

Radical Human Ecology

*Intercultural and
Indigenous Approaches*



Edited by Lewis Williams,
Rose Roberts and Alastair McIntosh

RADICAL HUMAN ECOLOGY

We dedicate this book to the elders whose indigenous wisdom has so inspired its making. We especially remember elders Ngāroimata Cavill, Betsy McKenzie, and John MacGregor.

He taonga whakamānawa tēnei ki a Ngāroimata Cavill (nee Ngātai), he kuia nō Ngāi Te Rangi. Ahakoa tōna tū rangatira ki tōna Ngāiterangitanga, i reira hoki te ringa kaha o te atua e whakamahana i a ia me ōna tikanga ā-wairua. E Aunty Ngāroimata, te tupuna māreikura, i a koe e hikoi ngātahi ana me ō tūpuna huhua, ka noho tonu ko tō wairua mo ake tonu atu.

In loving memory of Ngaroimata Cavill (nee Ngātai) Ngāi Te Rangi Kuia, who while of her Ngāiterangitanga knew so well that god dwells in all peoples, places and spiritual traditions. Aunty Ngaroimata, beloved tupuna, while you now walk with the ancestors, your wairua stays with us forever.

In memory of elder Betsy McKenzie.

“I guess I’m an Elder, there are people here that are older but they are forgetting the stories.” Thus my grandmother and Elder spoke with humbleness when I asked her if she was an Elder. Her stories were rich and full of meaning and often laughter; and her door was always open. She was a traditional healer, a knowledge keeper, an Elder of the church – as her eyesight failed, she continued to read the Bible in Cree syllabics using a magnifying glass. She lived in both worlds – the Woodland Cree and the Western ... and now she walks in another world but her wisdom stays with those of us that had the privilege of learning from her. *Ninanaskomoon Nohkom.*

To John MacGregor, crofter, hostel warden and weaver of the great Harris Tweed at Gearrannan (Garenin) on the Isle of Lewis: I always saw you as an elder to us younger folk, a mentor in the ways. You shared Tradition’s treasures and respect – indigenous and pilgrim voyager alike. And as you’d say with your great laugh, when pointing out that moorland resting spot, of family friend returning back to soil beneath the grass, long past her steadfast milking days but tethered to appreciation yet: “How now, brown cow?” *Mile taing. Leis gach beannachd.*

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Intercultural and Indigenous Approaches

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Notes on Contributors

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Ullrich Kockel is Professor of Ethnology at the University of Ulster, Visiting Professor of European Ethnology at Vytautas Magnus University, Kaunas, and an Academician of the United Kingdom's Academy of Social Sciences since 2003. He is editor of the *Anthropological Journal of European Cultures* and President of the International Society for Ethnology and Folklore (SIEF), and has held various teaching and research positions in economics, geography, sociology and area studies in Britain, Ireland and Germany since the mid-1980s. During the 1990s, while based at the University of Liverpool, he worked closely with the European Centre for Traditional and Regional Cultures. In 2000 he was appointed Professor of European Studies at the University of the West of England, Bristol. His research has ranged across the field of European ethnology. In 2009 he established the SIEF Working Group on Place Wisdom.

Ulrich Loening is a molecular biologist, studied biochemistry at Oxford, and continued a typical research and teaching career dealing with protein synthesis and the nucleic acids, in the Departments of Botany and then Zoology in the University of Edinburgh, from 1959 to about 1989. He developed various analytical methods to study RNA in detail and used this to clarify the progress of RNA molecules from the cell nucleus and its processing and transport to the cytoplasm. This work also showed how bacterial ribosomal RNA was distinct from that of plants and animals and that it evolved in size in the latter; the work confirmed the emerging idea that plant chloroplasts must have evolved from the capture or symbiosis of blue-green algae, giving some insight into what we might call *natural genetic engineering* and a picture of the interdependence of nature. Following long-held interests, starting with natural history, gardening and farming as a kid, and

eventually with the founding and later repeatedly threatened closure of the Centre for Human Ecology (CHE) in the University of Edinburgh in the 1970s, he became more and more involved with society's ecological impacts. He became Director of CHE in 1984, and retired in 1995. In this capacity he helped in setting up a large organic farming research and demonstration centre, organized numerous workshops and lecture series on human ecology and co-founded energy conservation organizations as well as a small "sustainable forest" timber company. With his wife Francesca he has always grown most of the family's vegetables, and converted two historic old buildings towards eco-sustainable living.

Marie Lovrod is Coordinator of Women's and Gender Studies at the University of Saskatchewan. She has led women's studies abroad and diversity education programs in Europe, the United States and Canada, and has published several articles and book chapters. She is deeply interested in the ways that economic systems construct gendered identities and attendant possibilities in human ecologies by establishing exploitable conditions of both stasis and mobility that often impact women and children closest to the land, first. Her work examines the political functions of representations of childhood and youth in a range of contexts from local to transnational, the mutually implicated positions of women across various social strata, most recently with a focus on aging women, and the continued use of bifurcated constructions of reproductive and paid labour to structure vulnerabilities that impact both gendered life chances and environmental sustainability. She is firmly invested in building knowledge communities that respect research and learning environments as spaces shared among participants.

