ECOLOGY: Stuart Hill's 'History & First Thoughts' (for a discussion on 6 Oct 2011)

Definition: The study of the relationships between organisms and their living and non-living environments

My 'ecological' history - Grew up in the country: camps in the forest, days spent with cousins in the local trout stream (the Chess – see Shelton R 2005; http://books.google.com.au/books/about/Longshoreman.html?id=kkXUAAAACAAJ&redir_esc=y), and on Chorleywood 'Common'; fishing with my Grandfather; many pets (many non-domesticated: local fish, lizards, snakes, bats...); XYZ Club with Desmond Morris at the London Zoo; love of nature; grew much of our own food

Mentors, Inspirers, Collaborators – Joe Bossanyi (protégé of Alistair Hardy; taught me A-Levels; trip at 16 years old to first Royal Zoological Society Conference on Primates: met Jane Goodall [just back from Africa], JZ Young [author of Life of the Mammals, etc.], Julian Huxley...); Amyan Macfadyen (taught me ecology at Swansea University); Vincent Wynne-Edwards & Malcolm Cherrett (external examiners of my PhD); Jake Kenny (supervisor at University of the West Indies in Trinidad); Keith Kevan (Prof of Entomology at McGill University); Scott Nearing (Maine; 'Living the Good Life'); John Todd [& The New Alchemists] & Jay Baldwin (both collaborators in a project to make a coralline island in the Seychelles self-sufficient in food and energy)...

Cave Ecology PhD – one of 1st whole ecosystem studies by an individual (1965-9); prizes for best thesis & student

Taught Ecology, Soil Animal Ecology, Entomology, Ecological Agriculture, etc. at McGill University for 27 years (1969-1995)

Established Ecological Agriculture Projects (EAP: www.eap.mcgill.ca): 1st such 'institute' in a university (1974; Director till 1995); New Brunswick Energy & Agriculture study (1977); Co-organised IFOAM Conf. in Montreal (1978); contract to support organic extension agents in Quebec; numerous publications...

Developed many Visual Maps & Models – Food & Space; Efficiency-Substitution-Redesign (ESR); triangle/pyramid models; psychology ones; learning spiral; unknown/known; social ecology...(many can be seen in my PPT presentations, some of which are downloadable from: www.stuartbhill.com)

Ecological Books & Publications - numerous papers; book: ***Ecological Pioneers: A Social History of Australian Ecological Thought and Action*** (with Dr Martin Mulligan; Cambridge UP, 2001); see also: Learning Ecology: A New Approach to Learning and Transforming Ecological Consciousness: Experiences from Social Ecology in Australia, *in* ***Learning Toward An Ecological Consciousness: Selected Transformative Practices*** (2004)

Psychology – holistic primal & many other humanistic & transpersonal modalities; co-counseling; Lloyd deMause psychosocial evolution; developed single session therapy; a lying for change strategy...; recent book: **Learning for Sustainable Living: Psychology of Ecological Transformation** (with Dr Werner Sattmann-Frese; Lulu, 2008)

Social Ecology – teaching in Murray Bookchin's program in Vermont; UWS Foundation Chair in Social Ecology, Professorship & Head of School; SE definition & models; numerous papers; taught basic subject & research ones; recent book: ***Social Ecology: Applying Ecological Understanding to our Lives and our Planet*** (with Dr David Wright and Dr Catherine Camden-Pratt; Hawthorn, 2011)

SE Definition: For me, at the moment, Social Ecology is concerned particularly with 'the study and practice of personal, social and ecological sustainability and progressive change based on the critical application and integration of ecological, humanistic, community, relational and 'spiritual' values to enable the sustained wellbeing of all'.

Barry Commoner's Four Laws of Ecology, 1971, *The Closing Circle*

1. Everything is Connected to Everything Else - there is one ecosphere for all living organisms and what affects one, affects all.

2. Everything Must Go Somewhere - there is no "waste" in nature and there is no 'away' to which things can be thrown.

3. Nature Knows Best - humankind has fashioned technology to improve upon nature, but such change in natural systems is 'likely to be detrimental to those systems'.

4. There Is No Such Thing as a Free Lunch - exploitation of nature will inevitably result in the conversion of resources from useful to useless forms.

Hill's Ecological Concepts – for application to eco-design and eco-management

- limiting factors and their substitutes;
- microhabitats, niches and territoriality;
- time and space specificity;
- numbers, biomass, energy flow and the specifics of resource partitioning and budgeting;
- guilds, roles and keystone species;
- system maintenance and service functions;
- resilience and ecosystem resistance;
- succession, developmental and intergenerational change;
- feedback loops, co-evolutionary processes, altruism and group selection;
- edge effect and boundary phenomena;
- functional diversity, system stability and homeostasis;
- specialists and generalists (eurytypic and stenotypic expressions of lifestyle), and r and K strategists;
- entropy and negentropy;
- specific indicators and integrator indicators;
- synergy and mutualism;
- catalysis and amplification;
- non-linearity, cyclic and threshold relationships;
- integrated web-like relationships;
- homeostatic, self-regulative and regenerative processes;
- adaptation, addiction, allergy and system degeneration (the result of adaptive processes, over time, becoming maladaptations); and
- hierarchical and systems phenomena at every level.

