Back to the Earth Ethic: Reading Leopold in Reverse

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Aldo Leopold's landmark ethics essays

"Some Fundamentals of Conservation in the Southwest" 1923/1979
sketch of an earth (Gaian) ethic based on "respect"

"The Conservation Ethic" 1933
sketch of a consumption ethic (boycott, buy green & clean)
no theoretical foundations

"The Land Ethic" 1949
(Humean) Darwinian evolutionary / Eltonian ecological foundations

Gist of this highly exploratory, experimental talk:
1923 Leopold Earth Ethic a better fit for contemporary global-scale, long-term environmental concerns

Evolutionary / ecological foundations of the Leopold Land Ethic

"All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts."

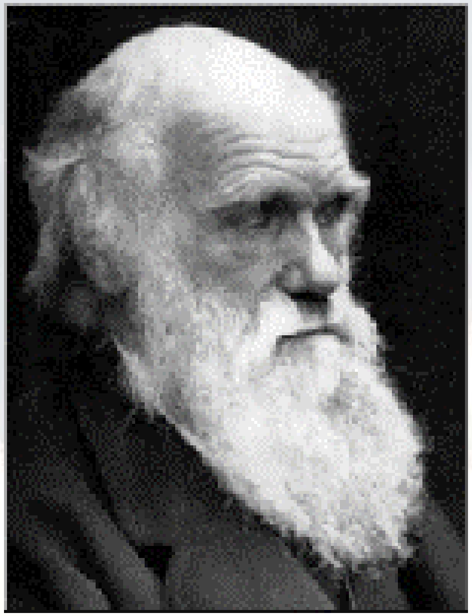
Ecology "simply enlarges the boundary of the community to include soils, waters, plants, and animals, or collectively: the land."

"[A] land ethic changes the role of *Homo sapiens* from conqueror of the land community to plain member and citizen of it. It implies respect for fellow members and also respect for the community as such.

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."



Evolutionary foundations of the Leopold Land Ethic borrowed from Charles Darwin's *Descent of Man*



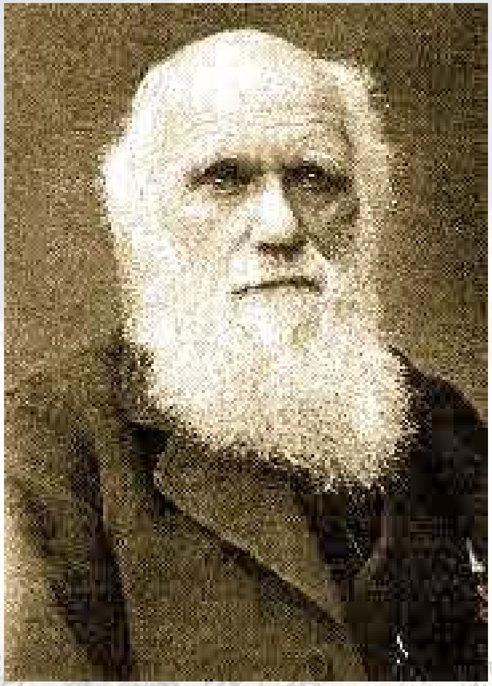
"No tribe could hold together if murder, robbery, treachery &c. were common; hence such crimes, within the limits of the same tribe, are 'branded with everlasting infamy.'"

If the "tribe" cannot hold together—> members would perish / fail to reproduce.

Ethics evolved by natural selection as a means to social organization
Vital to the inclusive fitness of individual members.

Raw material for the evolution of society: mammalian parental and filial affections + social instincts and (Humean) sympathy
Expanded by natural selection to siblings, uncles, aunts, cousins, etc. to create the human ur-society

Evolutionary foundations of the Leopold Land Ethic borrowed from Charles Darwin's *Descent of Man (1871)*



Ethics proper emerges when *Homo sapiens* acquires:

(1) intelligence: trace the causal sequence from action to effect on society

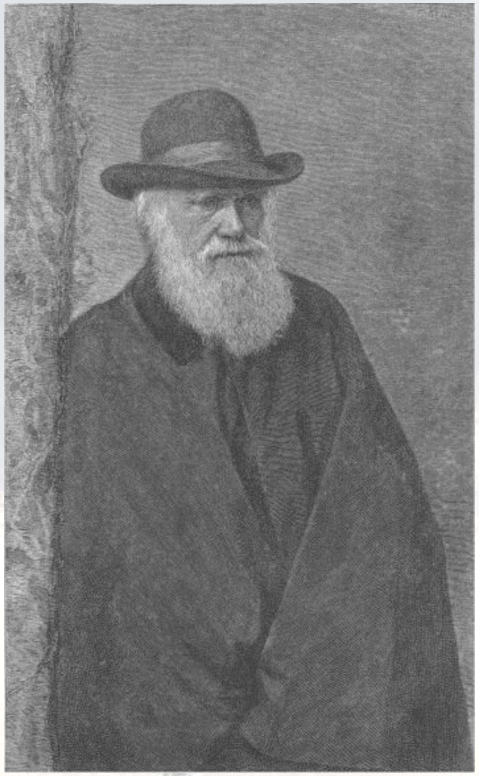
(2) imagination: envision the effect on society of similar actions

(3) language: codify prohibitions on anti-social actions

LEMMA: Ethics and society (community) are correlative

COROLLARY: As society evolves, ethics evolve in parallel

Evolutionary foundations of the Leopold Land Ethic borrowed from Charles Darwin's *Descent of Man*



Extended family (clan) — Self-sacrifice

Tribe — Gift economy

Ethnic nation — Property rights

Nation state — Patriotism

Global village — Universal human rights

"As man advances in civilization, and small tribes are united into larger communities, the simplest reason would tell each individual that he ought to extend his social instincts and sympathies to all the members of the same nation, though personally unknown to him. This point being once reached, there is only an artificial barrier to prevent his sympathies extending to the men of all nations and races"

Ecological foundations of the Leopold Land Ethic borrowed from Charles Elton's *Animal Ecology* (1927)

The community paradigm in ecology:

The biota is organized like human societies.

Each plant and animal occupies a niche, a "role" or "profession" in the "economy of nature."

Thus: Extended family → Ethnic nation → Nation state → Global village → Biotic community

Problems with the Leopold Land Ethic

Most generally and abstractly the LLE is inappropriately scaled both spatially and temporally

Neo-Gleasonian biotic communities lack ontological robustness:

- spatial boundaries are vague and porous
- no coherent typology or taxonomy, thus no coherent identity

Biotic communities are dynamic at multiple temporal scales:

- boundaries between successional seres are vague
- successional change is ateleogical (not terminating in a stable, self-replicating climax sere)
- natural disturbance—fire, flood, drought, wind—“incorporated,” frequent, and rhythmic.

Thus there is little “integrity” or “stability” associated with biotic communities to be preserved

The Leopold Land Ethic can be "dynamized"

Biotic communities no less ontologically robust than paradigmatic human communities

Typical community like Stevens Point, WI

- has vague and porous boundaries ("city limits" obsolete)
- "small city" type, but not exactly like any other

Temporal successional boundaries equally vague

- lumber-mill town —> paper-mill town —> hazard-insurance town —> college town
- individuals of various kinds (lumber jacks, mill workers, clerks, hippies, college students/professors) migrate in and out

If such human communities are ontologically robust enough to generate duties and obligations, so are biotic communities.

The Leopold Land Ethic can be "dynamized"

Leopold recognized that nature is dynamic, but primarily only at the evolutionary temporal scale (in "TLE" of *ASCA*).

"Evolutionary changes . . . are usually slow and local. Man's invention of tools has enabled him to make changes of unprecedented violence, rapidity, and scope."

We can add to ateleological successional change and disturbance regimes to evolutionary change.

And replace the norms of integrity and stability with norms of natural ecological dynamics —and revise the LLE's "golden rule":

A thing is right when it tends to disturb the biotic community only at normal temporal and spatial scales. It is wrong when it tends otherwise.

