Environmental Ethics and Land Management

ENVR E-120

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

Elements of Ethical Reasoning

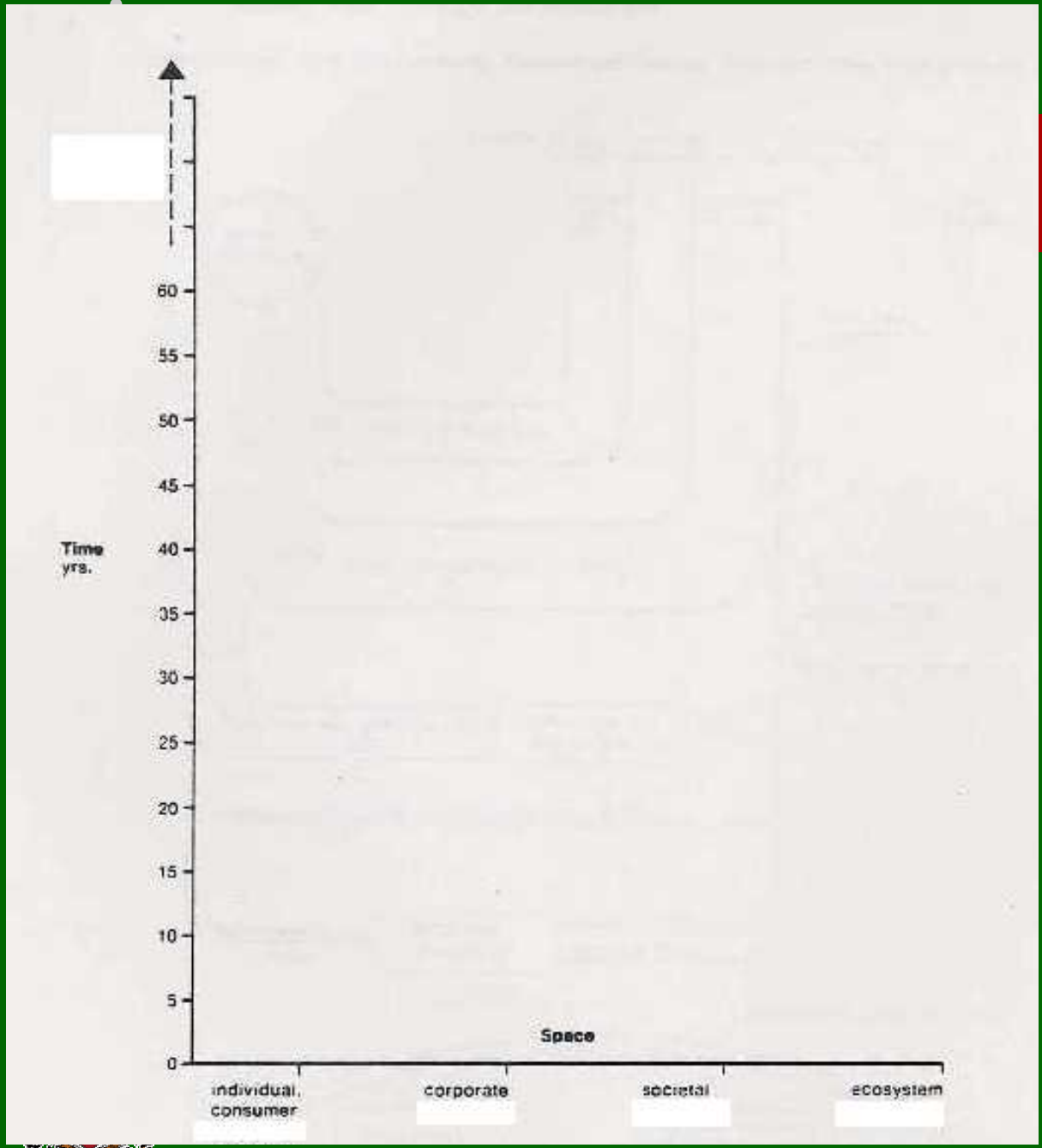
Timothy C. Weiskel

Session 3
5 October 2004

Harvard University Extension School
Fall Semester 2004

We have to try to situate environmental ethics – the principles of choice in an ecosystem -- *within* the cosmic order.

We should not expect our ethical systems to contradict natural systems



All decisions are made in a time-space continuum. In short, all ethics are “situated”

The question is what is the relevant time-space ‘frame’ for ethical choices in an ecosystem?

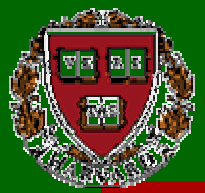
We have reminded ourselves that Earth and the life forms that have emerged on Earth have been shaped by cosmic events.

Further, these cosmic events continue to occur and "frame" all we undertake…

In short, in the ecosystem some very important things remain *beyond human control*. They always have been, remain now and always will be beyond our control.

Considering the larger cosmic context, we have learned that life systems may not be confined to Earth….

In fact, they may not have originated “here” on Earth.



BBC NEWS WORLD EDITION

You are in: Science/Nature

Tuesday, 1 October, 2002, 11:30 GMT 12:30 UK

Life may swim within distant moons

By Dr David Whitehouse
BBC News Online science editor

Oceans of water beneath the icy surfaces of distant moons may be far more common in the outer Solar System than had been thought, according to new calculations.

Some, in theory, could harbour life, claim scientists.

Until now it was believed that oceans might be found under the icy crust of Jupiter's moons Ganymede, Europa and Callisto.

But new calculations, by Christopher England of Nasa's Jet Propulsion Laboratory (JPL), to be presented at a major astronomy conference, suggest that this may be the case on other moons, such as Titan - which orbits Saturn - and Neptune's large moon Triton.

Even Varuna, the largest so-called Trans-Neptunian object

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Wednesday, 26 January, 2000, 19:01 GMT

How life may live on Europa

Impression of a probe searching for life in Europa's ocean

By BBC News Online Science Editor Dr David Whitehouse

A radiation-driven ecosystem could exist in the ocean thought to lie beneath the surface of Jupiter's moon Europa, a scientist has suggested.

Ever since the Voyager spacecraft flew past the Jupiter system in the 1970's, astronomers have been fascinated by Europa and its bizarre striped surface and the prospects for primitive forms of life on the satellite.

But life needs energy. It has been suggested that on the floor of the suspected subterranean ocean there may be hydrothermal vents like those found on Earth.

These vents, which gush hot water and minerals, could provide both the energy and the food sources for primitive Europans.

Further, we have learned that not all life systems need to be based on carbon, just because “life as we know it” on the Earth’s surface is based on carbon.

Non-carbon-based life forms may exist elsewhere because we know they exist in remote regions of Earth itself.

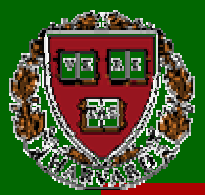
The Notion of Causality

In addition, we have observed that notions of simple causality do not really work very well in a complex ecosystem.

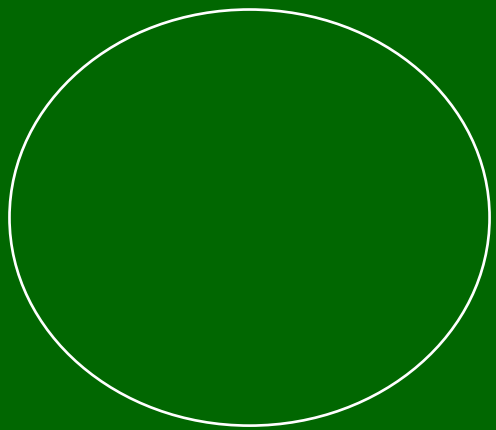
Simple causality implies that there is a linear relationship between cause and effect.

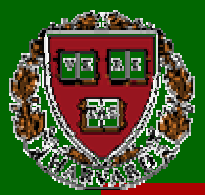
A “causes” B

therefore, if “B” then there must be a prior causal A



But what about complex systems?





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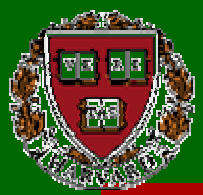

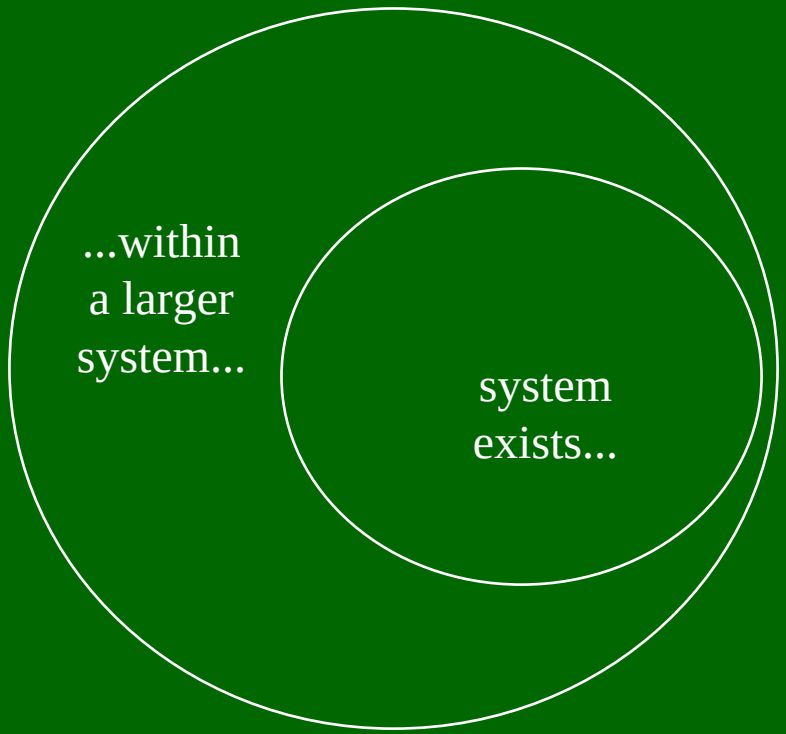
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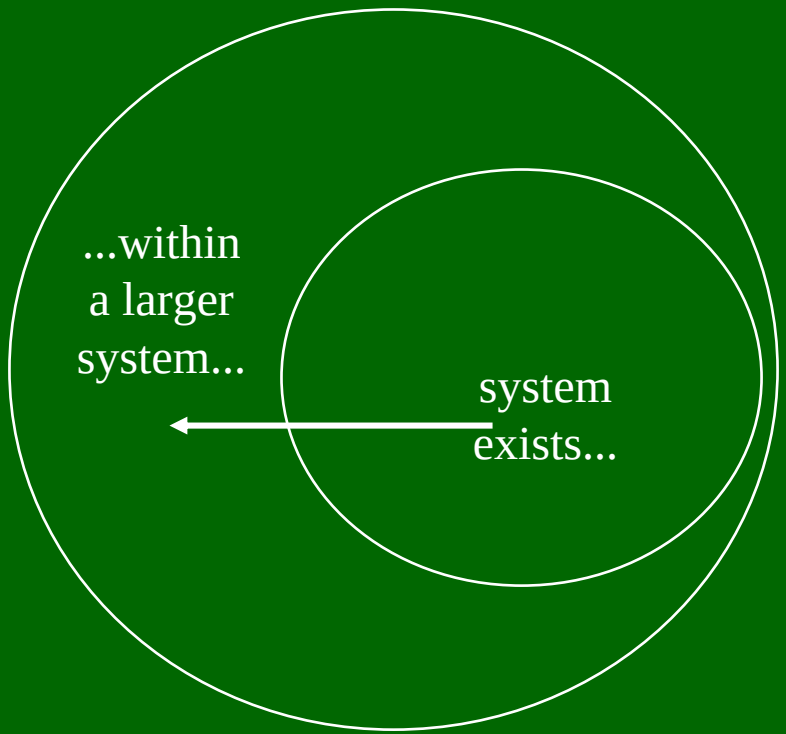
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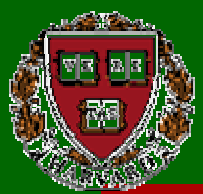

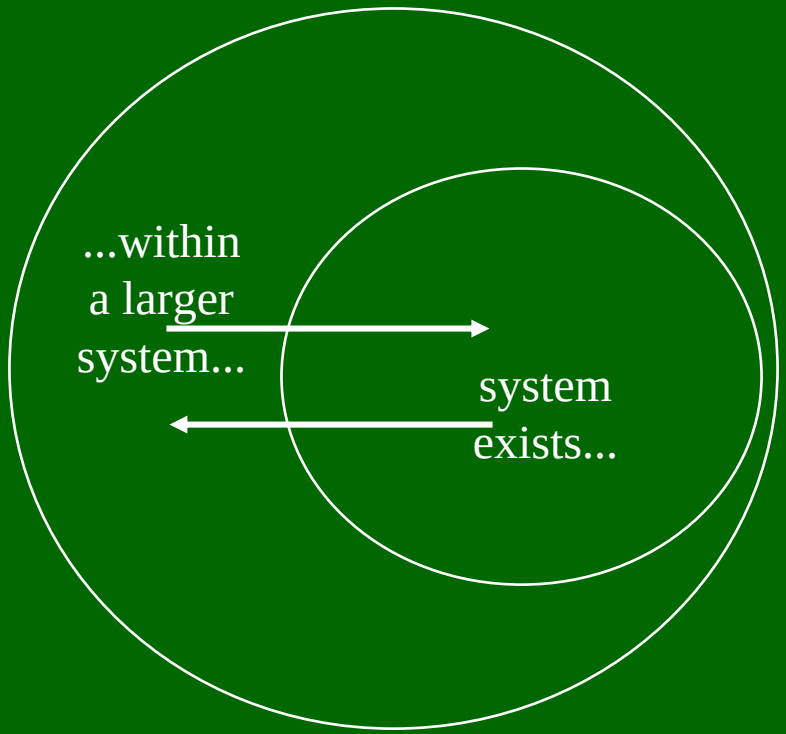
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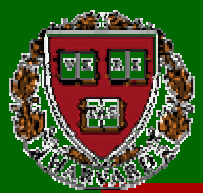

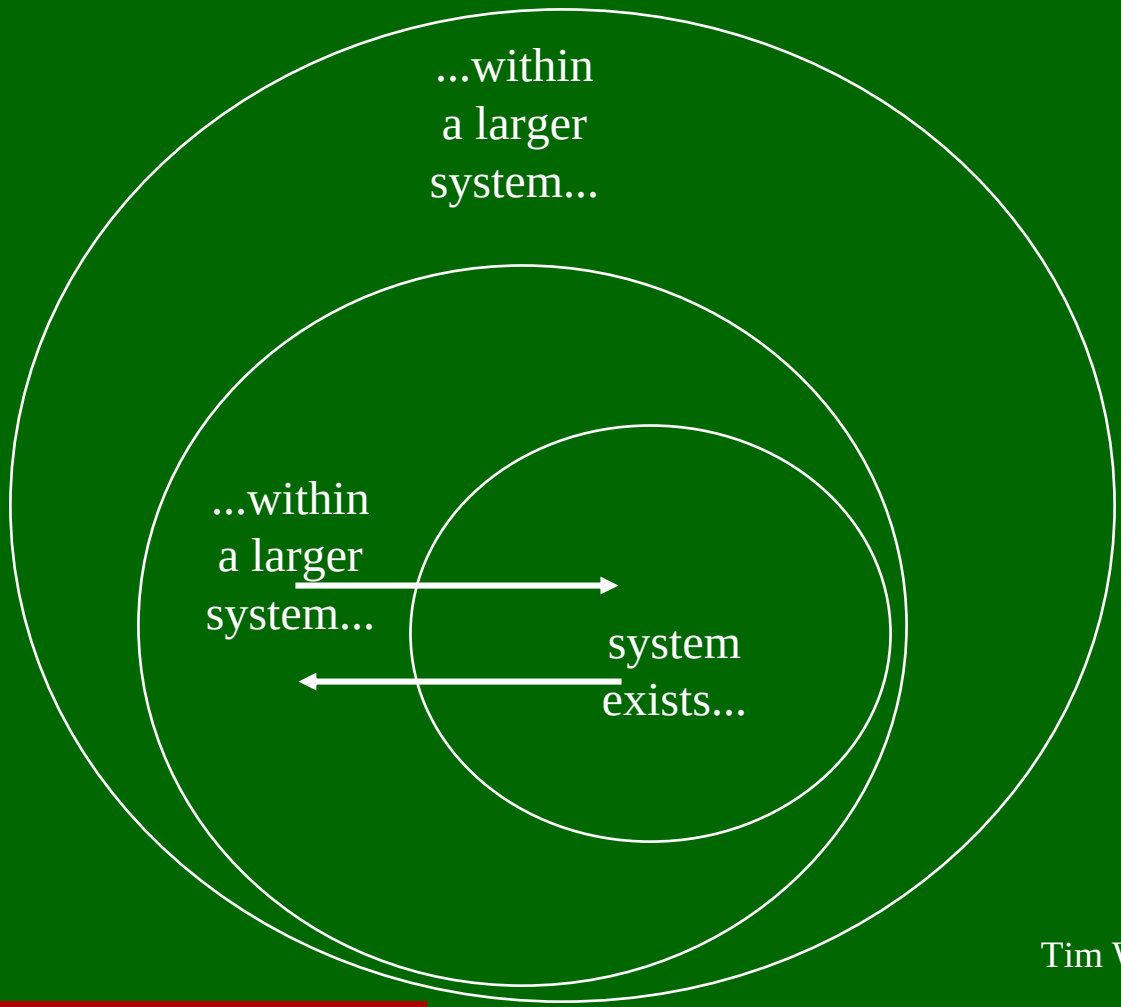
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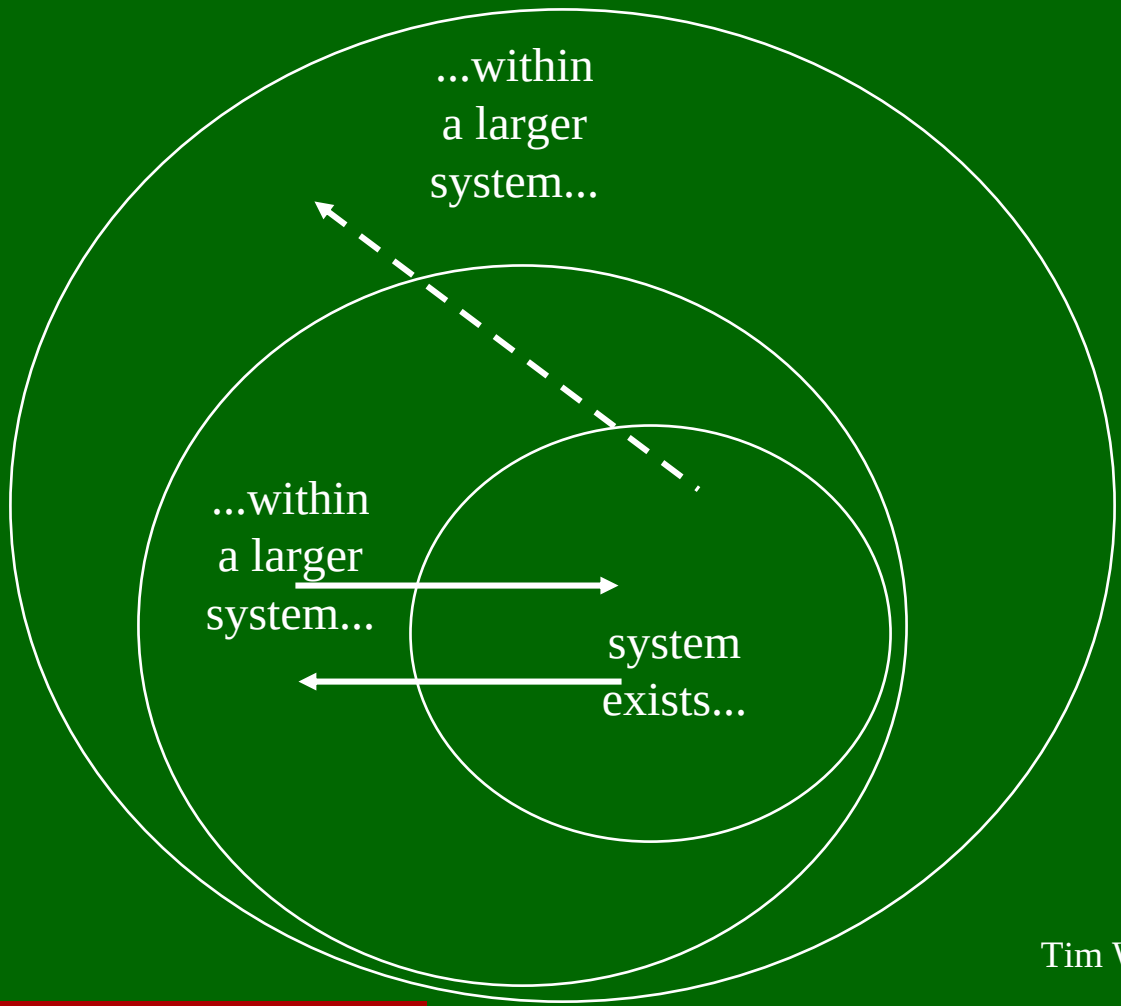
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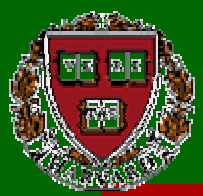