Iain MacKinnon, a graduate of the Centre for Human Ecology, is a Gaidheal from the Isle of Skye in the Highlands of Scotland. He is focused on work that concerns the way of life of the Gaidheals and much of his activism is support of crofting land tenure – a communal system of land use and occupation which is unique to the Highlands and Islands of Scotland. At present Iain is studying for a PhD researching the impact of cultural colonization on aspects of the traditional way of life of the Gaidheals. His current work is on the people's relationship to their lands, and how contemporary attempts by the Scottish Government to legislate for the Highlands and Islands seek to implant colonial norms of relating to land that are culturally alien to the indigenous way of living.

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Community, Love and Revolution (collected poetry) and *Hell and High Water: Climate Change, Hope and the Human Condition*. His writing has been described as “inspirational” by Starhawk, “world changing” by George Monbiot, “life changing” by the Anglican Bishop of Liverpool, and “truly mental” by singer Thom Yorke of Radiohead.

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Rose Roberts is a Woodland Cree woman, from the Lac La Ronge Indian Band in Saskatchewan. Within the Western knowledge system, she has an undergraduate degree in Nursing, a masters degree and a doctoral degree in Community Health and Epidemiology – all from the University of Saskatchewan. Her areas of research and interest include cancer among Aboriginal peoples, residential school survivorship, and indigenous ways of healing. From the Indigenous knowledge system, she does not feel that she has even finished the high school equivalent of the traditional ways of knowing. She has been receiving teachings on healing knowledge for the last 5 years and anticipates that it will be at least 20 more years before she receives her PhD equivalent. Until June 2010, she was an Assistant Professor at the College of Nursing, University of Saskatchewan

but after completing a Fulbright Scholar-in-Residence term at the Northwest Indian College in Bellingham, WA – she has decided to explore and broaden her horizons.

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Makere Stewart-Harawira is an Associate Professor at the University of Alberta. The author of *The New Imperial Order: Indigenous responses to globalization* and a number of edited book chapters and articles whose themes include indigenous ontologies and political strategies, globalization and post-modern imperialism, Stewart-Harawira's recent research has focused on the intersections of indigenous languages and ontologies, global citizenship, and new formations of global governance. Stewart-Harawira's research and scholarship is driven by her perceptions of this moment in time and her conviction of the need for a radically changed mode of "being in the world." She holds a PhD from the University of Auckland, New Zealand and has held positions at the University of Auckland and Te Whare Wananga o Awanuiarangi, a tribal university in New Zealand.

István van Deursen Varga graduated in Medicine, with a specialization in Public Health, MSc in Social Anthropology, PhD (post-doctorate) in Public Health. He is an Associate Professor at the Department of Sociology and Anthropology, and at the Post-Graduation Program in Health and Environment, of the Federal University of Maranhão (UFMA). He is also the Coordinator of the Specialization Course in Black Women Health, of the Post-Graduation Program in Health and Environment of UFMA; Coordinator of the Rural, Black Quilombolas and Indigenous populations and communities extension and research Nucleous of UFMA; leader of the Ethnology and Indigenism Nucleous of UFMA; researcher of the Social Medicine and Tropical Pathology Nucleous of UFMA; researcher of the Contemporary Society, Social Sciences and Public Health research group, Faculty of Public Health of the University of São Paulo (USP); member of the Journal of Health Law (USP) Body of Publishers; associated-member of the Nacional Association of Indigenist Action of Maranhão (ANAÍ-MA); Coordinator of the Organization Commission and President of the II. National Health Conference to the Indian Peoples.

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Foreword

This book has a clear and compelling aim: *hope!* This underlying message resonates in the voice of every contributor and throughout the entire volume – from beginning to end. Hope is always about the future. But the path we are on points increasingly towards a future of peril. If the world is to reclaim a path of hope – and a future that is *hope-full* – truly fundamental changes are needed. These are the kinds of insights that inspire this book, as well as the opening word of its title. In short, a radical reorientation *can* restore hope – through a deeply reflective and revitalized human ecological perspective.

Human ecology might be an unfamiliar phrase to some individuals. Others may see it as abstract or confusing. But for a growing number of people, it has become an unambiguous and unifying expression for the intersection of the two major realms in the living world. In the words of Paul Shepard – “the central problem of human ecology may be characterized as the relationship of the mind to nature.”

The first human ecologists, in my opinion, were not scientists or scholars. They were storytellers. It is unlikely we will ever know how the art of telling stories began. Perhaps the primal roots, as some suggest, lie in imitative dance or rudimentary drawing. But one thing is certain. At some point, our forbearers began to develop an aptitude to symbolically encode remembered and imagined events. These mental representations also became shaped into vocalizations, capable of reproduction and meaningful exchange. Oral communication was a world-changing palette for binding human experience, memory and imagination.

