change
A Theory of Agency
A Theory of Time
Environmental Ethics and Land Management

ENVR E-120

http://courses.dce.harvard.edu/~envre120

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