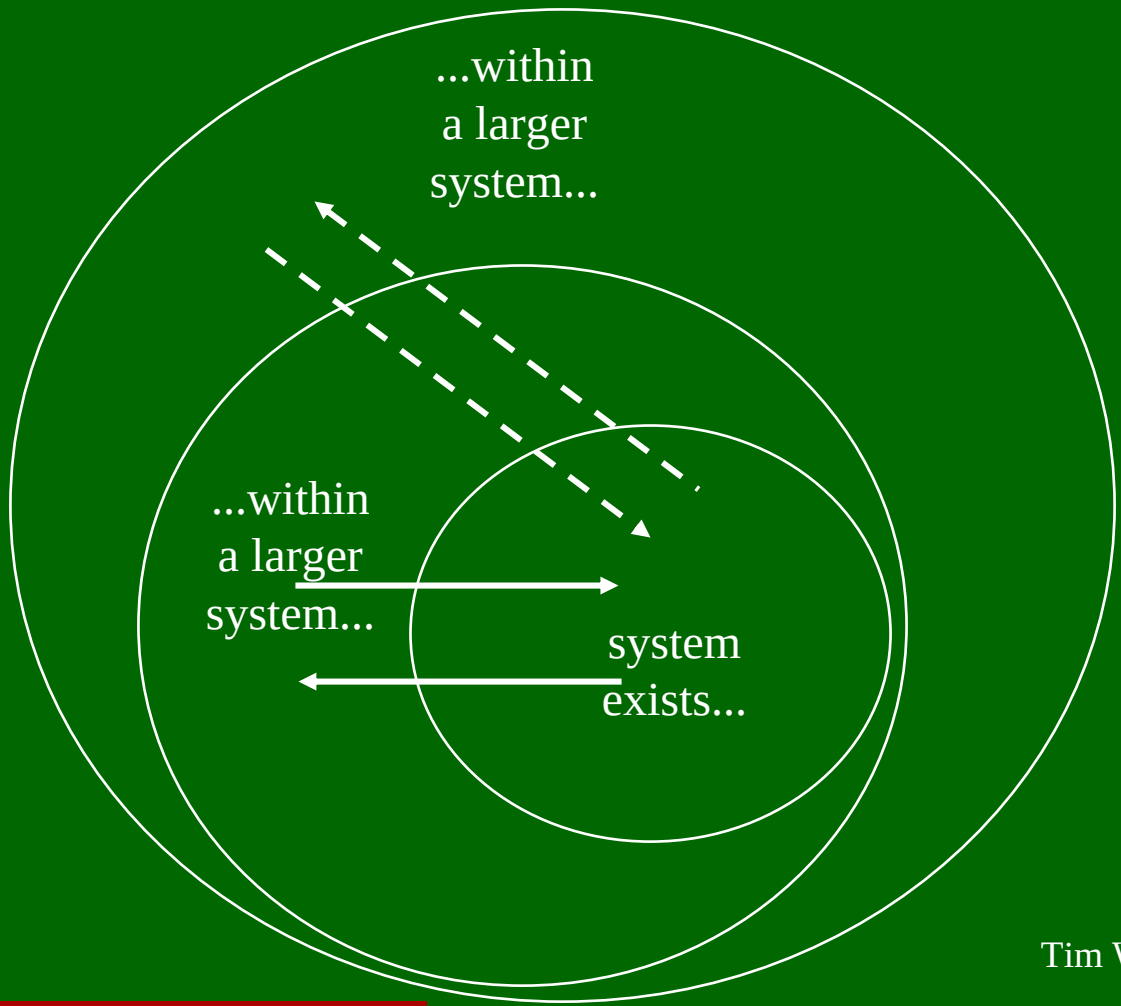
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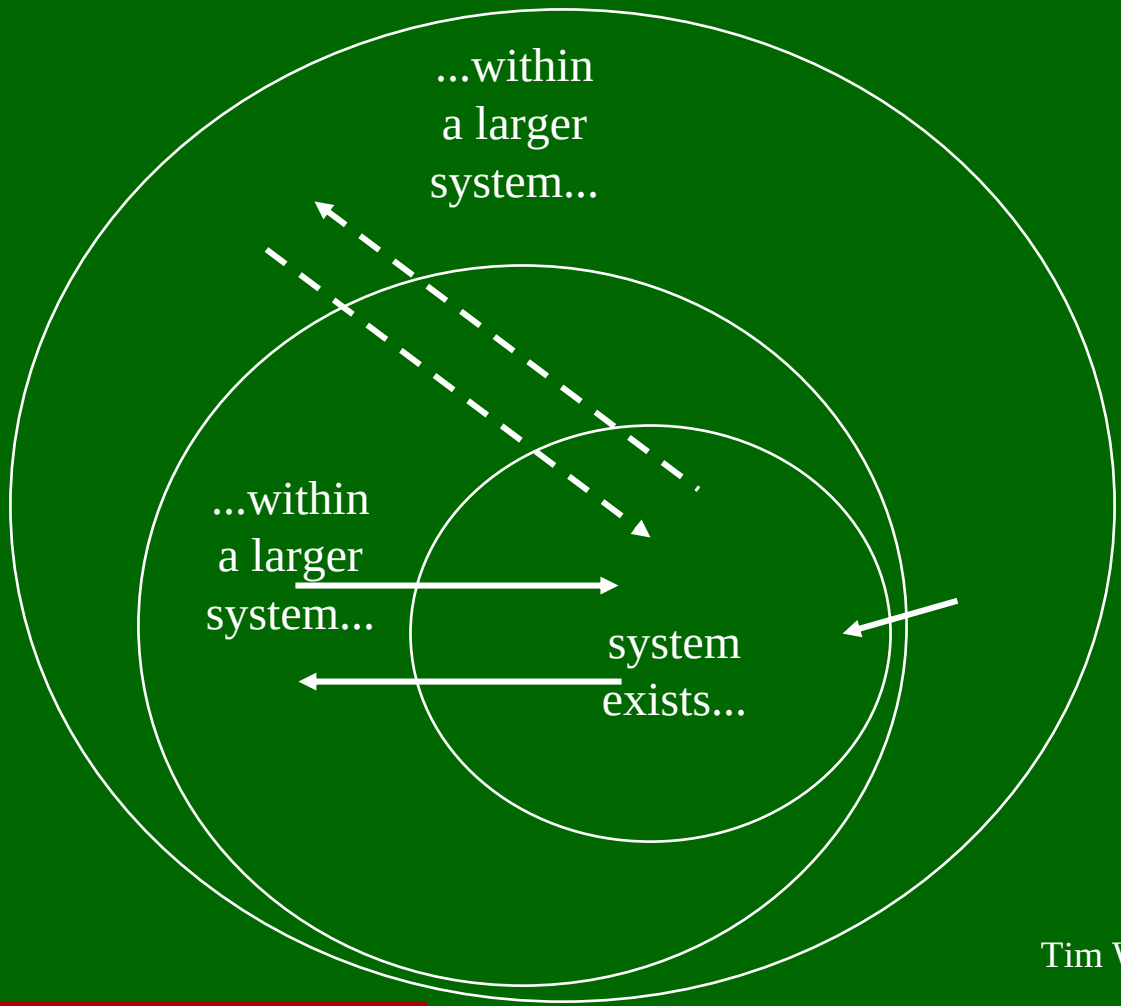
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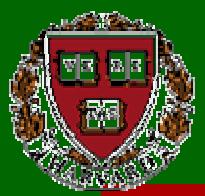

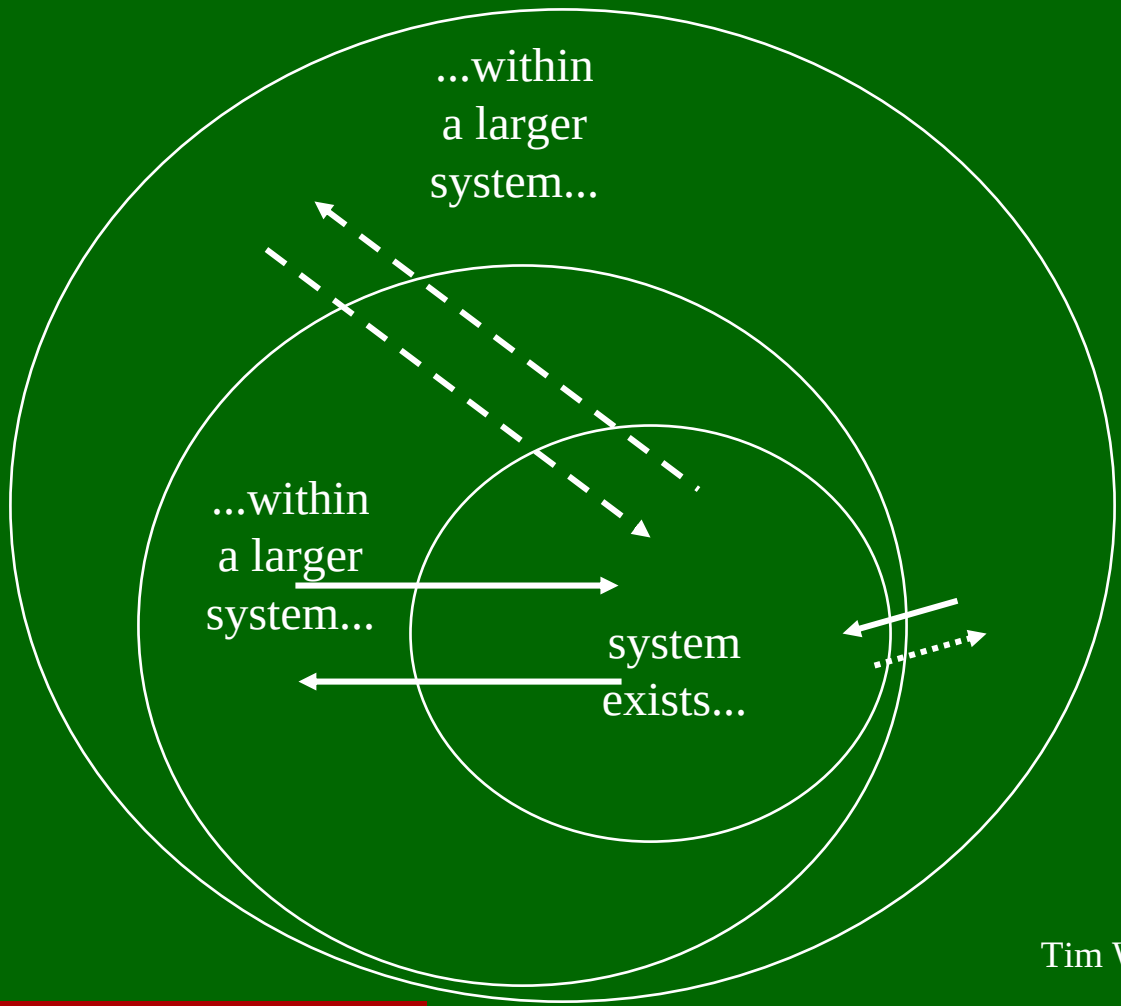
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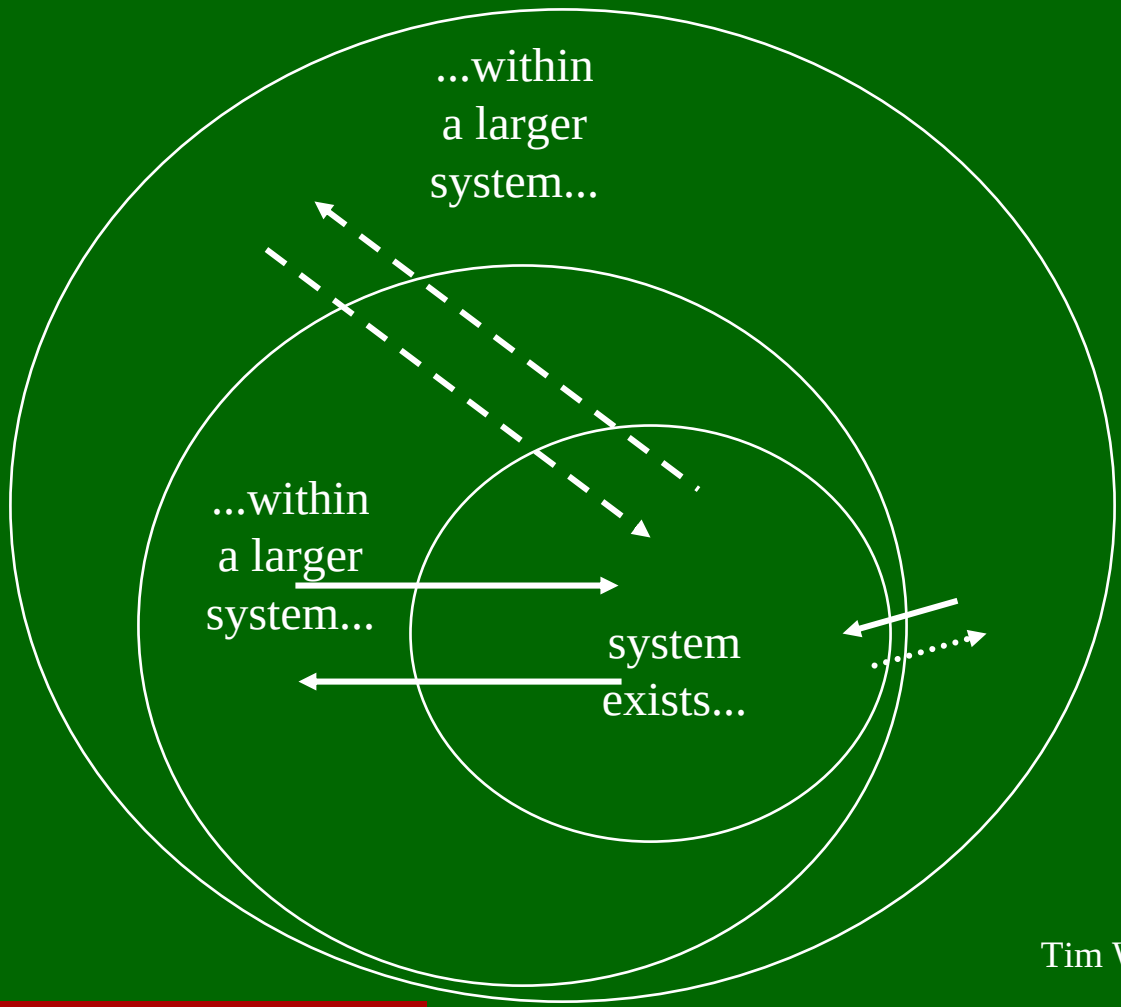
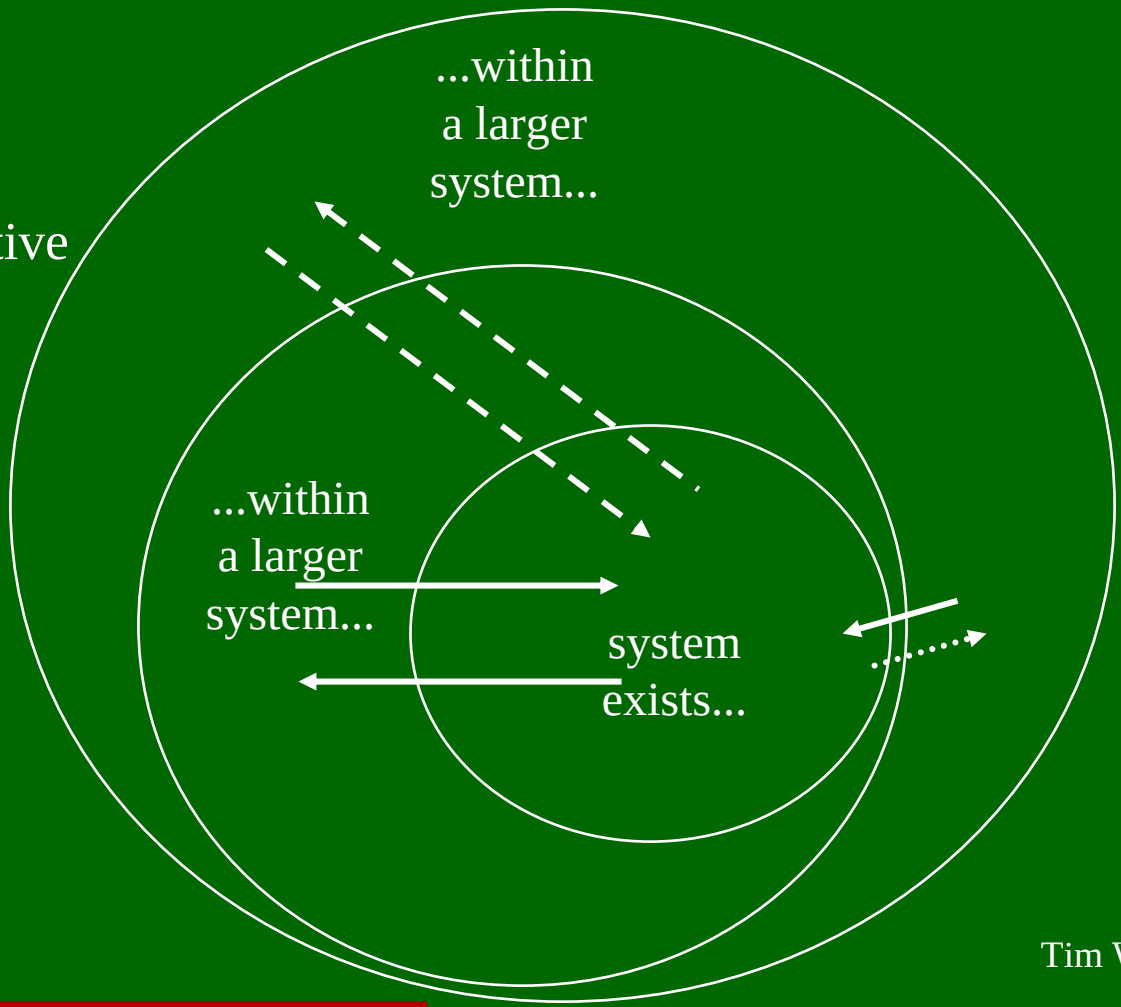
How can we locate causality in ‘non-linear’ systems?