Dynamized Leopold Land Ethic still useful but limited

Useful in re: ethically evaluating community- up to landscape-scaled and rapid and reversible human disturbances

- point-source pollution
- agricultural & forestry practices; recreational activities
- local development (residential, commercial, industrial)

Limited in re: larger, global-scaled, long-term, possibly irreversible human disturbances

- climate change
- mass extinction
- stratospheric ozone hole
- pelagic fishing

First wave of “environmental crisis” in 1960s focused on former
Second wave of “environmental crisis” in 1980s focused on latter

1923 Leopold Earth Ethic a better fit for contemporary global-scale, long-term environmental concerns

"[It] is at least not impossible to regard the earth's parts—soil, mountains, rivers, atmosphere, etc.—as organs or parts of organs, of a coordinated whole, each part with a definite function. And, if we could see this whole, as a whole, through a great period of time, we might perceive not only organs with coordinated functions, but possibly also that process of consumption and replacement which in biology we call the metabolism or growth. In such a case we would have all the visible attributes of a living thing, which we do not now recognize to be such because it is too big and its processes too slow. And there would also follow that invisible attribute—a soul or consciousness—which not only Ouspensky, but many philosophers of all ages ascribe to all living things and aggregations thereof, including the 'dead' earth."

1923 Leopold Earth Ethic a better fit for contemporary global-scale environmental concerns

"There is not much discrepancy except in language, between this conception of a living earth, and the conception of a dead earth, with enormously slow, intricate, and interrelated functions among its parts, as given us by physics, chemistry, and geology. The essential thing, for present purposes is that both admit the interdependent functions of the elements. . . . Possibly, in our intuitive perceptions, which may truer than our science and less impeded by words than our philosophies, we realize the indivisibility of the earth—its soil, mountains, rivers, forests, climate, plants, animals, and respect it collectively, not only as a useful servant but a living being, vastly less alive than ourselves in degree, but vastly greater than ourselves in time and space—a being that was old when the morning stars sang together, and, when the last of us has been gathered unto his fathers, will still be young."

Three Ethical Foundations of the Leopold Earth Ethic

1. A kind of individual and collective virtue ethics:

“Ezekiel seems to scorn waste, pollution, and unnecessary damage as something unworthy, something damaging not only to the reputation of the waster, but to the self-respect of the craft and the society of which he is a member.”—mentioned in passing

2. Long anthropocentrism—responsibility to future generations:

“the privilege of possessing the earth entails the responsibility of passing it on, the better for our use, not only to immediate posterity, but to the Unknown Future . . .”—mentioned in passing

3. Kantian non-anthropocentrism—respect for earth’s intrinsic value:

“It is possible that Ezekiel respected the soil, not only as a craftsman respects his material, but as a moral being respects a living thing.”—developed over next 6 paragraphs (2 just quoted)

Scientific Foundations of the Leopold Earth Ethic

Biogeochemistry, first articulated by Vladimir Vernadsky in the 1920s, developed by G. E. Hutchinson in the 1950s, and James Lovelock and Lynn Margulis in the last quarter of the 20th Century as the “Gaia Hypothesis”—not small-scale (community- ecosystem-level) ecology and evolutionary (species-focused) biology

Leopold may have been indirectly influenced in 1923 by Vernadsky via P. D. Ouspensky, whom he quotes in “Some Fundamentals” —as Ouspensky was a popularizer of Vernadsky’s ideas (Vernadsky was not translated into English until the 1940s).

Vernadsky coined the term “biosphere” and speculated about the “noosphere”

LEE avoids the temporal- and spatial-scale problems bedeviling the LLE

Biotic communities and ecosystems are difficult to isolate as robust entities—some suspect that they are mere theoretical artifacts.

Communities "represent merely abstract extrapolations of the ecologist's mind. . . . [A]n association is not an organism [as F. E. Clements had alleged], scarcely even a vegetational unit, but merely a *coincidence*"—H. A. Gleason (1926)

"[T]he [eco]systems we isolate mentally . . . overlap, interlock, and interact with one another. The isolation is partly artificial, but is the only possible way . . . we can proceed"—A. G. Tansley (1935)

The Earth, by contrast, is ontologically robust; it has clear boundaries, requiring no mentation to isolate.