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Latest YouTubes: www.wakeupsydney.com.au/Interviews/The-SandboxSyndrome.aspx; http://youtu.be/mzY1eZLwOdk & https://vimeo.com/123569201

Hill has published over 350 papers and reports. His latest books are:

- ***Ecological Pioneers: A Social History of Australian Ecological Thought and Action*** (with Dr Martin Mulligan; Cambridge UP, 2001),
- **Learning for Sustainable Living: Psychology of Ecological Transformation** (with Dr Werner Sattmann-Frese; Lulu, 2008) and
- ***Social Ecology: Applying Ecological Understanding to our Lives and our Planet*** (with Dr David Wright and Dr Catherine Camden-Pratt; Hawthorn, 2011).

Preventing Wild Fire Risks: Ecologically and Possibly Permanently

Emeritus Professor Stuart B Hill – May 2020

It is surely time to fund research to investigate and develop 'front-end/proactive, ecological approaches' to reduce fuel load and fire risks in our forests. Up to now nearly all research and action has focused on 'back-end/reactive, physical and chemical approaches', especially on burning the accumulated litter and using fire retardants. Burning adds more carbon dioxide to the atmosphere, and some retardant components, and their break-down products, can have negative environmental impacts. Although these current practices will continue to be needed, hopefully at reducing extents over time, as system redesign and improved management approaches are increasingly implemented (including integrating and further developing time-tested aboriginal fire management methods).

Finding ways to enhance the decomposition of the forest litter would not only reduce the fuel load, but improve the fertility and water-holding capacity of the soil and, over time, probably enable a succession to more diversified and less fire-prone forest species.

This research neglect is just one of many examples of our political system's failure to act preventatively, ahead of predicted crises, rather than too late, reactively. Indeed, the usual political action is to deny the crises, repress protest, and to conduct redundant studies to measure the problems. I label this "monitoring our extinction research". Such responses are best understood as strategies to deflect criticism, and to postpone both acknowledgement of the situation and of needed appropriate actions.

Back in the 1980s, while teaching and doing research on soil ecology at McGill University in Montreal, I recognised this need for taking proactive, bio-ecological approaches to addressing our environmental problems. My initial focus was in our agricultural systems. Ecologically, agriculture comprises a cycle of decomposition (of dead organic matter in soil), production (of crops), and consumption (of the produce). To ensure sustainability, the food and crop waste must be returned to the soil. This is being undermined by the increasingly linear material flows in our food systems.

In contrast to the highly visible 'production' and 'consumption' parts of this cycle, the importance of 'decomposition', being out of sight, has been historically neglected, and undermined. This has, throughout the world, led to catastrophic reductions in soil organic matter, fertility and productivity. This has also led to increased susceptibility to wind and water erosion, and to increasing dependencies on compensatory chemical inputs, with their associated environmental impacts, including on the biodiversity of the soil organisms needed for decomposition. Increased dependence on irrigation is also associated with the loss of water-holding capacity in the soil and landscape.

Research is needed, not to just measure these outcomes but, more importantly, to prevent the losses, and to support the decomposers. This will require the redesign of our agroecosystems (and

forest ecosystems) and their improved management. As part of this we need to find ways to enable, particularly the soil fauna, the ‘managers’ of decomposition processes, to more effectively carry out their decomposer functions.

The leaf litter of eucalypts, like coniferous litter, is particularly unpalatable to most decomposers. Hence the accumulation of thick layers of litter in our forests. This is also a natural and expected phenomenon in temperate parts of the world as the optimum temperature for plant production is lower than that for litter decomposition. This is why litter does not accumulate on the floors of most tropical forests, where the higher temperatures favour decomposition.

While investigating this in Canada’s coniferous forests, I identified certain earthworm species that were most tolerant to the acid conditions in the pine-needle litter. And I found an ingenious way to improve their acceptance of the needles as food. The first thing that earthworms eat when they emerge from their cocoons is the cocoon shell. So, by treating the cocoons with a tincture of pine-needle juice, the emerging worms will be conditioned to be more likely to accept the needles as food. Because this was based on a pilot study that failed to attract funding, these findings require further research. However, many years earlier, a similar outcome had been recorded, with stick insects, which also eat their egg shells on emergence. This is just one of many possible lines of bio-ecological research that could be (and should be) pursued to better enhance litter decomposition.

When I emigrated to Australia in 1995, and witnessed the fire threats in our eucalypt forests, I surmised that similar research, to better enable the decomposition of the equally unpalatable litter, might result in a significant reduction in the fuel load, and so reduce the intensity of wild fires.

I shared these ideas with both the fire service and leading fire researchers. The response was a deafening silence! Surely now is the time to open our minds to investigating such proactive, ecological approaches to address the many environmental challenges that we are facing, including the devastating wild fires that are currently threatening so many of us.

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