The evolutionary threshold around this “second world,” as Loren Eiseley called it, irrevocably transformed social and environmental relations. The mindscape of an interior consciousness liberated our ancestors from the ever-present moment. Time and space could be mentally transcended and endlessly refashioned within the crosscurrents of emotion, desire and buried intention. Those primeval images of the living world – and early human sense of their place in it – are lost forever in the mists of time. Nonetheless, the need to create and recreate life stories still dwells in the depth of our psyche. It may well be the enduring urge and perennial birthmark of the human condition.

In its present-day meaning, human ecology aims at comprehensive approaches to human-environment interactions. The scope of its domain is nearly boundless – from the emergence of humans on earth, across the here and now, and into the furthest reaches of our imaginable future. Its subject matter cannot be subdivided according to academic tradition. Its mandate is unequivocally broad and integrative, and thus demands a multiplicity of perspectives in search of connections among otherwise segregated ways.

Most of my professional life has been at the confluence of these streams of inquiry. The journey began in the late 1970s when I left a large research university to join the faculty of College of the Atlantic, a small private institution committed to the interdisciplinary study of human ecology. For two decades I served as the college’s academic dean. In the early 1980s I joined a small group of scholars and practitioners in the creation of an international Society for Human Ecology. These roles have furnished countless occasions to explore and engage with diverse meanings of human ecology. The frame around human and ecological perspectives, as I have come to know them, stretches across rich terrain. A growing and substantial literature of human ecology can be found in libraries, yet at least as much comes directly from people working on this common project and sharing the pleasures of doing it.

My initial connection with this book dates back to the summer of 1984. I had just received a research grant to travel around Europe in search of other human ecology programs. My trip took me to a dozen European academic institutions, including the University of Edinburgh and the original site of the Centre for Human Ecology at 15 Buccleuch Place. I arrived, as I recall, unannounced. Ulrich Loening, the Centre's director, greeted me enthusiastically as a professional colleague; moreover, I was welcomed as his houseguest for several delightful days. My research, if that is the proper term, has been an ongoing *in situ* exploration of the history of these ideas ever since.

If human ecology does anything, it should strive to maintain the human dimensions of its own narrative. So it was a great pleasure when I was invited to read the chapter drafts and write these few lines of foreword. The authors of this volume have allowed themselves to become an unavoidable part of the story. Mixing personal anecdotes and self-reflections with scholarly content can be risky. But also, as anyone experienced with the give-and-take of small-group seminars knows, it is the most effective mode of teaching.

My initial duties as an academic dean were aimed at building a non-departmentalized, interdisciplinary program of human ecology. Longstanding academic traditions had carved reality into compartmentalized approaches to knowledge. The main challenge, at the time, was to figure out ways to arrange affairs so my colleagues might overcome their specialized backgrounds and work together in creative and collaborative ways. We could not divine, back there, what the forthcoming decades of post-modernism would bring to the equation. Between then and now, most academic disciplines have been reduced to baggy shadows of their former outlines. Along the way a new generation of critically minded scholars have repopulated the academy. Their interests and skills often appear discordant with a human ecological vision. A further set of epistemological and ontological challenges would also arise from a growing acknowledgement of traditional and sacred ways of knowing. These widely diverse strands, taken together, might well have further dissolved human ecology. Thankfully, this is not the case – as a careful reading of the chapters that follow will disclose.

Below the clamor of a bustling world, this volume imparts the seeds of a radical alternative for human ecology. They lie beneath the surface: amid the whispered voices at the margin, in the praxis of traditional spirituality, along the dusty road of post-modernism, and from the ivy halls of science. This is not the human ecology of a prehistoric fireside or an academic symposium. It is an unconventional and timely pedagogy of hope. The promise remains, I believe, as much as when Paul Shepard, a half-century ago, counseled that: “human ecology will be healthiest when it is running out in all directions.”

Richard J. Borden
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Introduction

Human Ecology: A Pedagogy of Hope?

Lewis Williams, with Rose Roberts and Alastair McIntosh

If human consciousness can be rejoined not only with the human body, but with the body of the earth, what seems insipient in the reunion is the recovery of meaning within existence that will infuse every kind of meeting between self and the universe, even in the most daily acts with eros, a palpable love that is also sacred.¹

A central message in this book is that the ultimate challenge facing Human Ecology and humankind is an onto-epistemological one – both as this concerns our experience of reality (including what we think we are), and what we count as “knowledge.” We are, profoundly challenged to remember and recall that which many of us have actively dismembered; to reclaim the unitive, depth dimension of being – the Life World that so interconnects us.

At this critical juncture in history, it seems we human beings are being called to re-engage with the poetic forces that lie within us; those that enable us to hold a vision of what is real and possible in these troubled times. Perhaps, it is only a re-coupling of reason and logic with eros, the human power or life force energy that arises from our deepest and intuitive ways of knowing that might offer us and Human Ecology as a pedagogy of “hope,” a way forward through what may seem an impasse of our human condition.