How can we locate causality in ‘non-linear’ systems?

Causality is:

- nested
- reciprocal
- and cumulative

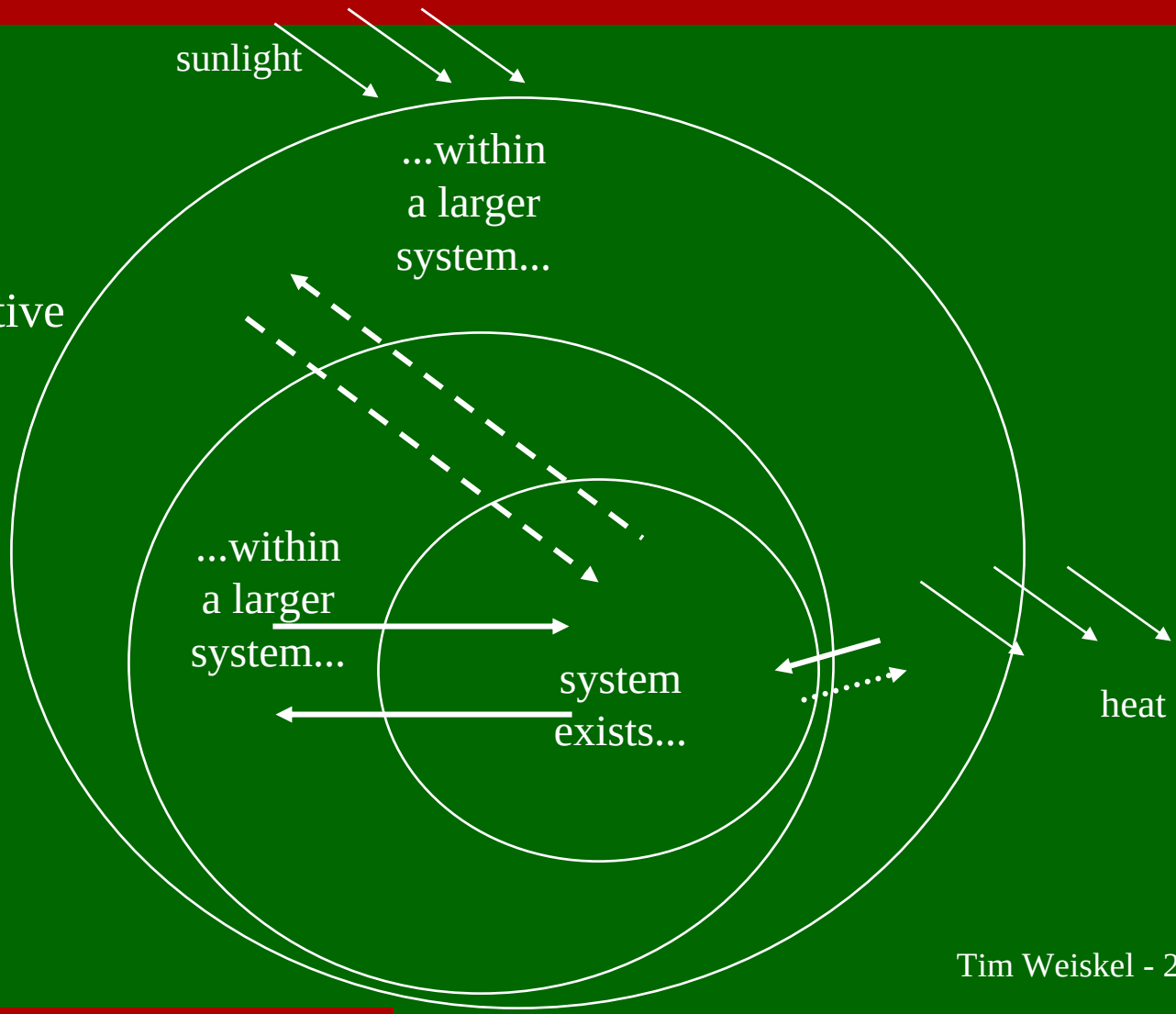


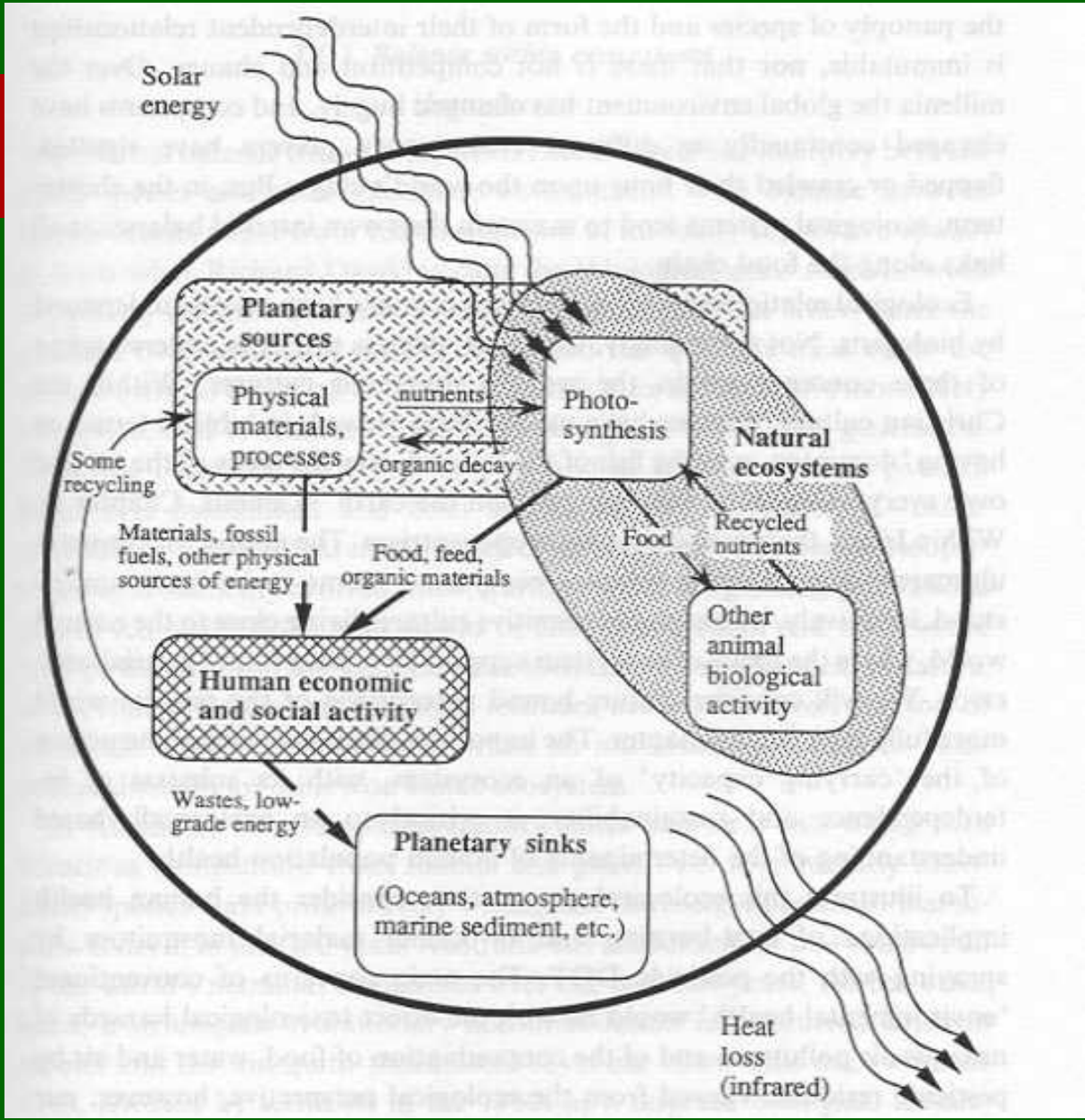
How can we locate causality in ‘non-linear’ systems?

Causality is:

- nested
- reciprocal
- and cumulative

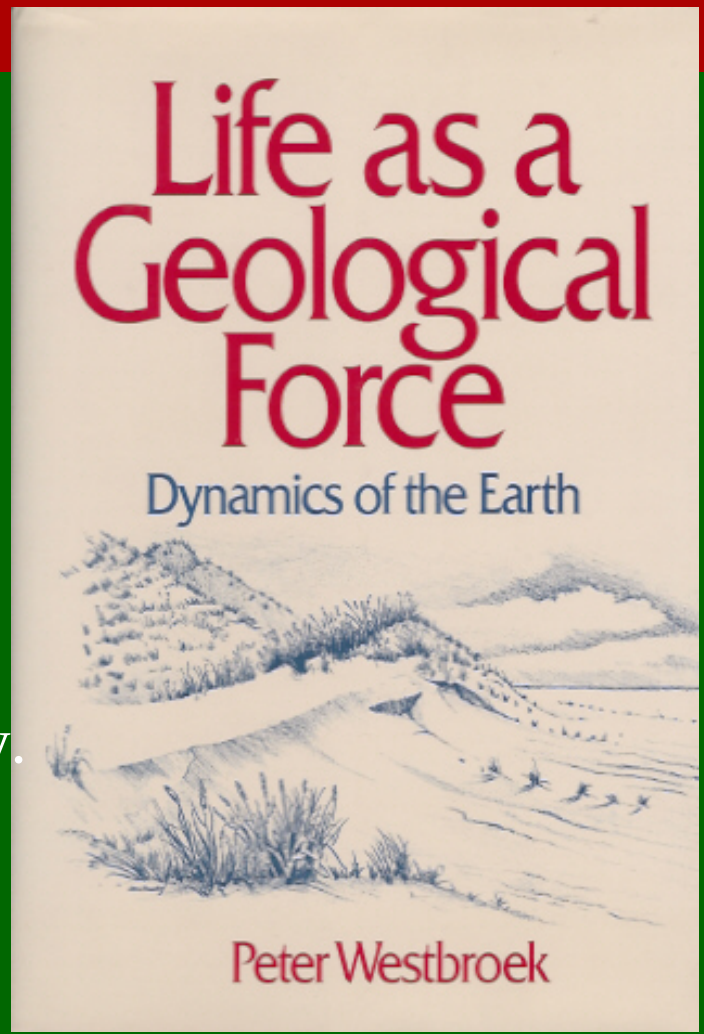
… in an overall system governed by the first and second laws of thermodynamics.




Solar energy
Planetary sources
Physical materials, processes
nutrients
organic decay
Photo-synthesis
Natural ecosystems
Some recycling
Materials, fossil fuels, other physical sources of energy
Food, feed, organic materials
Food
Recycled nutrients
Other animal biological activity
Human economic and social activity
Wastes, low-grade energy
Planetary sinks
(Oceans, atmosphere, marine sediment, etc.)
Heat loss (infrared)

So, with nested, reciprocal and cumulative causality while larger systems seem to condition smaller systems within them, the reverse is also true.

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 products of bacteria.



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Tuesday, 1 October, 2002, 17:23 GMT 18:23 UK

Land use 'alters climate'

Deforestation in snowy areas can change the climate

By Alex Kirby
BBC News Online environment correspondent

The way humans alter the surface of the Earth may be a key factor in climate change, scientists believe.

They say land-use changes are probably just as important as greenhouse gas emissions.

They think tropical land surface changes are probably a greater influence on climate than the seasonal El Nino weather disturbances in the Pacific.

And they suggest a new formula for measuring all human-caused climate influences.

The scientists, whose work was funded by the US space agency Nasa, published their findings in the Philosophical Transactions of London's Royal Society, the UK's national academy of sciences.

And we are learning that changes in behavior of some species can lead to changes in the larger systems of which they are a part…

For example, the way landscapes change over time, may in turn change climate in some measurable ways.

Sometimes Humans behave as a “Geological Force”

Human behavior has been an increasingly important ‘geological force,’ altering land, water and air.

But all human activity operates within the “laws of nature.”

Laws of Thermodynamics Govern the Known Universe

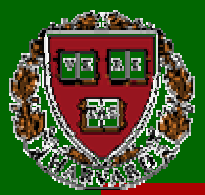
First Law:

Energy is neither created nor destroyed; it changes form from one form into another.

Second Law:

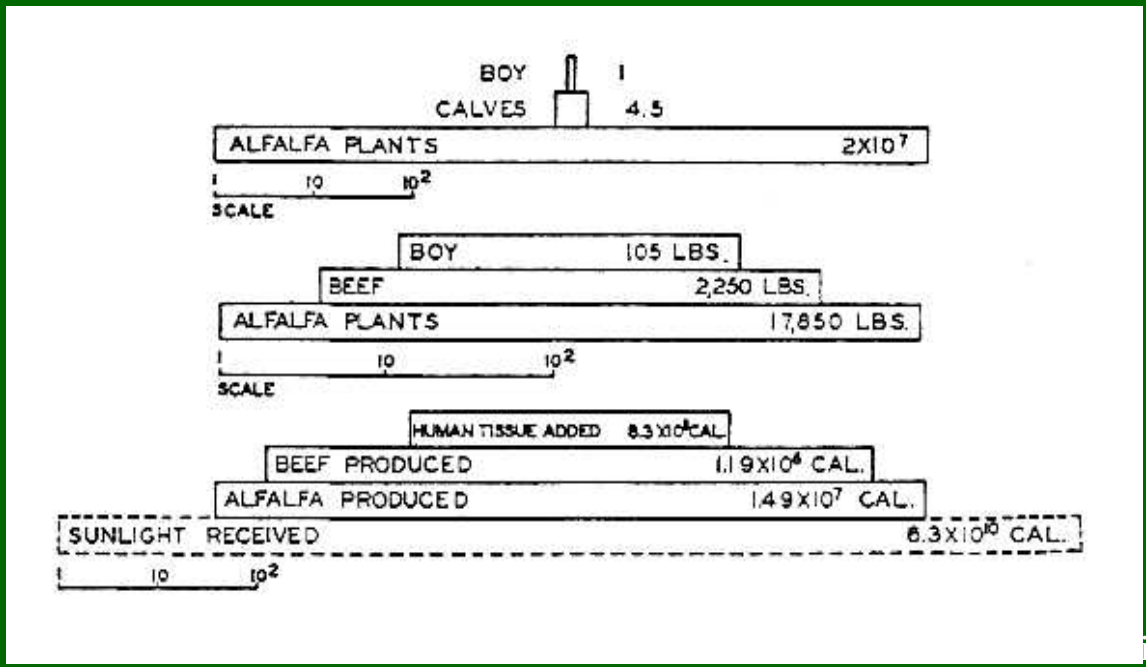
In spontaneous transformations, energy moves from more highly organized forms to less organized forms. That is, for example, from the high energy wave lengths of light to the dissipated long wave lengths of heat.

All “work” in the system requires the dissipative expenditure of energy. This is the “no free lunch” principle of the universe.



Where are we located in this system?

Where are we located as individuals -- and *as a species* -- in the circulation of materials and the flow of energy? Where are we in the web of life on earth?



Well, 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)

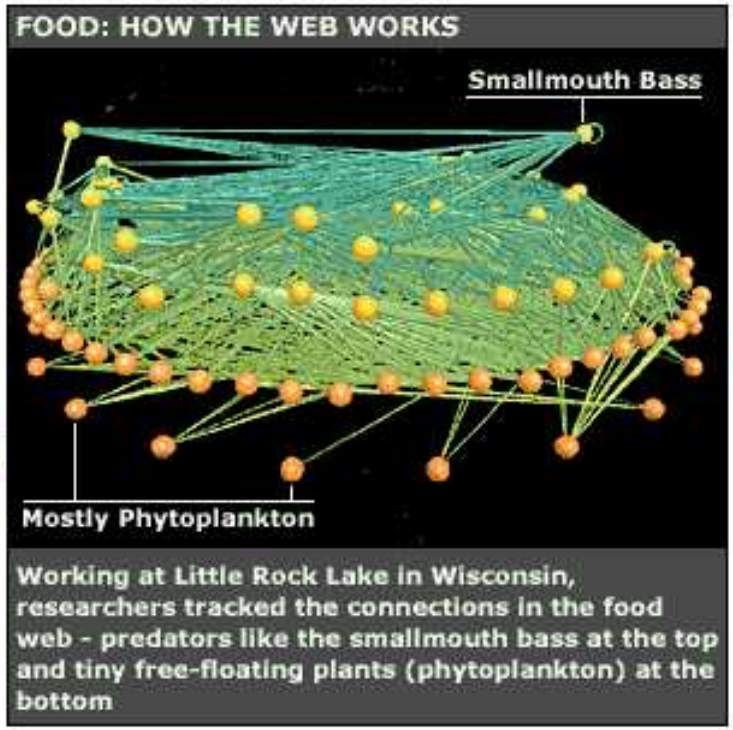
One way to describe a "niche" is to define it as a "position" in a food chain (or more precisely) a resource web.