Old balance-of-nature paradigm in ecology

Ecosystems considered to

- be closed (except for energy and water inputs)
- be self-regulating (follows from closed)
- tend toward a single stable point of equilibrium (climax)
- have determinate and invariant successional pathways
- have disturbances as exceptional events
- have humans excluded from normal ecological factors

—S.T. A. Pickett and R. S. Ostfeld, “The Shifting Paradigm in Ecology”

New flux-of-nature paradigm in ecology

Ecosystems now considered to:

be open to nutrients, pollution, motile organisms
have external as well as internal regulatory factors
have multiple domains of ecological attraction
exhibit directionless and endless successional change
have disturbances incorporated—"disturbance regimes"
have human influences incorporated (everywhere for millennia)
be ontologically fuzzy and relative
have ontology driven by epistemology

—S.T. A. Pickett and R. S. Ostfeld, "The Shifting Paradigm in Ecology"

Biosphere has many characteristics of old ecosystem paradigm

Closed—open only to sunlight, other radiation, and incidental cosmic material

Self-regulating—the core concept of the Gaia Hypothesis

Single points of equilibria for many biogeochemical cycles, e. g.:

atmospheric oxygen (O_2) = @21%

atmospheric nitrogen (N_2) = @78%

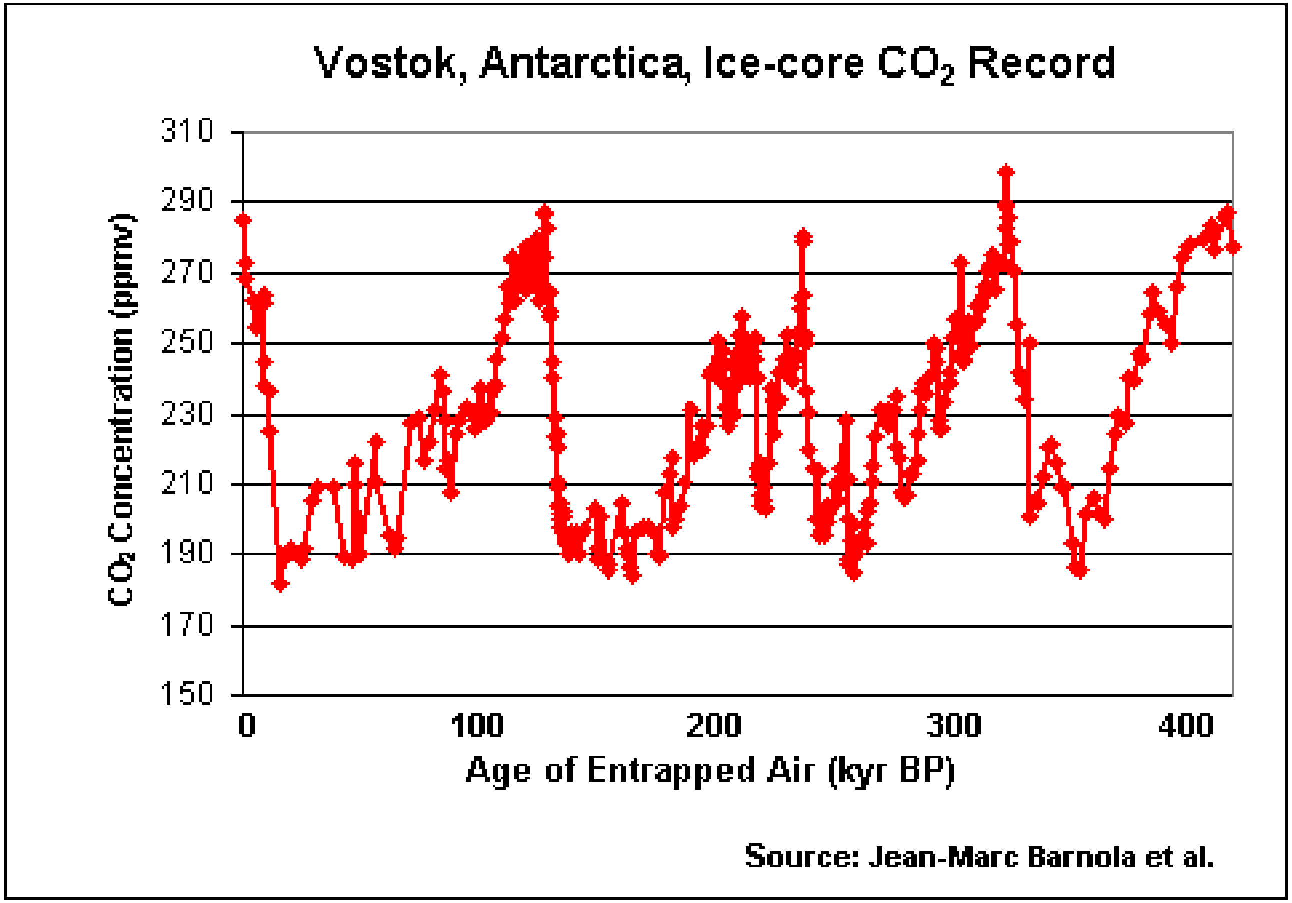
atmospheric carbon (CO_2/CH_4) = @ 2.05 ppmv