As Nayyar Javed points out in this volume, much of contemporary human consciousness is like “foam on the surface of deep ocean.” We act as if caught by the reductionism of modernity, many of us unwitting recipients of a kind of superficial mono-culture of mind, whilst paradoxically we cling to our limited identities and positionalities. We stick like glue to our worn-out story line of exponential growth, as the earth bleeds oil, ice caps melt, rivers shrink and life recedes. We continue to evade our deep ocean, the deeper resonance of being.

Yet, the ocean stirs, speaking her mind, calling us back to our deepest primordial knowing. Out of her depths emerges wave upon wave of ecological movements – coming from all directions – criss-crossing, overlapping, colliding, and even cohering. Many of their progenitors would not recognize or name themselves as Human Ecologists as such. They simply act for our larger earth and human community because they feel drawn to do so. Their relentless pursuit of ecological justice undoubtedly draws significantly on the vital qualities of intellect and reason, but somehow pulses from a different place. It is, rather in response to the collective trauma of our peoples, species, soils, and oceans, right down to the very lived, breathed molecules of our atmosphere – a kind of empathic resonance that pulses from the depths of human receptivity.

1 Susan Griffin, *The Eros of Everyday Life*, in Chalquist, C. (2007) *Terrapyschology. Reengaging the Soul of Place*. Published by Spring Journal Inc, New Orleans, Louisiana.

Human Ecology Today

This book is a response to a different calling than that of a standard human ecological research text. To start with, the reader might note that over half of the contributors are women and a similar proportion could be considered as being from indigenous or marginalized groups. This is not accidental. It is our contention that like the rest of the mainstream academy, human ecology is caught in a web of reductionism and scientific materialism. This risks rendering it impotent before the global scale of the ecological crisis.

In many respects human ecology is as old as human existence – for as long as we have been capable of contemplating our relationality with the rest of life. Indeed if conceived as an intentional practice of “mutuality” with other living presences (both animate and in the Western sense inanimate), human ecology has existed as a form of Native Science (Cajete, 2000) – along with all the rigors of any form of systematic inquiry – which has supported the sustainable development of Indigenous Peoples for thousands of years. What society has not had as one of its primary concerns for reflection, law-making and action the relationship between peoples and their places?

It is therefore noteworthy that in an academic context it becomes necessary to specify that modern scholarly debate is framed by Western definitions of the discipline. Historically speaking these are very recent. In the Western sense, Human Ecology has its roots in Ecology, which as a discipline was technically born when Ernst Haeckel used the word “oekologie” in 1866 to describe the study of an organism’s relationship to its environment (Haeckel in Esbjorn-Hargens and Zimmerman, 2009: 159). Initially grounded in the physical and biological sciences, ecology was largely concerned with the study of the ecosystem as distinct from human beings – unsurprisingly, the discipline largely mirrored the predominant Cartesian dualistic conceptualization of reality of the times, as man stood “apart” from nature looking on. The 1940s and ’50s gave rise to the birth of human ecology when mounting concerns about the impact of people on the environment (Sears, 1954) culminated in the inclusion of human beings into the equation. Over time, the entrance of other key disciplinary protagonists – namely, sociology and human geography – was largely responsible for the field’s growing account of the reciprocal impact of the environment on human society.

The influence of the Chicago School of sociologists was pivotal – thinkers like Robert Park, Ernest Burgess and Roderick McKenzie – but it is the 1940 paper by James Quinn drawing on the work of all these that perhaps most succinctly crystallizes not just the debate of the era, but also, the foundation that it provides us as editors in linking this volume to the coherence of an epistemological lineage. The central issue was whether human ecology was a subset of geography, biology or sociology; the epistemological pigeon holes of the time. Crediting the work of the Natal scholar, J.W. Bews, Quinn plots them out. Each is represented on paper by a circle, the three being arranged as a triad. Human ecology is then drawn in the middle as a fourth circle, its edges intersecting each of the other three. As such, one’s first impression is that human ecology is a discipline composed of subsets. But Quinn, in a visionary manner, saw that the whole was greater than its parts. Here is how he described it and the italics are his (Quinn, 1940: 719):

Human ecology, according to this ... conception, does not constitute an inclusive synthesis such as was proposed by Bews. The chief difference lies in the fact that it covers only the *relationship* component of the Bews triad. It does not include studies of environment per se, such as meteorology; and it does not embrace studies of man’s biological body per se, such as anatomy. In contrast, it comprehends only those parts of various sciences which study *relationships* of man and environment ... This ... stands as the single point upon which all students of human ecology agree.

What followed in various guises could mostly be seen as elaborations of, or at least, as being broadly cognate with this theme. A very partial list of names might include Paul Sears, Kenneth Boulding, Margaret Mead, Paul Shepard, the Ehrlichs, Ian McHarg, Aldo Leopold, Garrett Hardin, Gregory Bateson, Arne Naess, Donella Meadows, Carolyn Merchant, Edward Goldsmith, Richard Borden and Stuart Brand. The Anglo-Saxon bias will be evident and many listings would have forgotten the women. That is precisely part of the problem that the current volume seeks to redress. To achieve narratorial control – to have a voice of influence – it is generally necessary to have “made it” in some other field, preferably reductionist.