BBC NEWS WORLD EDITION

You are in: Science/Nature

Monday, 30 September, 2002, 21:02 GMT 22:02 UK

Life's not so complicated web



Working at Little Rock Lake in Wisconsin, researchers tracked the connections in the food web - predators like the smallmouth bass at the top and tiny free-floating plants (phytoplankton) at the bottom

By Arran Frood

It is easy to claim that everything is connected to everything else, but a hard proposition to test scientifically.

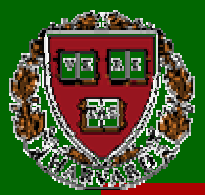
Now research by ecologists studying food webs has shown this may after all be the case.

They found species are much more closely linked to each other than previously thought.

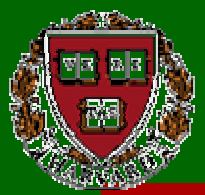
"People should not be so confident that they can predict the consequences of species extinctions"

A more accurate way to define a niche is to say…

A Niche is an “N-dimentional hypervolume”



A Niche is an “N-dimentional hypervolume”



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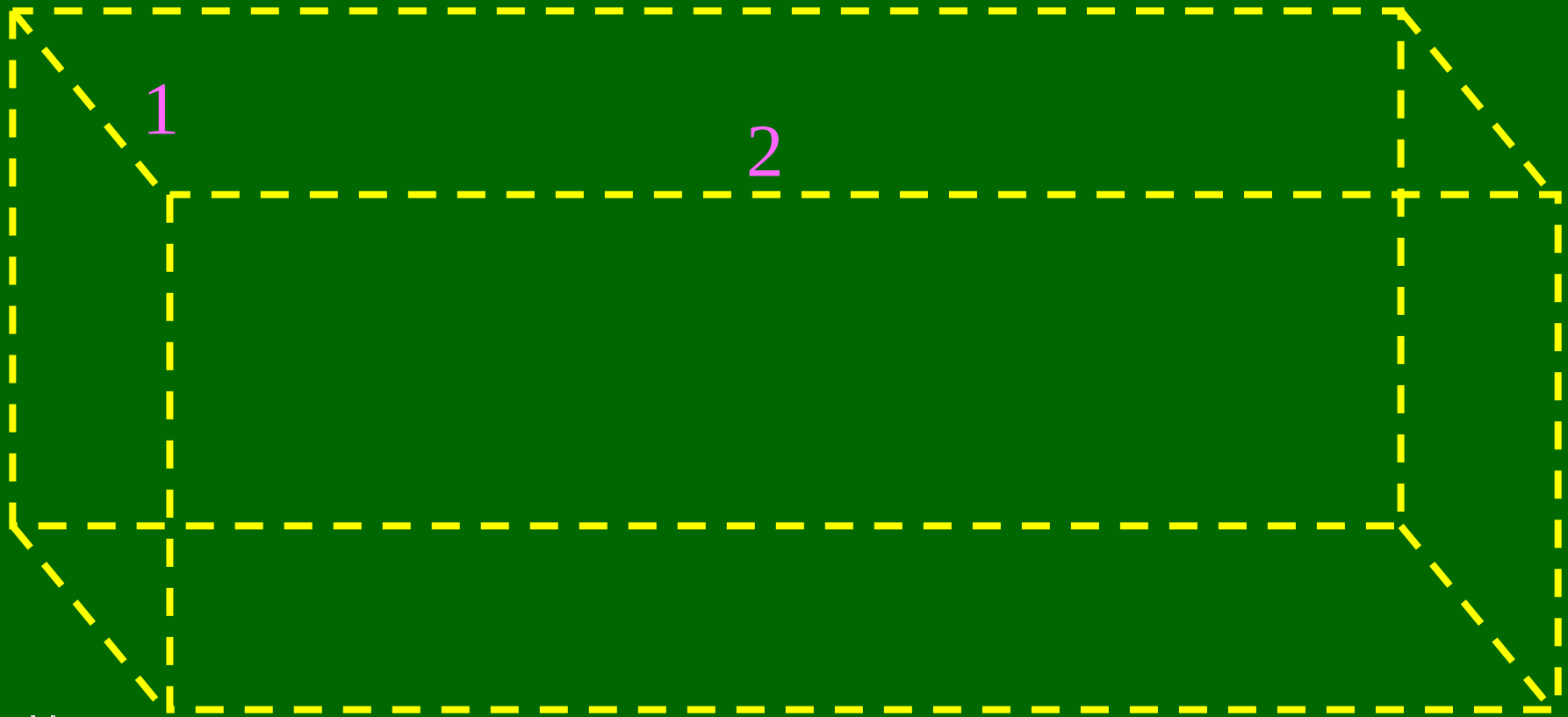

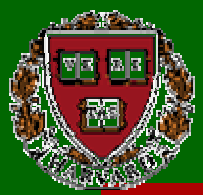

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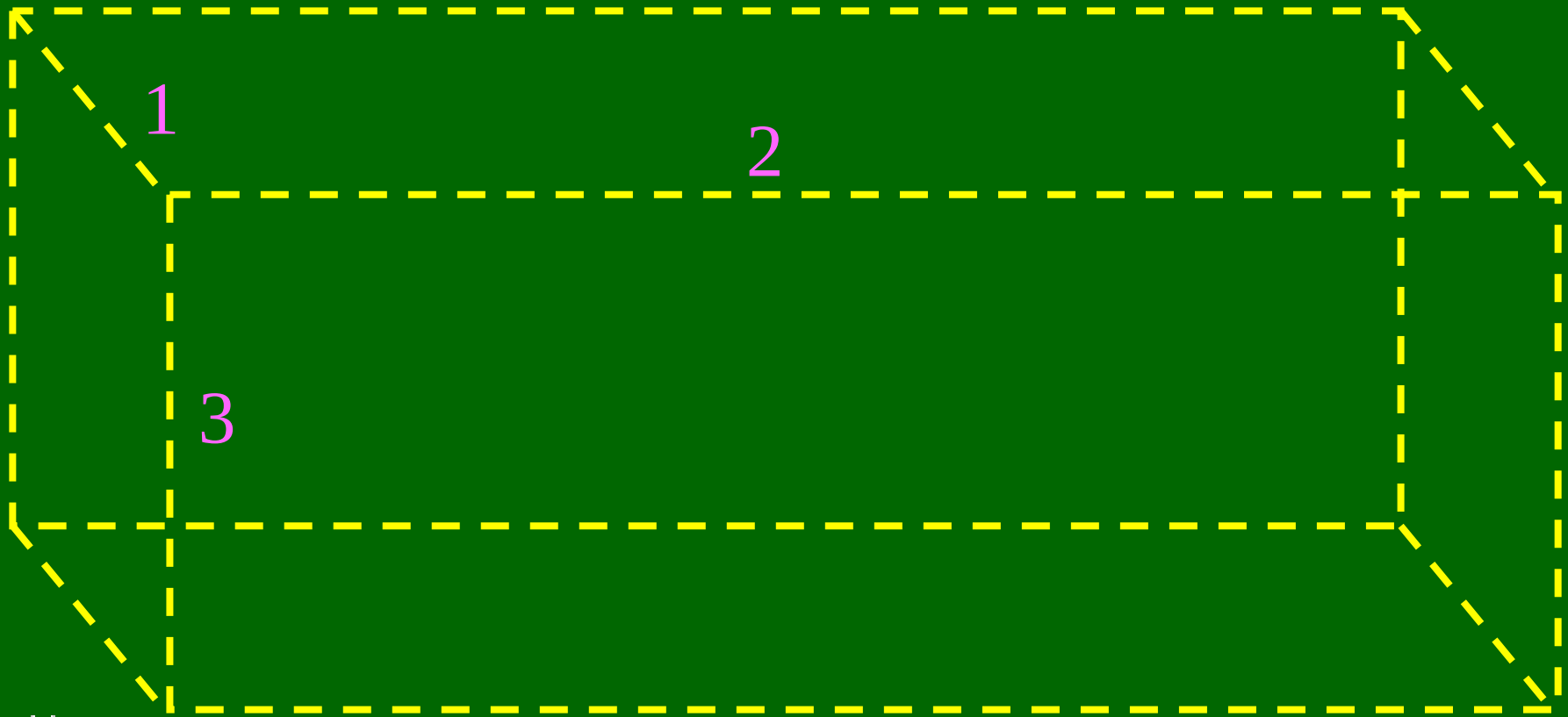
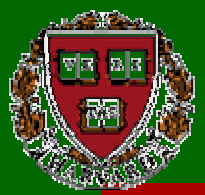
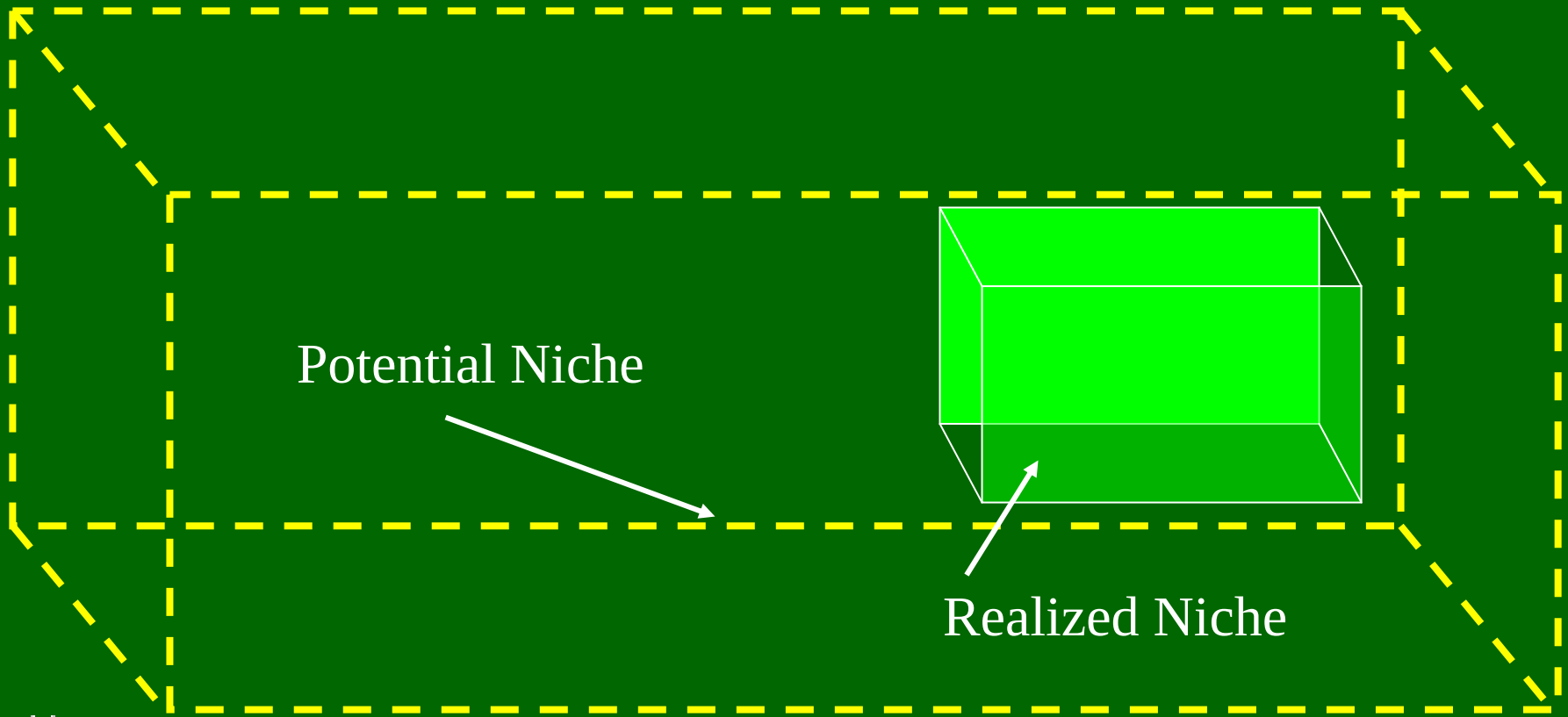
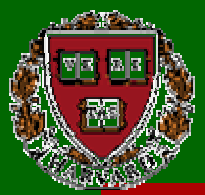


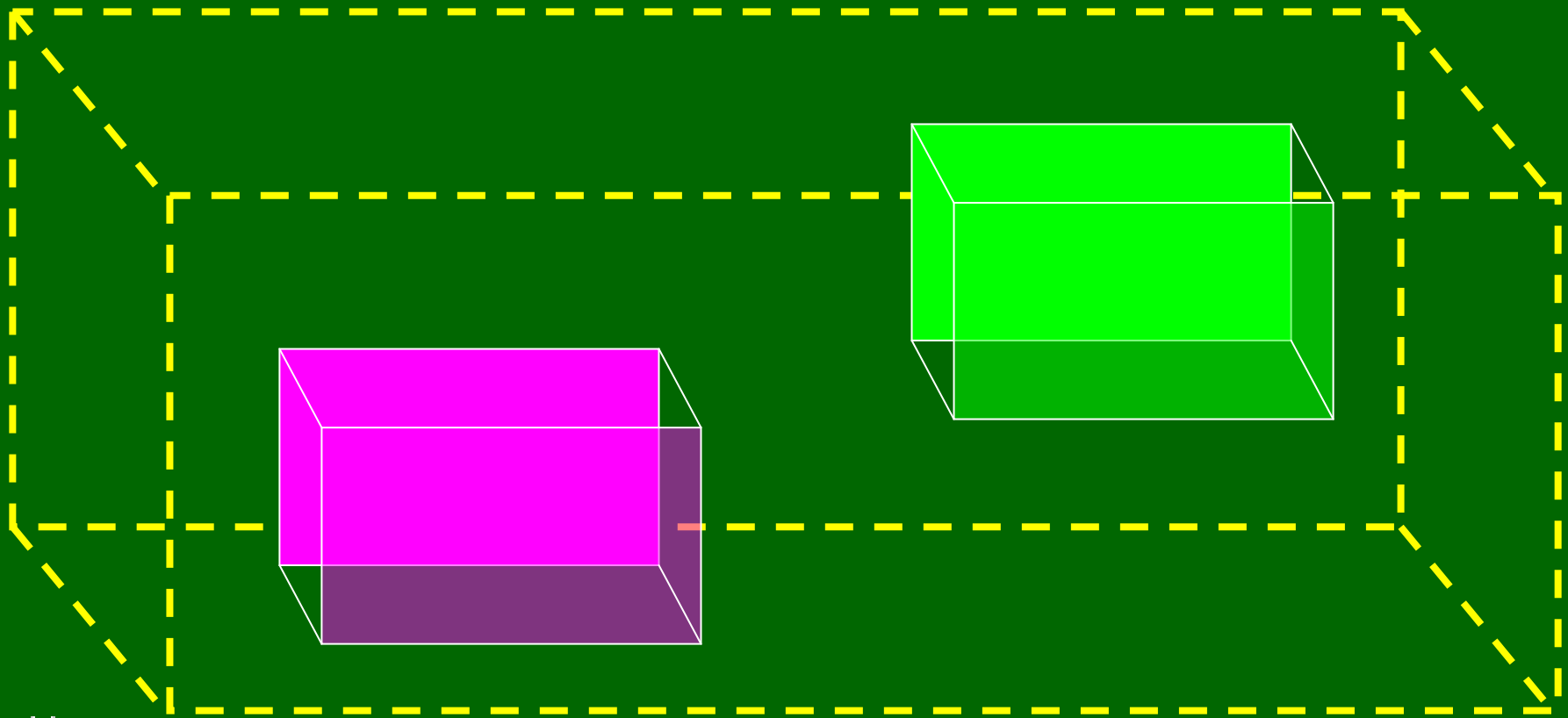


All species have a *potential* niche and *realized* niche

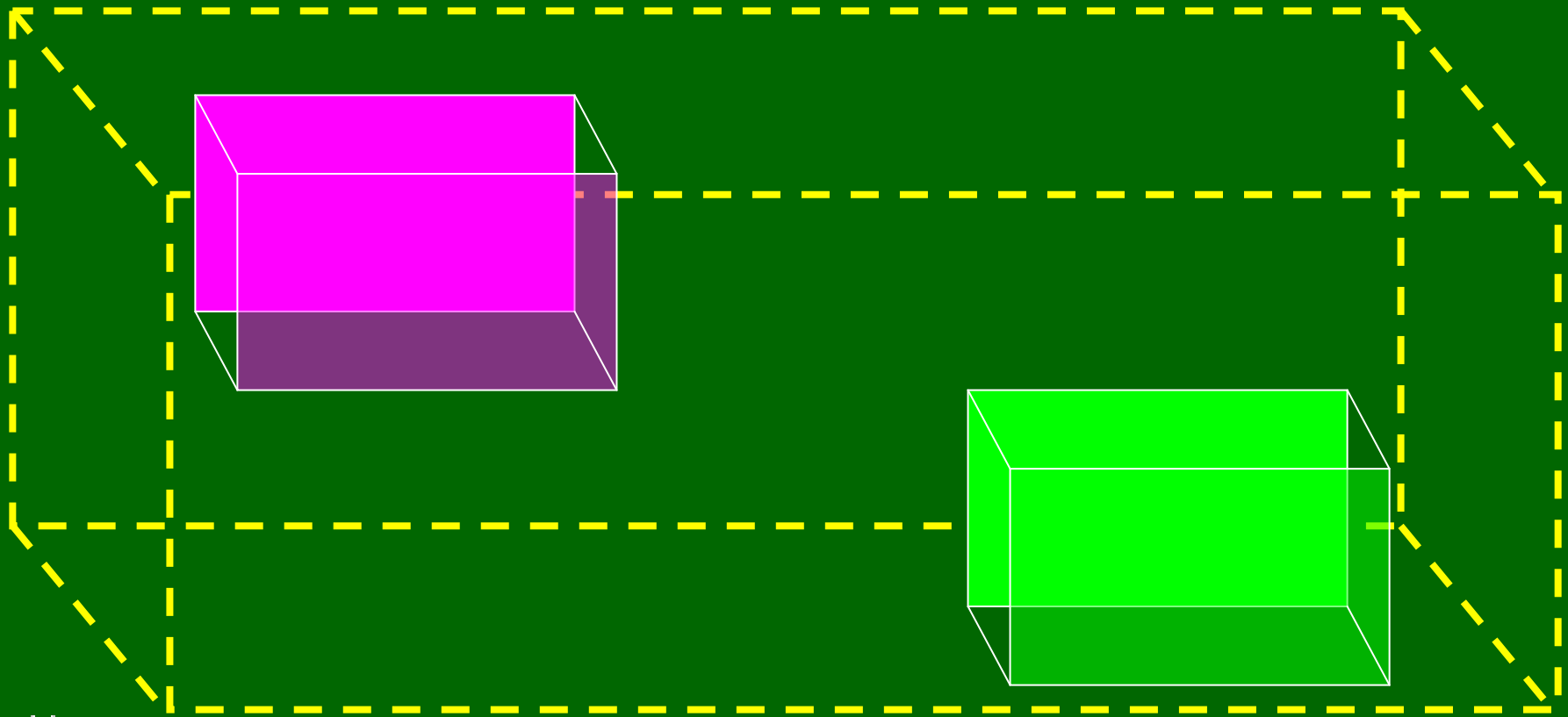


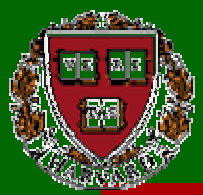


Other species can find their realized niche in our "potential niche" but not share our "realized niche"