global average temperature = @15°C

—Stephen Schneider and Penelope Boston, eds, *Scientists on Gaia*

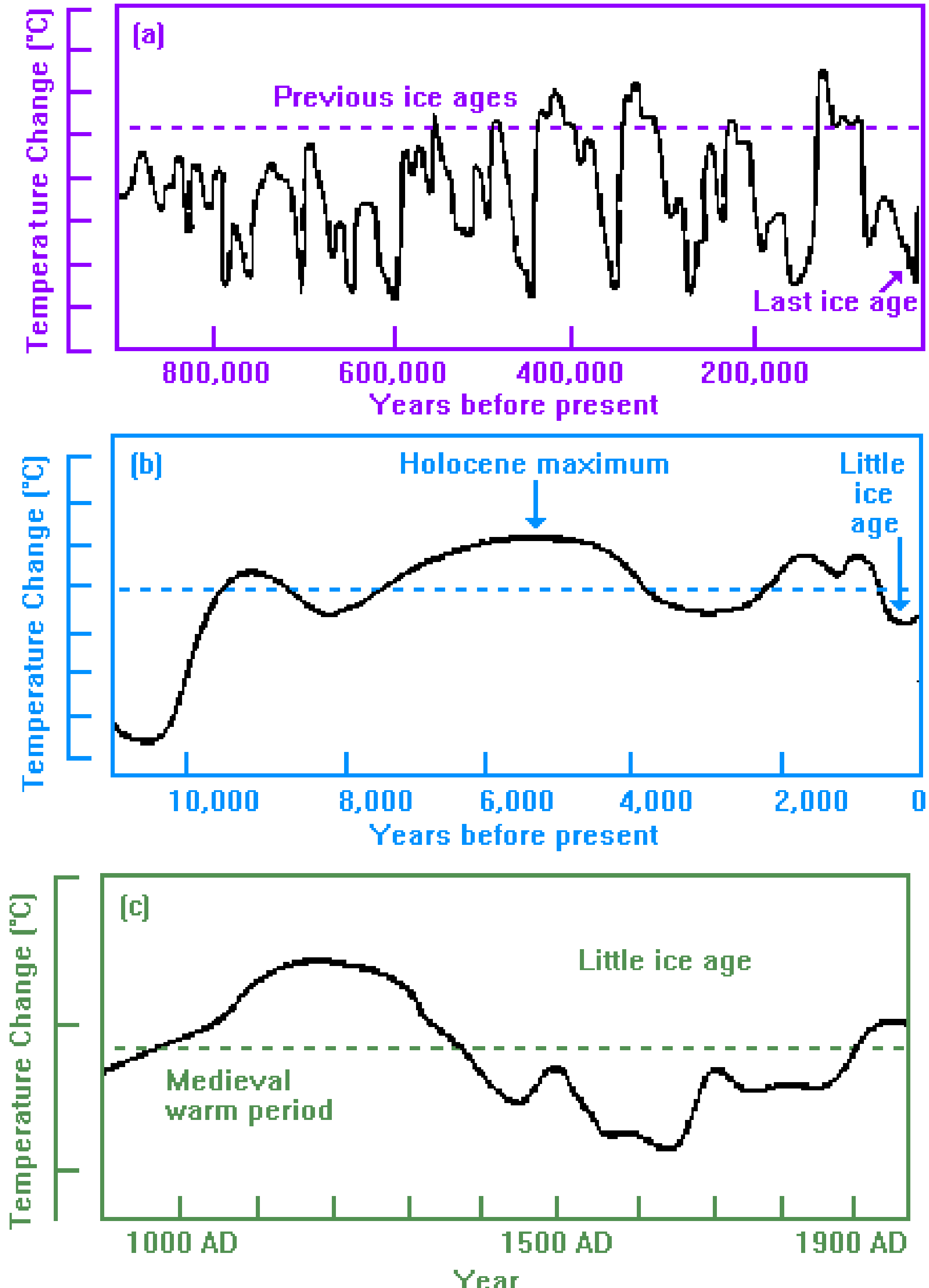
Biosphere subject to **equilibria fluctuations** and catastrophic disturbance