The result is that we are left today with a discipline that is very much a “work in progress.” Yet it is an exciting time. Human Ecology’s vast and burgeoning approaches encompass numerous sub-disciplines (including eco-theology, ecological anthropology, bio-cultural ecology, global ecology, ecological economics, eco-feminism, eco-technology and political ecology) with recent scholarship (Esbjorn Hargens and Zimmerman, 2009) estimating over 200 emerging schools of ecology, environmental studies and ecological thought! This begins to beg the question of *what it is* or *what is it not*?

The most persistent definitions over time have conceived of human ecology as (1) “the study of relations between men and their environment” (Quinn 1940: 162) and (2) more latterly as an academic discipline that deals with the relationships between humans and their natural, social and created environments (Mumtaz and Williams 2007: 4). We contend, however, that the predominant and implicit conceptualization of such enduring definitions remains grounded in Cartesian ontology which largely reflect human ecology’s failure to correctly perceive humanity as an implicit part of biodiversity, embedded in a vast web of mutual and symbiotic interrelations.² In summary contemporary genres of human ecology (in all their diversity) tend to reflect three historically embedded and related characteristics: an emphasis on scientific rationality and reductionism, a concern with materiality and externalities, and an underpinning onto-epistemological monoculturalism. Overall, they continue to reflect very Western orientated ways of dealing with predominantly Western-originated problems. But is this good enough? Do such approaches access the depth of relationality that is required for an authentic human ecological relationship? That is what many of the papers in this collection seek to wrestle with.

We do not wish to be prescriptive in what human ecology can or cannot be. Rather we offer two related definitions; the first which articulates an obvious indigenous onto-epistemological perspective whilst the second underscores human intentionality for ecological well-being in terms of what could be or should be through “problem-solving, creative action and ethical concern” (Borden, 2008: 95). Firstly, human ecology may be defined as “*the study and practice of community: community with others (Society), community with the earth (Soil) and community with the divine (Soul)*” (McIntosh, 2008: 48). Secondly, in recognition of humanity’s innate capacity to envision and participate in shaping a more ethical future, we invite readers to also consider the study and practice of human ecology as: “*the ability to understand, respond to, and work towards what is in the best interest of and will benefit all human beings and life on this planet*” (Spariosu, 2005: 6).

2 This misperception, as evidenced by the amount of human ecology discourse currently orientated towards scientific prediction and technological human adaptation to issues such as climate change rather than deeper cultural shifts more concerned with subjectivity and behaviour, is in part responsible for our continuing emphasis on human “centred” and materialist forms of development.

Deepening Relationality

This book aims to inspire, provoke, and to challenge what many assume Human Ecology to be and the voices that represent it. Given the discipline's traditional identification within the harder edged disciplines of the social and physical sciences and emphasis on exteriority we are therefore, equally, if not more so concerned in this volume with interiority – that is consciousness, spirit and the metaphysical underpinnings of material reality. As is the implicit message in some of the texts assay, it is this more encompassing pre-modern or indigenous perspective that is potentially capable of holding a larger reality within which Scientific modernity might sit. We are intent on privileging them at this very juncture in history because of their inherently unitive potential and rather radically different orientation regarding humankind's responsibility for taking care of and respecting our relationships with all living things – animate and in the Western sense, inanimate. As Alastair McIntosh seems to suggest in his first chapter, if we do not call back the soul into the endeavour of Human Ecology, it, and we, are as good as dead anyway.

The overarching objective of this book, therefore, is to begin a conversation that seeks to decolonize various taken for granted assumptions about what Human Ecology research should be. This is not so much a subversion of Western empirical methods from which the discipline has grown, as a radical reintegration. We are all people who deeply value “science,” but who wish to see it re-grounded into wider, culturally based epistemologies. In this instance we are concerned with traditions that privilege worldviews based on metaphysical interconnectedness: in plain language, paradigms that are open to there being a spiritual grounding to reality.

There are of course many views of what Human Ecology should be or could be. For some the situation that we are confronting is so grave that our present circumstances have been described as a “planetary hospice” (Williams et al., 2008). *Is it the job of human ecology, then, to help the planet die comfortably? Or, is the work of human ecologists to re-centre interiority and knowing of the metaphysical aspects of reality, alongside the seemingly more tangible, objective, material concerns of every-day life? Or is the work of human ecology more about de-centering human consciousness and activity in ways that open the space to the possibility of a much more encompassing form of ecological alliance and intelligence?* Each path has quite different implications for Human Ecology practice and those engaged in human-ecology related practice – as will be evident in the contributions to this book – represent a range of opinion concerning its aims, epistemologies and approaches.