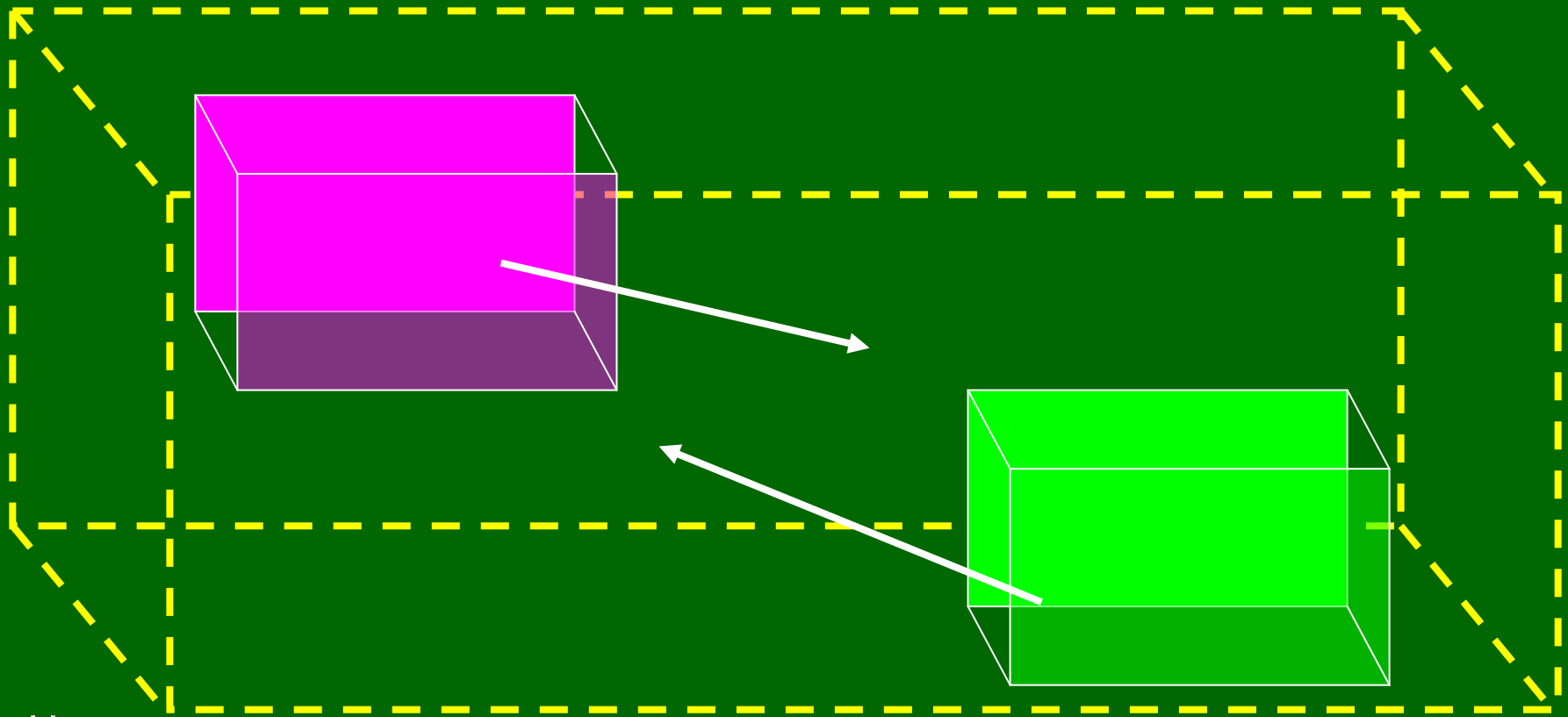


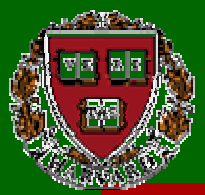
A species realized niche can change over time

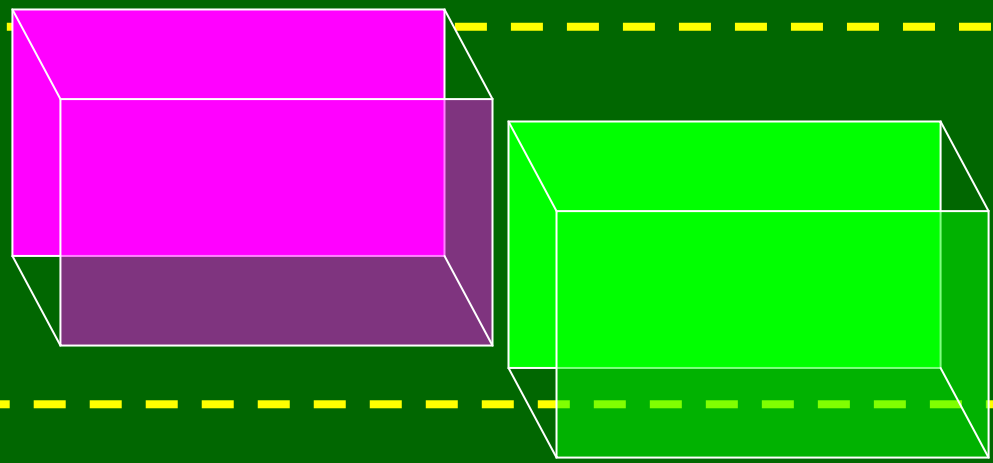


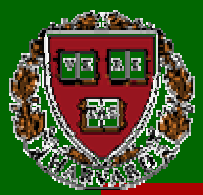


What happens when realized niches converge?

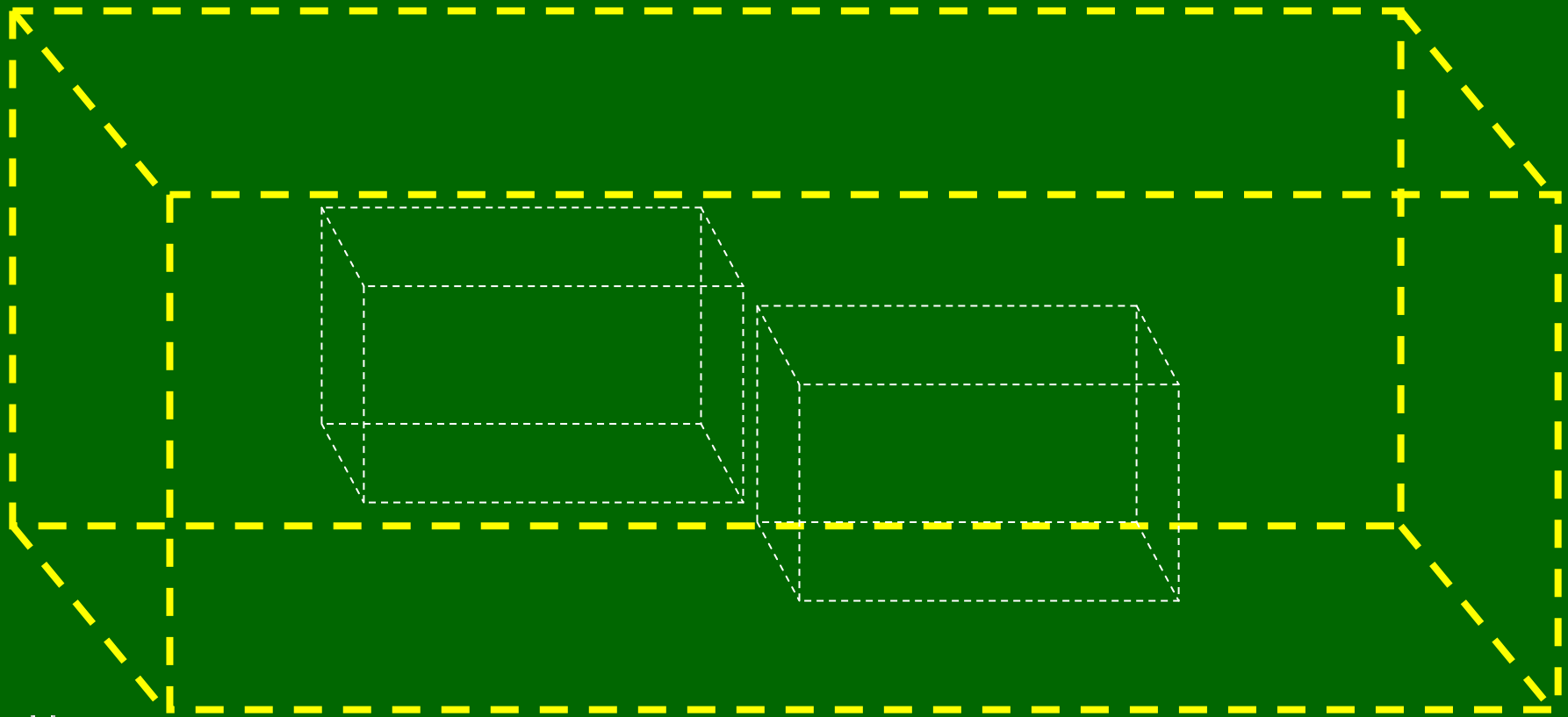


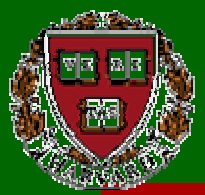




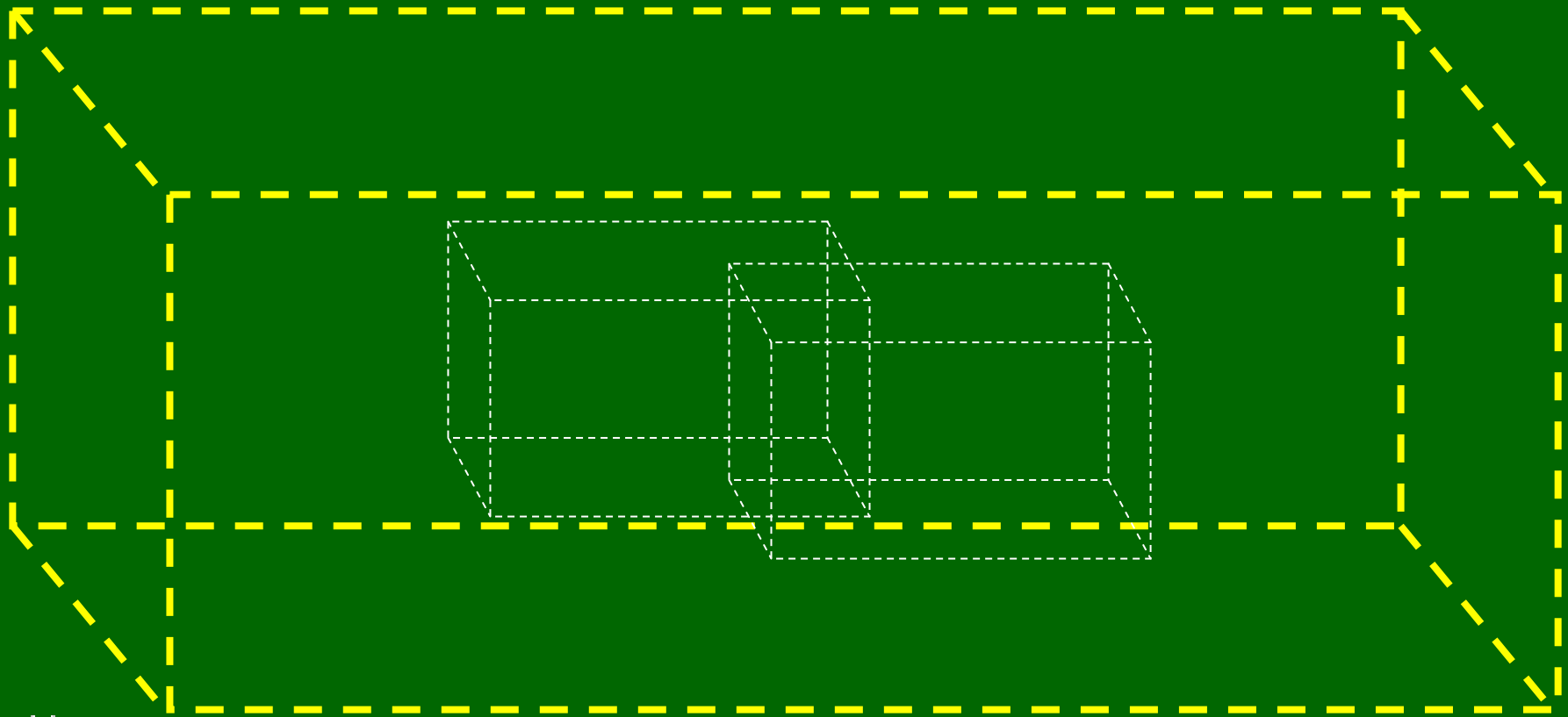


Remember, niches abstractions (reflecting real behavior)



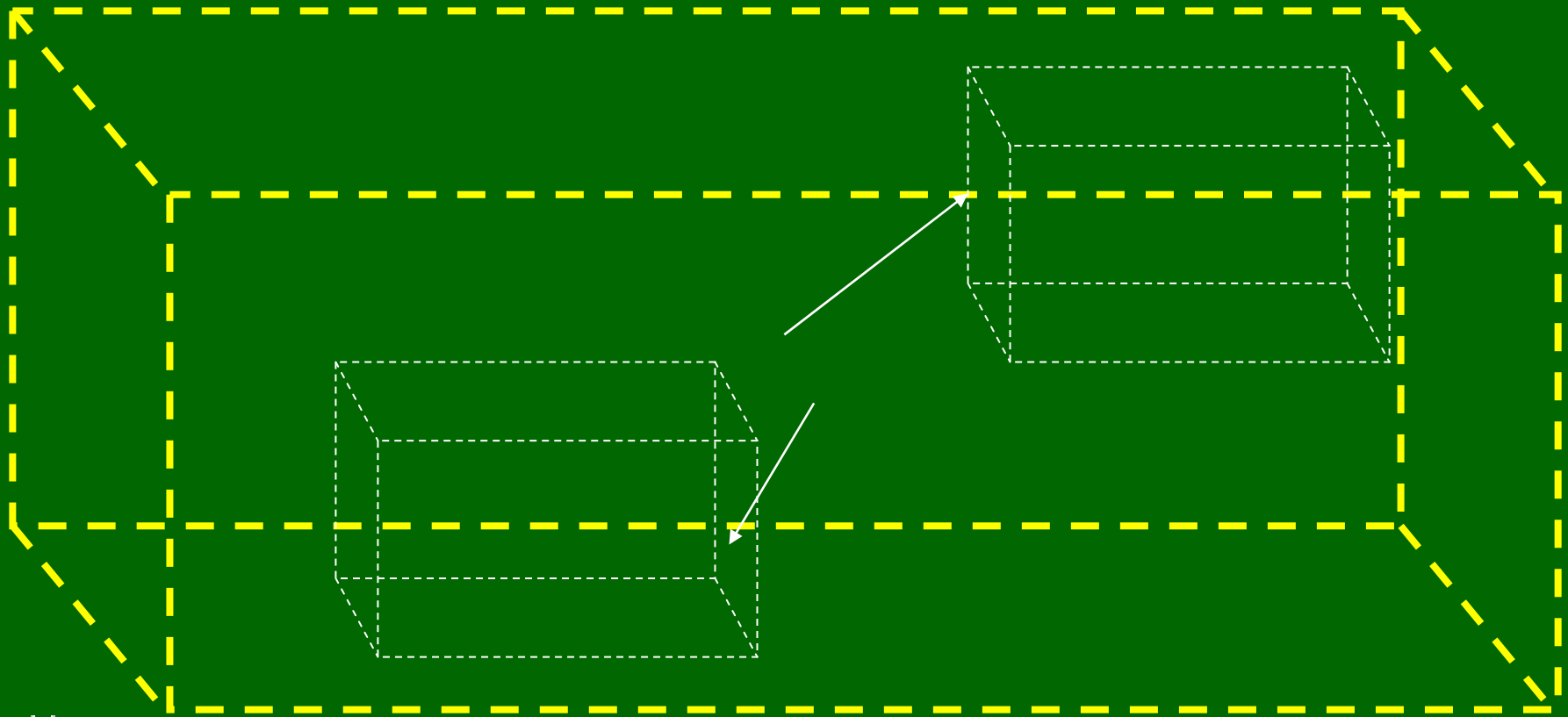


Niches can be “shared,” leading to commensualism or symbiosis.