Atmospheric CO_2 Fluctuations over 400,000 years BP



Biosphere subject to **equilibria fluctuations** and catastrophic disturbance

Temperature fluctuations over @ 1,000,000 years, 11,000 years and 1,100 years respectively

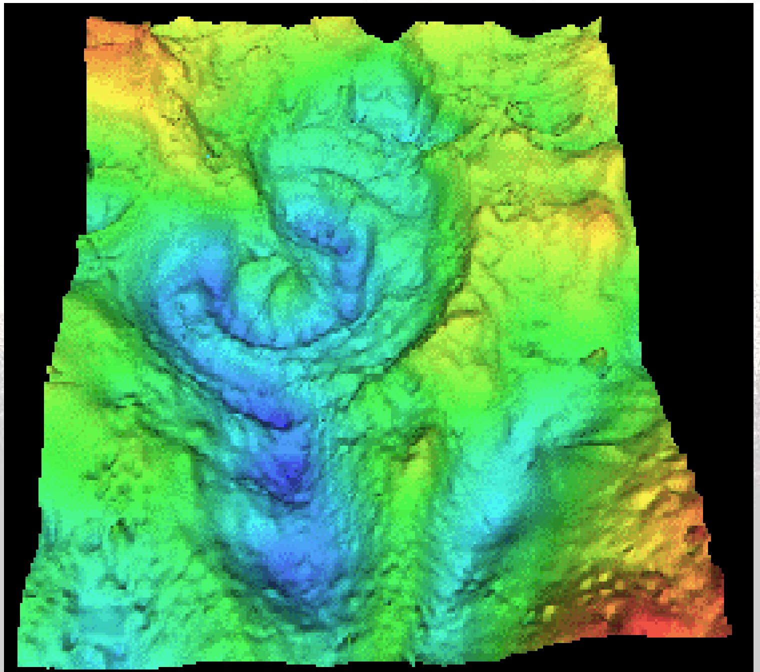


Biosphere subject to equilibria fluctuations and **catastrophic disturbance**

putative location

Meteor strike at the K-T boundary 65,000,000 years ago that maybe did in the dinosaurs

possible impact crater



Temporal scales suggested by C. S. Holling (each driven by various biological and suprabiological Processes)

1. the "vegetative" (organismic) temp. scale = @ 1 day - 1000 yrs
   (photosynthesis and metabolism)
2. the ecological temporal scale = @ 1 year - 5000 yrs
   (succession and disturbance)
3. the climatic temporal scale = @ 3-5 C yrs - 3-5 K yrs (regional)
   1 K yrs - 3-5 M yrs (global)
   (mean annual temperature & moisture fluctuations)
4. the evolutionary temp. scale = @ 10 thousand - 10 million yrs
   (adaptation, speciation, extinction)
5. the geo-morphological temp. scale = @ millions to billions of yrs
   (plate tectonics, up thrust, erosion, rock cycle)

—"Cross-scale Morphology, Geometry, and Dynamics of Ecosystems,"

Boundary conditions at the interface of temporal scales

Albeit themselves dynamic, up-scale processes may be regarded as stable vis-à-vis down-scale processes.

Examples (1): "The Pacific plate is moving north relative to the North American plate at a rate of approximately 5 cm/year. . . . As a result, Los Angeles, now more than 500 km south of San Francisco is moving slowly toward that city. If this motion continues, in about 10 million years San Francisco will be a suburb of Los Angeles."
— D. B. Botkin and E. A. Keller   This geomorphological process has had no effect on the organismic-scaled California real estate market.