The reader will note the obvious autobiographical emphasis of this text. This is in keeping with the radical reorientation of human consciousness which this text implicitly argues is so necessary for Human Ecology and humanity generally. The overtly techno-rational approach to ecological dilemmas on a larger scale represents a colonization of human consciousness and perception by Western Scientific empiricism with repercussions of a magnitude almost beyond description. Any corresponding discussion of Human Ecology which views people as co- participants with the rest of the earth community in shaping this planet's future inevitably begins to address the topic of human agency. Here it becomes evident that the deeper recesses of human agency are inevitably located in our onto-epistemological relationship to the world – in other words our experience of reality and the corresponding experience of the relationship between ourselves and our larger Life World. We argue that the decolonization of consciousness so radically needed in light of the dominant positivist, capitalist, techno-rational discourse requires starting at the centre of one's experience—the deeper resonance of being. Indeed as has been so aptly emphasized by Richard Borden, the key problematic of Human Ecology, and our larger world, is no longer “Can nature absorb the

impact of humans?” Rather, increasingly the question has become “Can human consciousness comprehend our relations with the living world?” (Borden, 2011: 48).

Background to this volume

The genesis for this book lies in part in the heart of the Canadian prairies. In 2008 a small group of international scholars and activists (members of this group who are contributors to this volume include Goodman, Javed, McIntosh, Moreno, Morrison, Roberts, White and Williams) met to discuss the potential of Human Ecology; what it might be and what it might become.³ Over some 10 days, we both engaged with the many faces of Saskatchewan’s communities around contemporary ecological issues and retreated amongst ourselves to story-tell, dialogue and ponder how an international Human Ecology network – specifically one that took an indigenous and intercultural approach – might contribute to the growing global and collective effort to address our ecological ills. With the exception of one or two, we by no means represented eminent scholars in “the field.” Rather, we were a collective of scholars and activists from a number of diverse interests, disciplines, cultural identities and psycho-spiritual histories, and geographies, deeply concerned with the well-being of our human and more than human communities. We were united not so much by our belief in conventional approaches to Human Ecology which have largely eschewed Western Scientific and techno-rational “solutions”; rather, our common ground lay in our shared belief that our ecological predicament is essentially a crisis of epistemology and relationship.

As the initiator of this international gathering, Williams was at the time an Associate Professor, with the Department of Native Studies and Director of the Prairie Region Health Promotion Research Centre, at the University of Saskatchewan. In the course of her work she had been struck with how marginal indigenous ways of knowing were both to the academy and those in the business of promoting health throughout the province. The predominant Western, sanitized version of public health had almost disengaged from its own life-giving origins – the science of the earth community. Rather it seemed to lie limply aside, like a cauterized, half deadened limb, cut off from the very blood flow and heart beat of that which sustains us. However, for the indigenous communities of Saskatchewan, and particularly the more remote Saskatchewan and other northern Canadian Aboriginal communities, this dismemberment was far from habituated. They experienced the effects of humankind’s materialist fundamentalism on an everyday basis. The depletion of their earth and waters, through uranium and oil extraction, the shrinking of wildlife through the everyday effects of climate change, loss of traditional food and medicinal sources through the global reordering of economic and knowledge systems, and the alienation of their youth from the land itself, manifested through an epidemiology of elevated suicide rates, self-harming, addictions, unintentional injury, diabetes and cancers. The affliction of land and its people was undeniably shared.

The other impetus for this international Human Ecology Learning Week and Retreat was the “Reducing Mental Health Disparities: Translating Knowledge into Practice – Practice into Knowledge Project”; an applied, interdisciplinary research initiative with Canadian Aboriginal and racialized immigrant and refugee women living in Canada, which investigates ways in which global conditions similarly impact on the agency and mental well-being of these women. Significantly, this project sought to draw on the culturally based and often indigenous knowledge systems of the participating communities in how these structured issues of identity, belonging, and well-

3 See www.kinincommon.com

being. However, traditional Cartesian mind-body conceptualizations of well-being implicit within the mental health promotion literature (including those that provided an ecological or settings-based approach) were proving inadequate to the task. Rather the project sought a deeper and more encompassing range of onto-epistemological perspectives, capable of radicalizing conventional ecological perspectives on mental well-being, which tended to primarily focus on the psycho-social and materialist aspects of ecology – that is, social and built environments. The discipline of Human Ecology held potential.

Around this time the XV International Conference of the Society for Human Ecology (SHE) was held in Rio de Janeiro, Brazil. The conference was impressive; representing a vast international array of “scientific” and interdisciplinary endeavour, with strong local academic, government and non-governmental participation. Among its many themes were indigenous/local knowledge and sustainability, agro-ecology and sustainable rural development, human behaviour and ecology, geographic information systems and remote sensing, environmental and cultural pollution, traditional people, biodiversity and cultural diversity and advances in ethno-ecology and ethno-botany. It was clear, however, and also noted by Katherine McCarter, the then executive director of the Ecological Society of America, in her key note speech that Human Ecology had only recently begun to integrate the humanities and social sciences into the discipline as a whole. Initially grounded in the Western, physical sciences, and focused on natural systems it had just begun to conceptualize the environment – human or nature – culture interface worthy of study in its own right. Despite the very welcome advance of the more aesthetic disciplines into the field of scientific ecological endeavour, however, the Cartesian split of self-other, humans – environment, and nature-culture remained implicit in the discipline’s onto-epistemological underpinnings.⁴