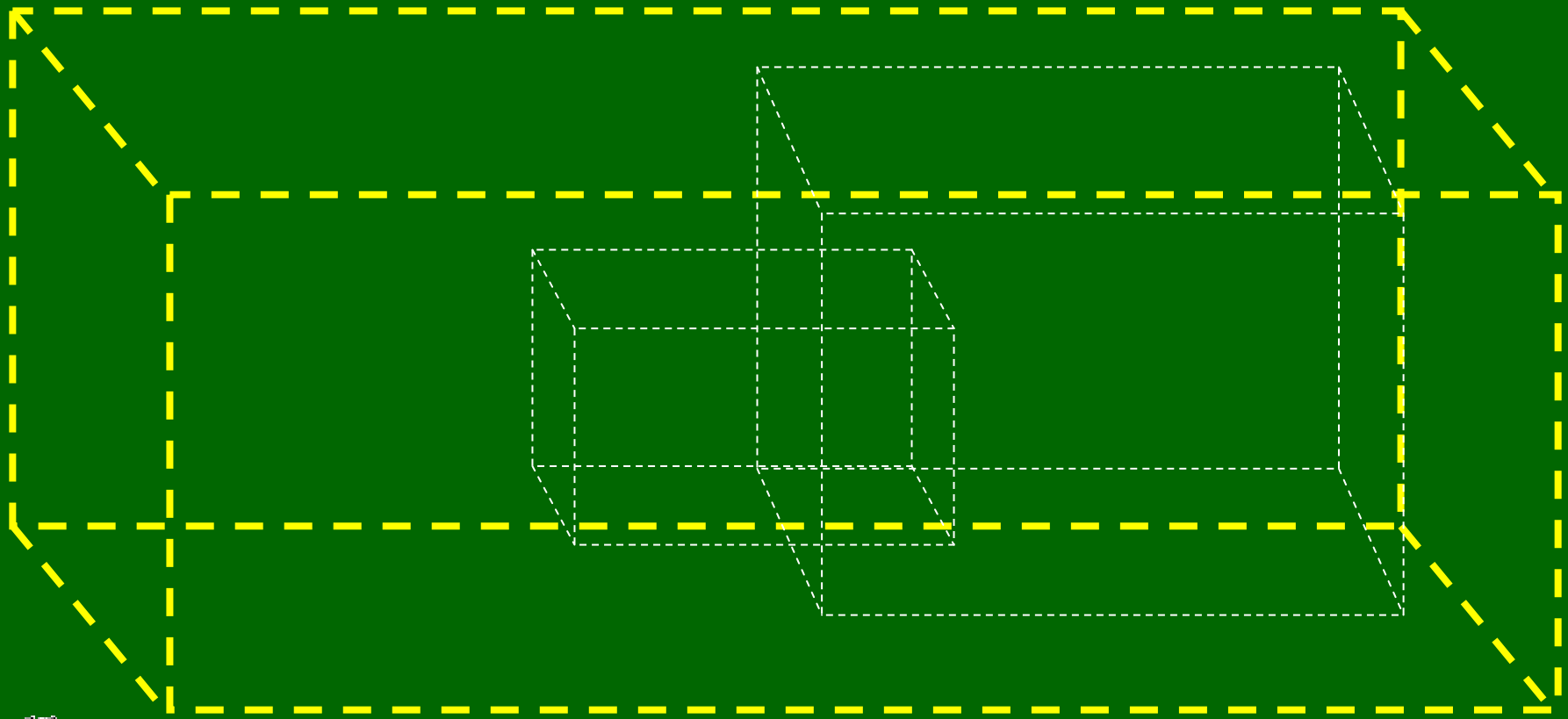
Symbiosis, mutualism

But species can also “move” to a different portion of their potential niche.

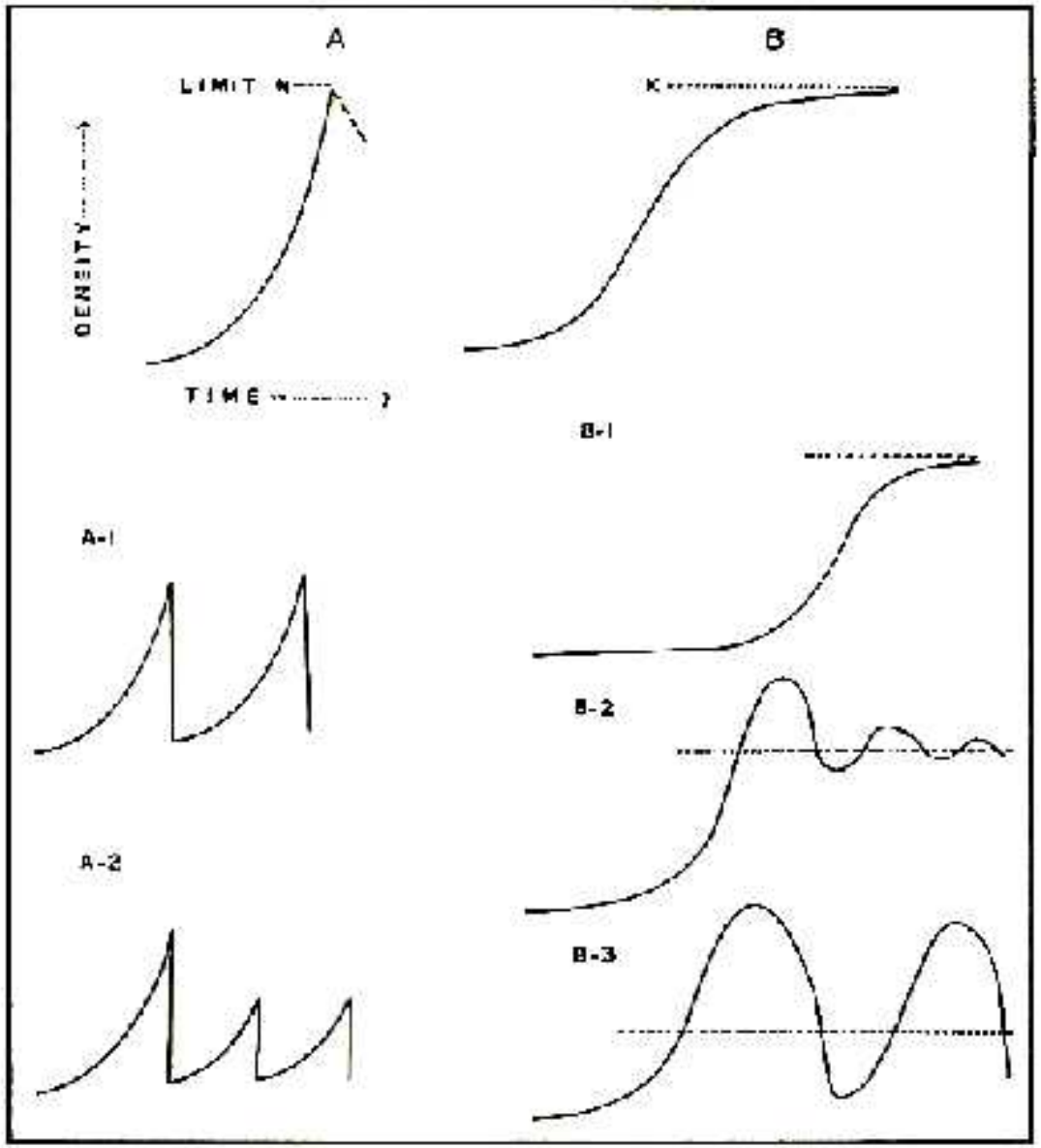


Antibiosis, avoidance, antipathy

In addition, the “shape” of the realized niche can change because of the new relationship with another species.



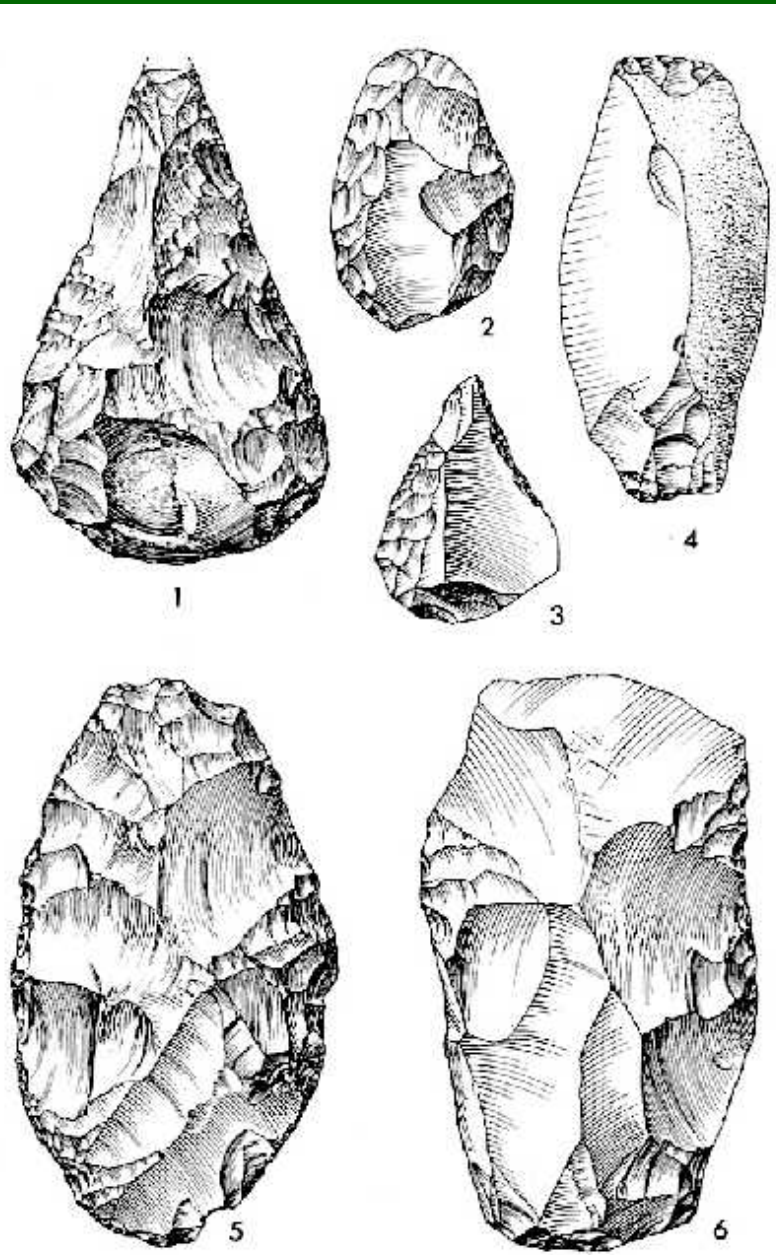
parasitism ==> predation ==> annihilation


A
B
LIMIT N
K
DENSITY
TIME
B-1
A-1
B-2
A-2
B-3

Anthropologists examine the regular patterns of life processes and the "improbable" traces they leave behind.

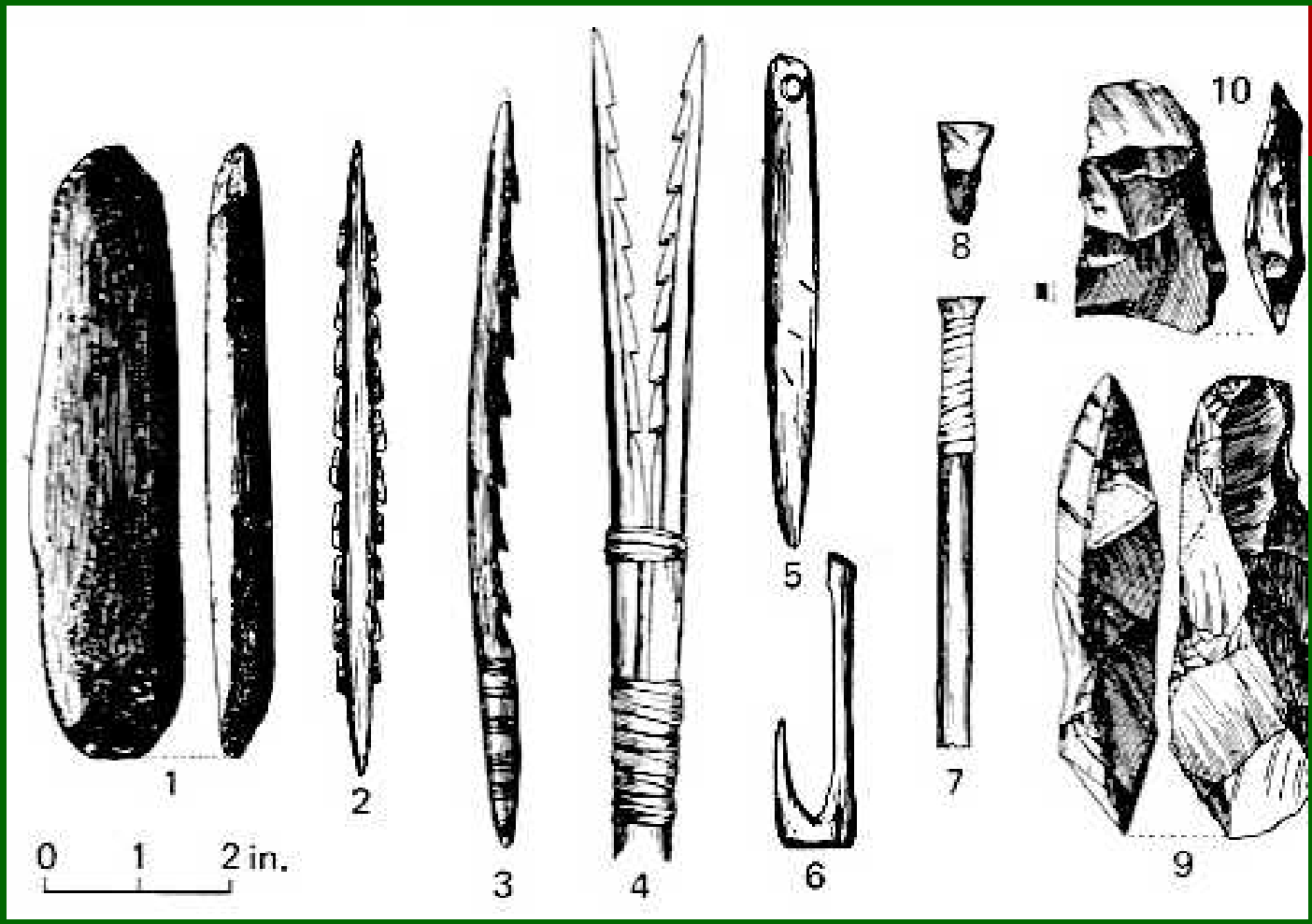
If something appears improbable, we seek an explanation.

Some explanations do not involve humans…



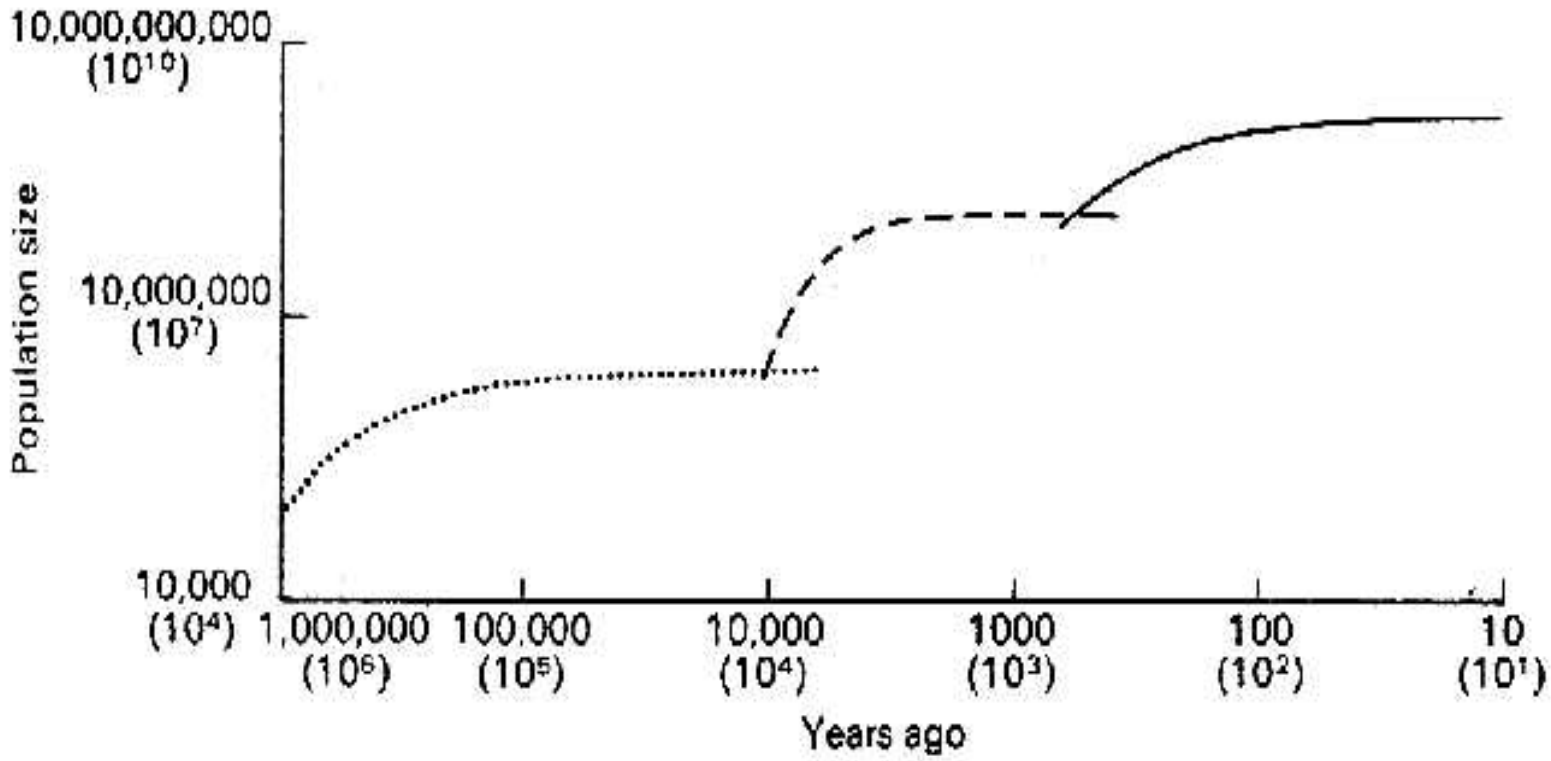
But other improbable patterns can only be explained by human agency.

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.