Example (2): Canada is increasing in elevation (rebounding from the weight of Pleistocene ice) and moving northwest with the North American plate. An ecologist studying the population dynamics of snowshoe hare and arctic fox at the ecological temp. scale may regard the elevation and latitude / longitude (at the geomorphological scale) of her study site as unchanging.

Boundary conditions at the interface of temporal scales

Up-scale processes "constrain" down-scale processes

Example (1): climate constrains processes at the organismic and ecological scales—(A) plants grow more slowly in (a) colder & (b) dryer climates; (B) diversity increases progressively with warmer / wetter climates from arctic to tropical latitudes.

Example (2): disturbance regimes at the ecological scale constrain processes at the organismic scale—(A) seasonal flooding in the Colorado River is necessary for the reproductive success of the CR Squawfish; (B) periodic fires and herbivory prevent the growth of woody vegetation on prairies.

Boundary conditions at the interface of temporal scales

Down-scale processes are often constitutive of up-scale processes

Ex (1): weather (diurnal / seasonal / annual fluctuation of temp & rainfall = @ organismic temporal scale) constitutes climate.

Ex (2): plant growth and reproduction on the organismic temporal scale constitutes succession on the ecological temporal scale.

Boundary conditions at the interface of temporal scales

Down-scale constitutive processes are damped down and averaged out as they cross the border to constitute up-scale processes

Ex (1): the diurnal, seasonal, and annual vagaries of local weather are averaged (to annual rainfall and temperature) as they constitute regional climate. Pulses of hard rain or lack thereof (drought)—both common in US SW—and temperature fluctuations (heat waves / cold snaps) are damped as they constitute climate.

Ex (2): The vagaries of mortality and replacement of individual trees constituting an old growth or climax forest are averaged out and damped down as the border between the organismic and ecological temporal scale is crossed.

Boundary conditions at the interface of temporal scales

Changed rates of constitutive downscale processes can storm across the border and alter up-scale processes

Ex (1): traditional scattered swidden agriculture in Amazon rain forest is at a ecological temporal scale comparable to individual tree mortality and replacement; wholesale clearing for cattle pasture threatens to alter regional climate. Reduced forest cover—>reduced transpiration—>reduced atmospheric moisture—>reduced annual rainfall = regional climate change.

Ex (2): fire suppression and livestock grazing (changes in disturbance regimes at lower end of ecological temporal scale) in US Southwest "flipped" region from grassland to scrub (at higher, successional end of the ecological temporal scale).

Leopold explores the boundaries between climatic and ecological temporal scales in "Some Fundamentals"

Struggling to understand a regional-scale flip from one ecological domain of attraction—savannah to brush—that took place over the span of 50 years, he writes,

"In discussing climate changes, a clear differentiation between the geological and the historical viewpoints is essential. The status of our climate from the geological viewpoint has nothing to do with the question in hand. Any such changes that may be taking place would be too slow to have any bearing on human problems. . . . In general, there thus appears to be no clear evidence during any recent unit of time small enough to be considered from an economic standpoint, but at least one line of pretty clear evidence as to the general stability of our climate during the last 3,000 years."

Summary and Conclusion

The LEE provides an ontologically robust object of respect: the Earth

The LEE provides clear norms against which to measure and ethically assess human changes: up-scale conditions, which also fluctuate naturally, but at rates so slow in comparison with humanly-relevant temporal scales that they may be regarded as stable.

Examples are

Composition of the atmosphere and oceans
Global climate
Global biodiversity

The LEE is better scaled spatially and temporally for morally engaging post-1980s environmental concerns that are spatially global and temporally centennial and millennial in scale.

Proposed Golden Rule for the LEE

A thing is wrong when it storms across a temporal boundary and rapidly speeds the rate of otherwise slowly fluctuating equilibria at higher temporal scales.

Examples:

anthropogenic doubling of atmospheric carbon causing global temperatures to rise at an abnormal rate.

anthropogenic species extinction at rates exceeding the rate of speciation.

flattening the trophic structure of the biota of global ocean by over-harvesting big fish