Meanwhile, on the other side of the Atlantic in Scotland was a group of Human Ecology scholars and activists who had constellated around the Centre for Human Ecology. As will be evident from the contributions to this volume by several of its former and current faculty and students (Loening, McIntosh, Wilding, Smyth and MacKinnon), this initiative has been significant to date with respect to its integration into traditional Human Ecology of leading edge paradigms such as eco-feminism, post-colonial studies and spirituality. Perhaps even more significantly in relation to this Human Ecology research reader, the land-based activism of some of its members on lands which have been successively colonized – both by the English and the Scottish gentry, and more recently by transnational business interests – led some of these academics to critically rethink some of the more taken for granted notions of indigeneity and begin to apply these to the Centre’s scholarly pursuits. These developments have undoubtedly underpinned a significant portion of the scholarship within this volume. The indigenous scholarship emanating out of North America which will be obvious within this text has unquestionably complemented and sustained these developments. Finally, a good number of contributors to this volume are activists/scholars who sit on the fringes of the academy and Human Ecology. They do so, because they seek to bring a creative kind of ecological praxis to their work, influencing the academy from the outside in. They may be regarded as part of the Deep Ocean of activism.

4 It should be noted, however, that the recent XVIIIth International Conference of the Society for Human Ecology (April 2011) demonstrated some overall shifts in ecological discourse. Phrases such as the “need to reorder human relationship to the bio-sphere,” the “importance of incorporating a depth ecology” and the imperative of the generic human ecology discourse “freeing itself of Cartesianism” were evident in keynotes and group dialogue throughout the conference.

Key Themes in this Book

This Human Ecology Research Reader aims to (1) bring about a radical reintegration of indigenous ways of knowing, which inevitably include the sacred, (2) to locate greater onto-epistemological agency within the Human Ecology researcher and scholar, (3) to provide a number of practical interdisciplinary and intercultural applications of Human Ecology praxis throughout the world, and (4) to provoke conversation on how we might stimulate the academy to engage with Human Ecology not merely as a theoretical entity, but as a living, breathing, post-colonial activist movement.

Our agenda is to join forces with those who seek to radicalize Human Ecology – that is to go to its roots, to dig deep, and to stir the very soil of the assumptions on which it rests. Only through a re-examination of some of its fundamentals which have provided the discipline with its very form and structure can we be hopeful for Human Ecology's future as a living and vital approach capable of attuning and responding in ways which breath life back into our relationships. In this respect the demands upon the reader in this volume may be considerable. As scholar, student or practitioner in Human Ecology a vigorous journey can be expected, of which some key themes are as follows.

We are concerned here with the “indigenous,” a term which remains highly contested, and is throughout this volume differentially treated by various contributors. This volume attempts to get underneath its commonly understood meaning as a political and cultural identity category,⁵ although we contend that this understanding, including the honouring of treaty obligations and agreements, remains vitally important to the safe keeping of our planet. Our digging below the surface, is more concerned with this as a perspective and practice of deep interconnectedness that includes and is capable of being held by all peoples and for many of the contributors, other than human persons.

Alastair McIntosh names this as a pre-modern view that is capable of holding, epistemologically and ontologically, both its successors – modernity and post-modernity. For McIntosh, the challenge of this radical form of Human Ecology to the academy is that it invites us to integrate our perception of Earth, as the physical exteriority of reality, with Spirit as its metaphysical interiority. This queries the ontology and epistemology of the mainstream Academy. Williams in her partially autobiographical exploration of what it means to reclaim our Deep Life World picks up on this point. For her, the re-incorporation of our innate capacity as human beings to remember our indigenous ways of being and seeing, means that we must re-adopt the radical forms of empiricism that are the providence of the metaphysical and shamanic. The construction of knowledge therefore also starts to become a key theme within this volume, both as this specifically concerns the indigenous as with Lakota ways of experiencing our ecology (Mehlmadrone and Mainguy) and the intercultural more generally as with Goodman's peace-building research.

In what is perhaps seminal work within this volume, the German-born and Irish-based ethnologist Ullrich Kockel calls for a renewed and critical understanding of indigeneity, particularly in Europe. Kockel shows us that deep in the pedagogical roots of German speaking Europe are embedded the twinned concepts of *Heimatkunde* (the deep knowing of a place, including its material and spiritual elements) and *Heimat* (a historical ecology of belonging – literally the place we are from or towards). A place of birth, suggests Kockel, only becomes a *Heimat* once we have “lived ourselves into it” and human beings can create *Heimat* far away from the place where they are born. The possibility of *Heimat* offers hope for the dislocated and dispossessed in our contemporary diasphoric postmodern condition with which Human Ecology is inextricably bound.