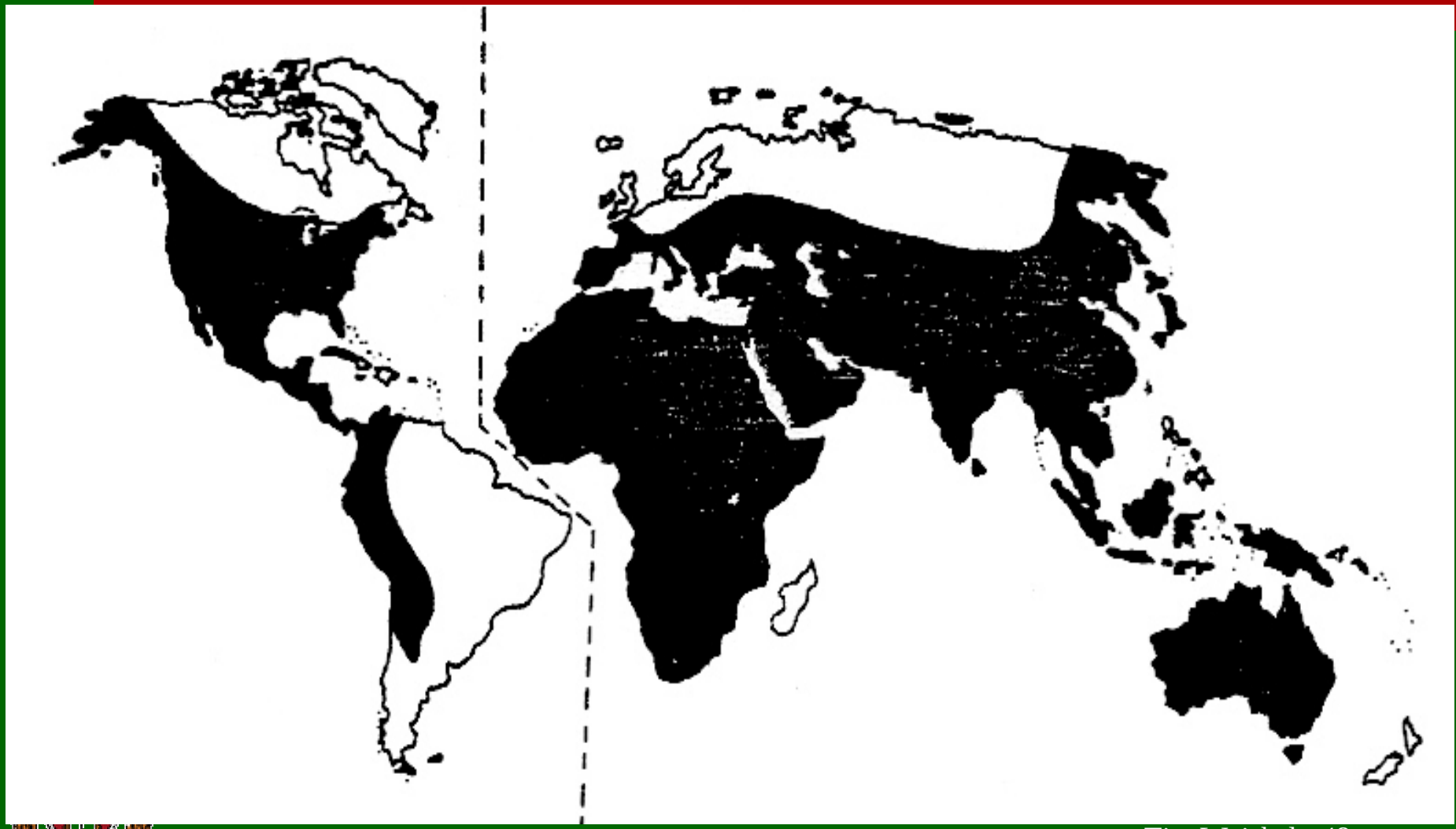


Over time, there are marked changes in the types of “tool kits” that humans use, and these point to different forms of behavior and social organization.

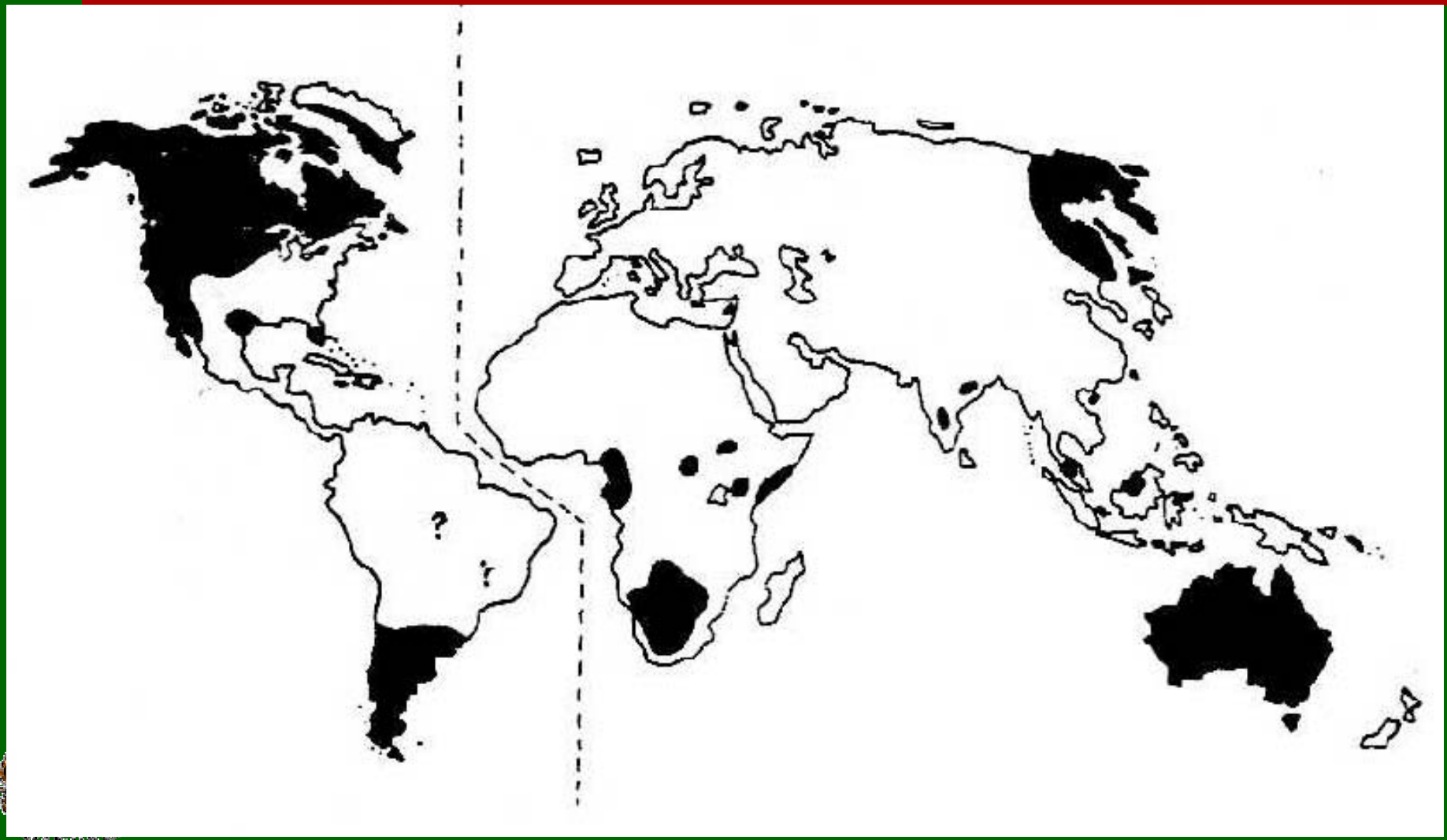
Changes in tool kits and in social organization are reflected in "discontinuities" in population dynamics of humans as a whole.



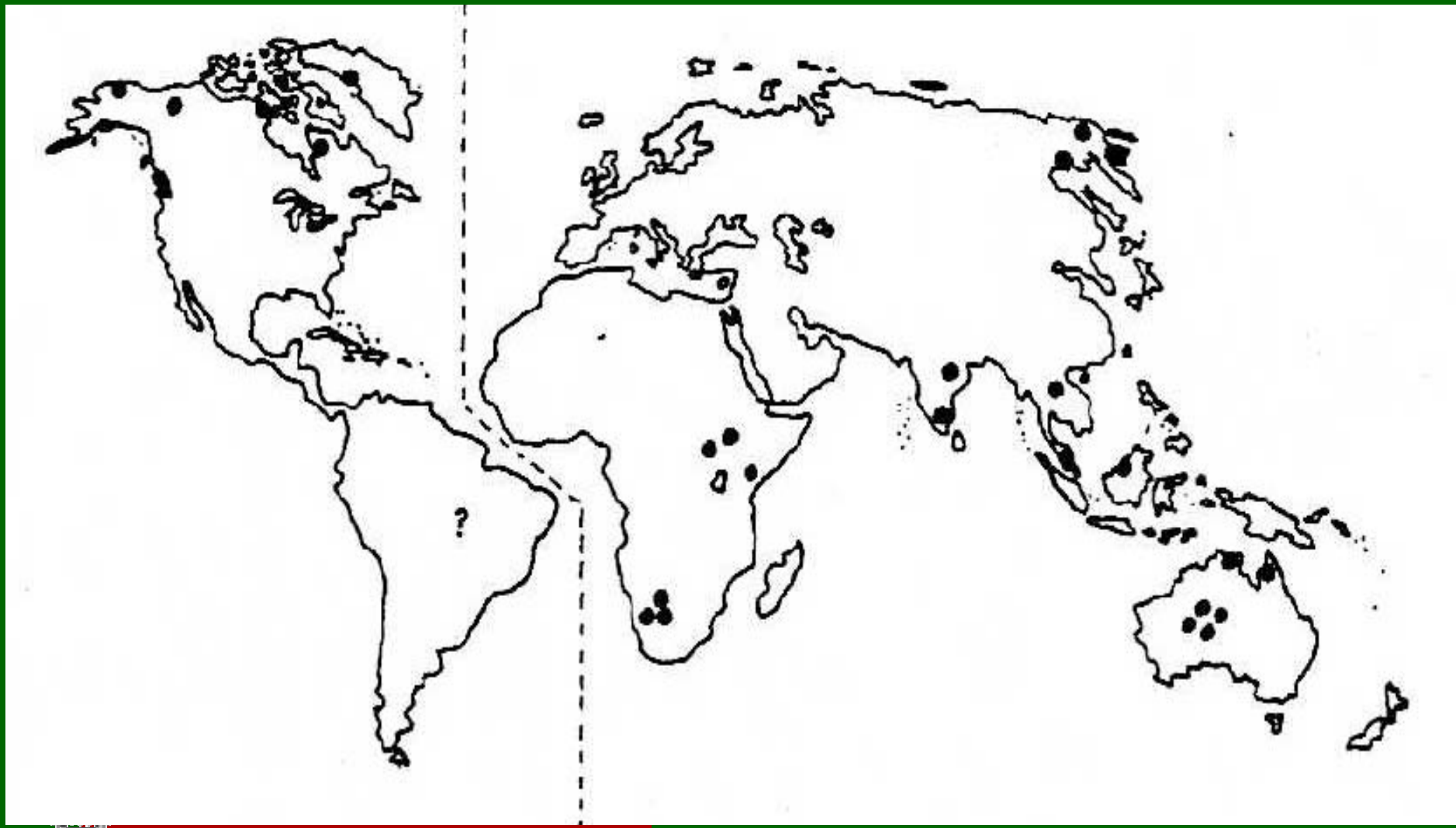
Human as Foraging Species Distribution - 12,000 BP



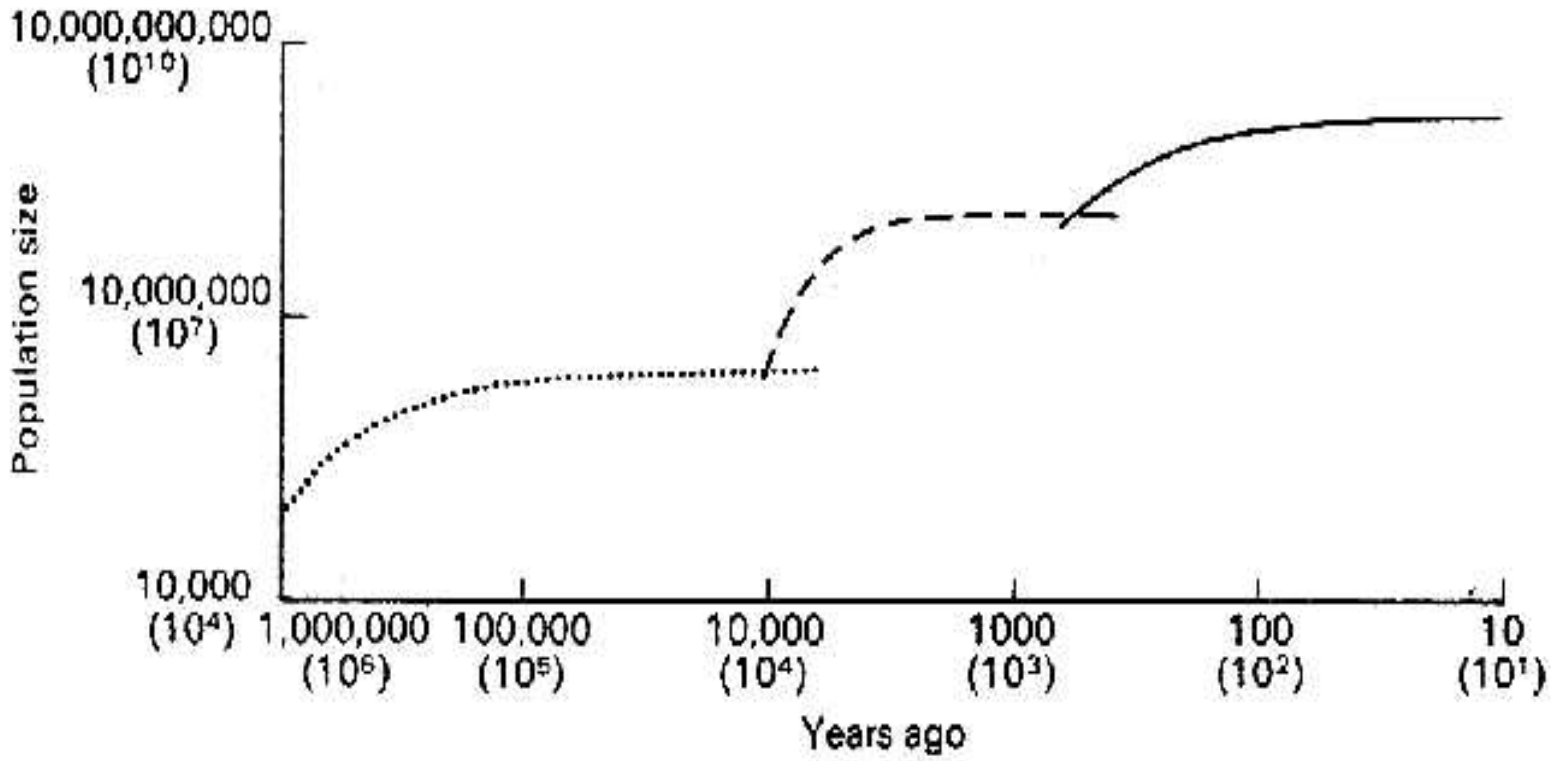
Humans as Foraging Species Distribution - 2,000 BP



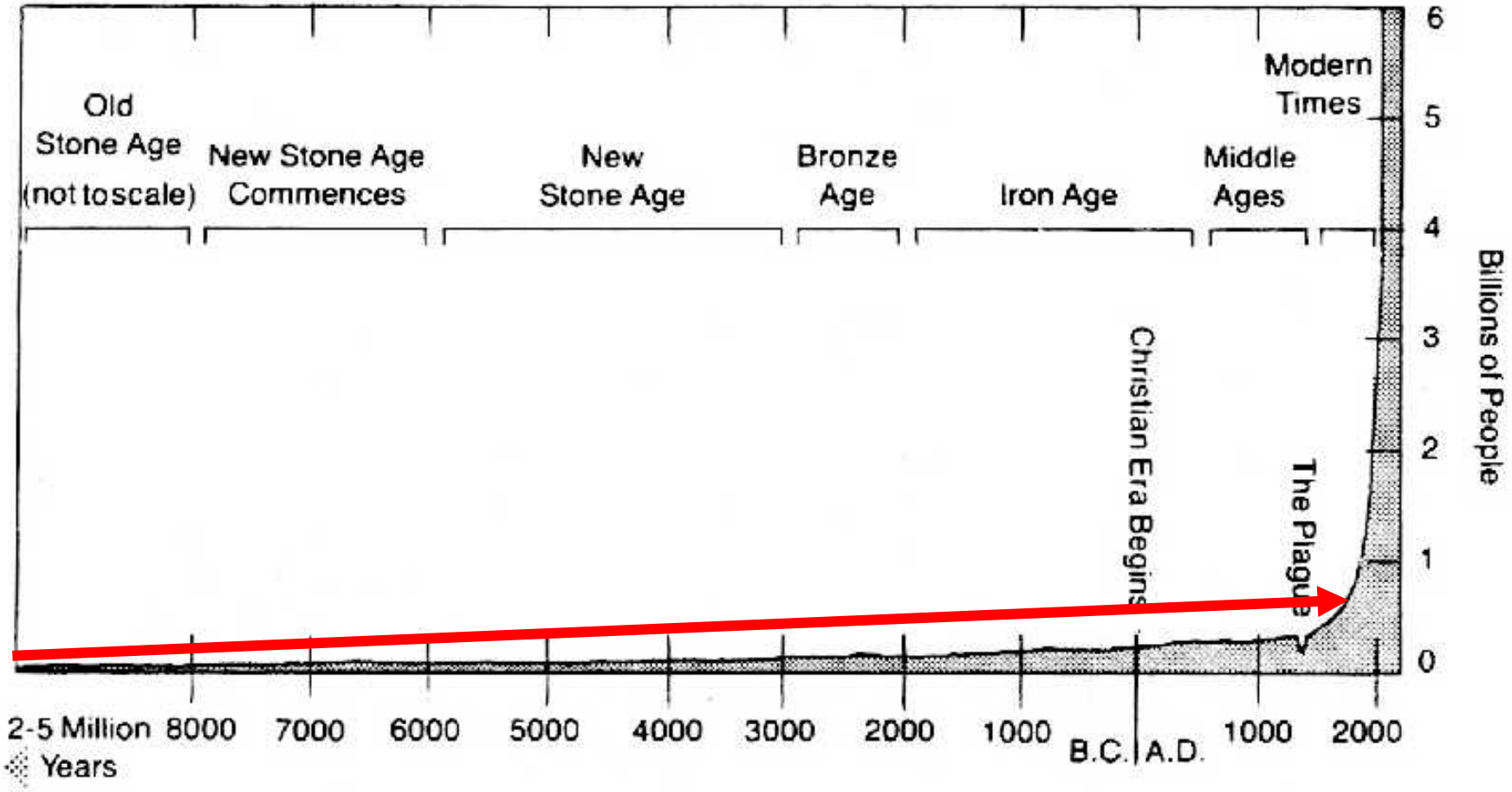
Humans as Foraging Species Distribution - 50 BP



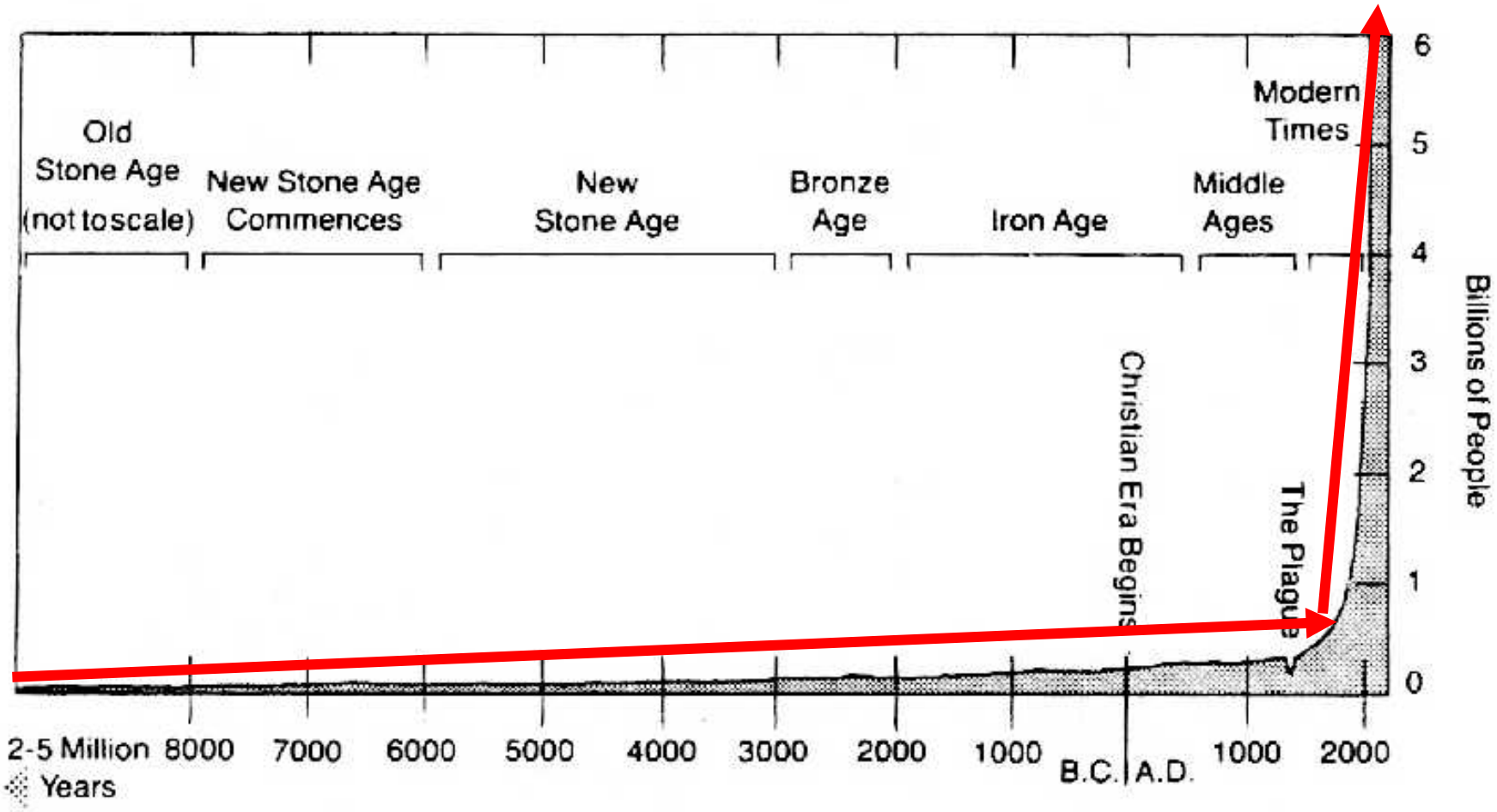
New Means of Capturing Energy ==> Population Spurts



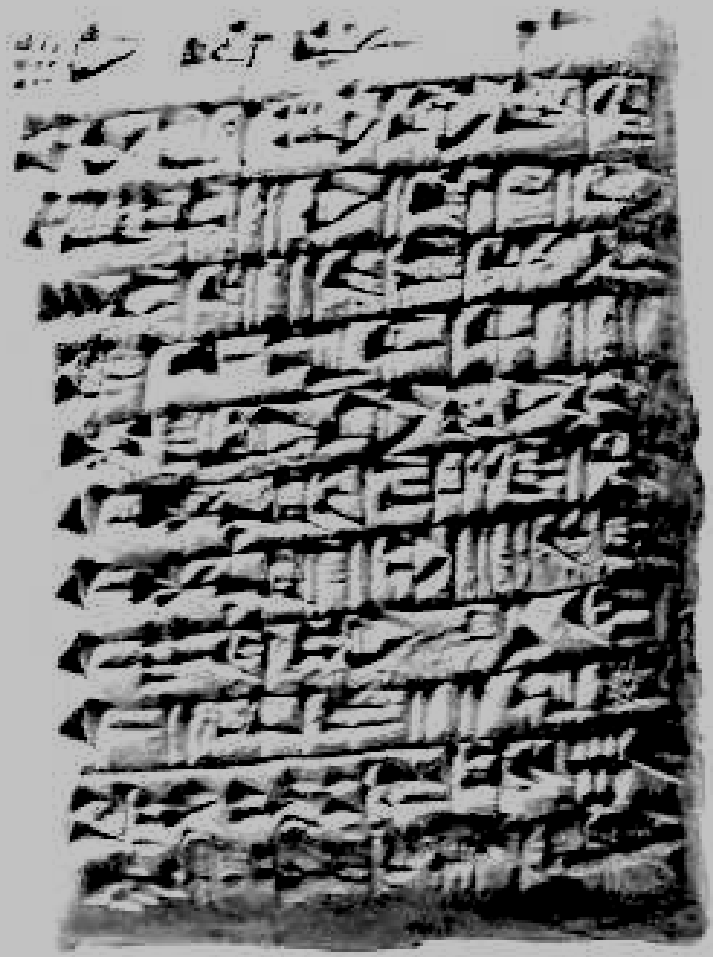
World Population Growth Through History



World Population Growth Through History



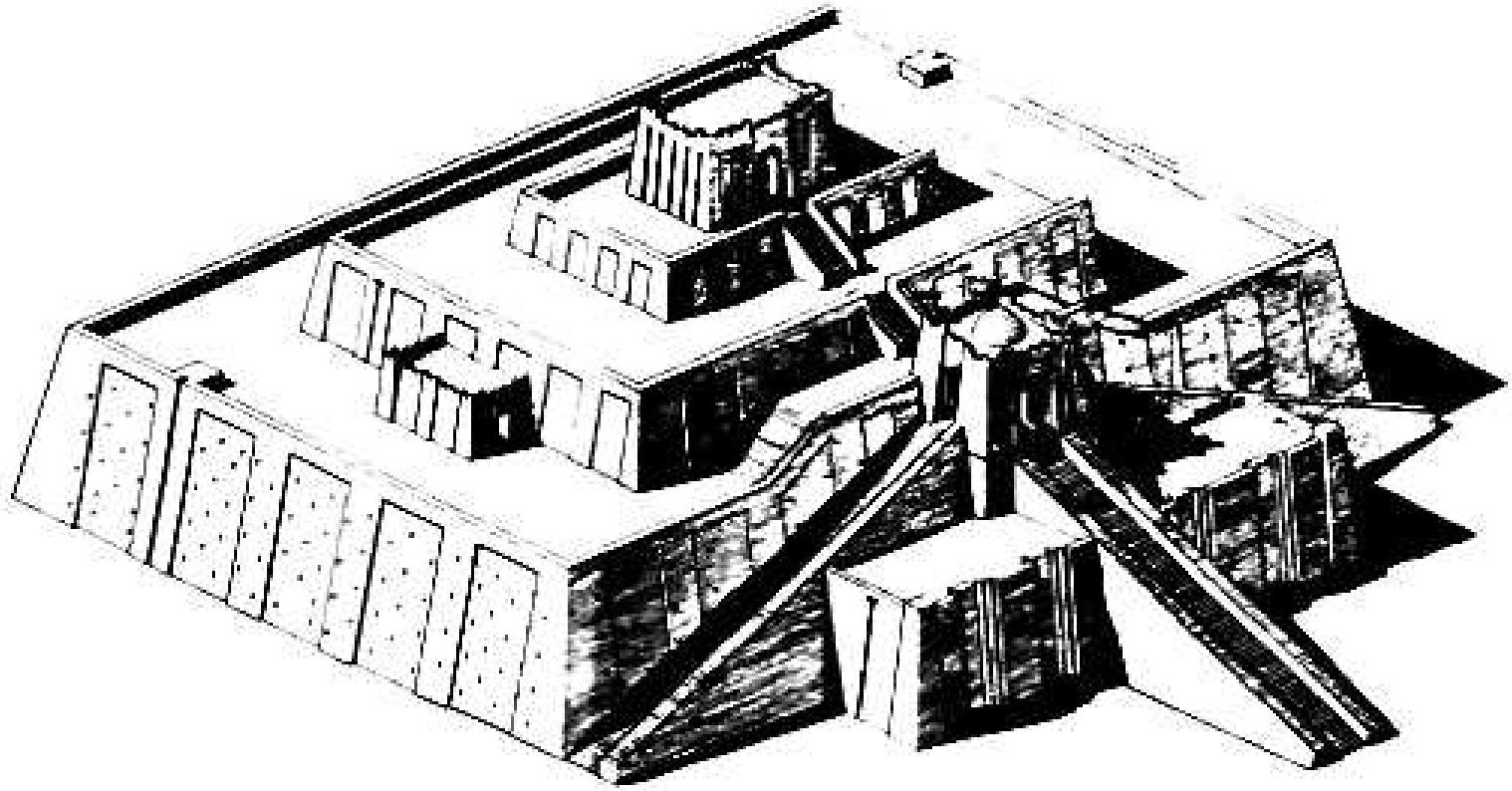
Along with a “new” set of stone tools that were more technically advanced and durable, the “neolithic” or “new stone age” is distinguished in the archaeological record by the appearance of several nearly simultaneous technologies that emerge along with sedentary agriculture.



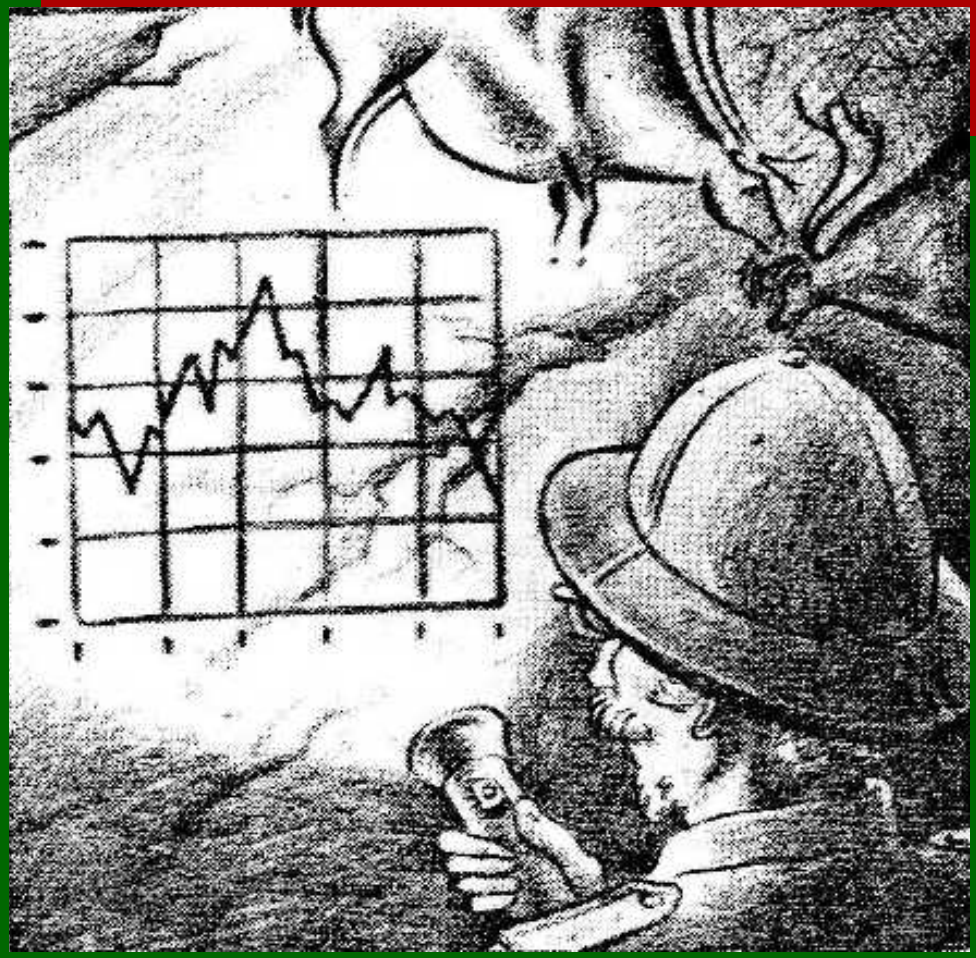
Sedentary life patterns combined with storage technologies and record keeping technologies (writing, in particular) allow for a rapid, largely simultaneous burst of social and cultural invention leading to….

The State

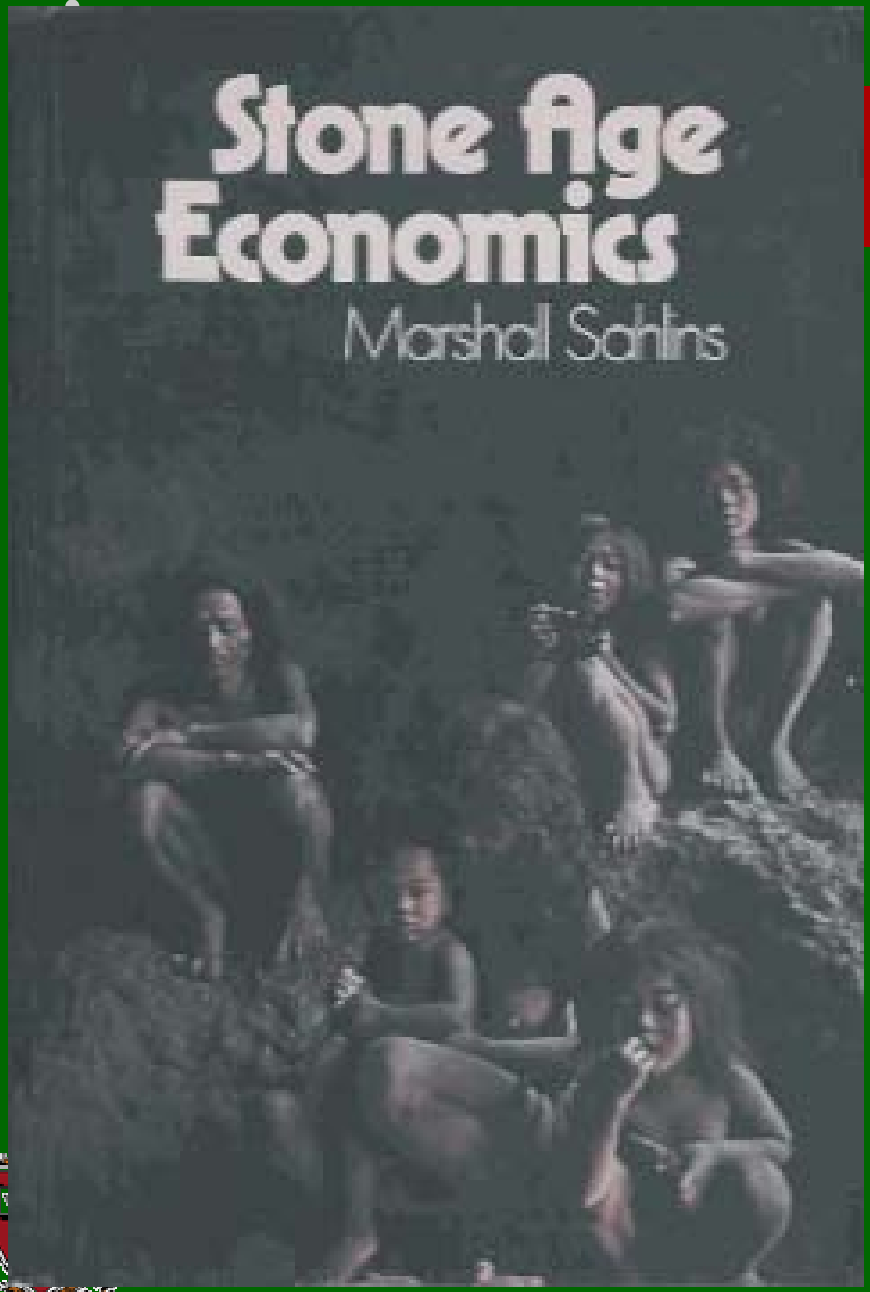
Town ==> City ==> City State ==> League of States == Empire



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. This, in turn, kicks off an enormous “positive feedback loop” in all subsequent human history.



Because of its mobile character, the calculus of the domestic sphere in foraging societies is based on on the “limit of portability.”

Both production and *reproduction* are undertaken with regard to the overriding concern for the limit of portability.

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.

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.

This is an ever escalating “positive feedback” loop - a “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 one's domestic labor force one can command.

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

Growth is good….

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

We need, however, to be aware of our “neolithic ethnocentrism.”

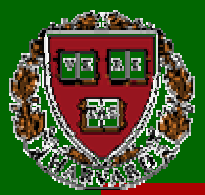
Moreover we must watch very carefully how the collective human econiche shifts with agriculture.

New forms of symbiosis have emerged.

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.

We may need to overcome this neolithic bias in our outlook.

"Evolution's been good to you, Sid."

Our Neolithic Bias Contains Some Important Implicit Theories in our Ethical Discourse

A Theory of **Community**

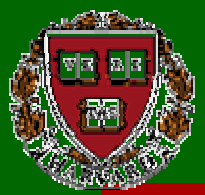
A Theory of **System**

A Theory of **Authority**

A Theory of **Change**

A Theory of **Agency**

A Theory of **Time**

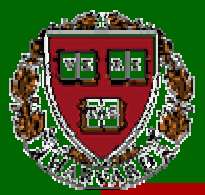


Analysis of implicit theories leads to understanding of the hierarchy of values = ***Worldview***

In analyzing the implicit theories behind the moral discourse we can arrive at an understanding of how these theories combine to provide a *hierarchy of valuation* for any individual or group, enabling it to make choices, judge right from wrong and establish policy.

Some things are said to be *more important* than others or they are attended to *first.* Some things are thought to be self-evident or true beyond any need for proof.

A shorthand way of referring to these different hierarchies of valuation is to speak of different *"Worldviews."*



Environmental Ethics and Land Management

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Elements of Ethical Reasoning

Timothy C. Weiskel

Session 3
5 October 2004

Harvard University Extension School
Fall Semester 2004