5 Those who have been colonized within their own territories and are at this juncture in history the main keepers of traditional ecological knowledges.

More sequentially, and by way of a summary of what follows, we have structured our material according to the “3 Hs” of the pioneering Victorian Scots human ecologist, Patrick Geddes, who echoed Johann Pestalozzi in calling for an integration of “head,” “heart” and “hand.”

Organization of this Text

Part I (“Head”): “Theories of Human Ecology” opens with Loening’s call for humanity to engage in a deep questioning of the ethics of the how, where and why we live as we do. For Loening, the “attitude of Human Ecology” is vital – it must be one which is willing to risk calling conventional wisdom into question in order to stir deeper forms of human creativity capable of addressing the ethics of how we relate to our global commons. Alastair McIntosh continues Loening’s challenge to the academy, perhaps more bluntly, with his aforementioned chapter “The Challenge of Human Ecology,” whilst Kockel’s “Being from – Coming to” takes up some of the epistemological issues raised by McIntosh in his interrogation of what it means to really live one’s self into the soil. This section concludes with a compelling account by Makere Stewart Harawira of the gift of “indigenous ontologies in perilous times.” The next “Great Work” of humankind she shows us – as we stand collectively poised to either plunge into the abyss of our own destruction or take a great leap forward in human consciousness – is the integration of indigenous ontologies as the animating force in the necessarily deeply transformative journey that we must make if we are to avoid our own demise.

Part II (“Heart”): “Radical Epistemologies of Relationship” takes up Harawira-Stewart’s invitation as it invites the reader deep into the scholarship of integrating indigenous ontologies into ecological praxis from a range of cultural perspectives. It tends to do so, from the inside-out, including auto-biographical elements which to varying extents interrogate the very onto-epistemological foundations on which conventional approaches to Human Ecology rest. The range of cultural-spiritual perspectives is deliberate, for a key premise of this volume is that elements of indigeneity exist within all cultures and postcolonialism’s gift to Human Ecology as a movement is the reintegration of these into the foundations of Human Ecology as legitimate bodies of knowledge. As effective ecological endeavour is necessarily a collective global effort, *all* cultural groupings must see the basis for their human agency reflected back.

Williams anchors this section with an in-depth account of what it is to radicalize one’s relationship to the world. In her outline of an alchemical Life-World perspective, she tackles the subject of human agency, out-lining an “Ecology of Human Agency” which draws on indigenous, modernist and critical post-modernist theoretical perspectives. For her, Human Ecology is at its foundations a shamanic practice. In the two chapters that follow Smyth and McKinnon continue to develop the theme of authentic relationship as they seek to interrogate, decolonize and develop firmer onto-epistemological groundings from which to tackle ecological issues. Both touch on the marginalization of indigenous perspectives from within mainstream Western cultures that are no longer formally considered indigenous. Along with Williams, they demonstrate the applicability of in various ways weaving together the inner and outer arches of attention through “Living Life as Inquiry.” In her chapter “Exploring identity, belonging and place-making as a transition activist” Smyth boldly asserts that she will no longer give permission for materialists to marginalize our deepest source of wisdom – our spiritual knowing. Her narrative exposes her own negotiation as an Irish-born women living in England and Scotland of complex issues of identity, place and belonging and the subsequent application of this wisdom to the Transition

movement, a prominent sustainability initiative throughout the UK and other countries. Smyth warns of the emerging greening elite within environmentalism if we fail to pay attention to issues of social class, deracination and our rich but neglected indigenous psycho-spiritual histories. Iain McKinnon's equally rich auto-biographical work makes links between fundamental problems in formal education systems and our ecological crisis through comparing two very different learning experiences. He provides an evocative account – undoubtedly very relevant to the experiences of other young indigenous scholars – of his own negotiation of the powers that be within formal education, both as these colonize and deracinate, and as they can potentially liberate. For McKinnon the type of Human Ecology learning to which he has been exposed has ultimately been a pedagogy of powerful connection and reconnection with our shared relational essence.

In her account of the mystical tradition of Sufism as “the other,” both in relation to Islam and the West, Javed reveals to us not only elements of indigenous ontology, but extends an invitation to authentic relationship with the nature of being. Whilst she is clear that we must get beyond our discursive identities to uncover a meaningful and unitive human collective, more capable of tackling our ecological issues, she is equally discerning of the ways in which “power” continues to structure contemporary ethnic, gender and class relations.

Keith Morrison enters into the potential of Eastern Orthodoxy as a mystical and indigenous form of spirituality to facilitate transition to sustainable lifeways. For Morrison, Orthodoxy is the lost heritage of the West. It can provide a bridge back to the early Christian world; one from which the West can recover parts of its own indigenous knowledge, therefore potentially achieving solidarity with other indigenous peoples and cultures. To those reared on versions of Christianity that denigrated indigenous knowledge this may come as a surprise, but most people raised in the West are not aware of the marked differences between Eastern and Western Christianity going back to the thousand-year-old split between the two. They are certainly not aware of the profound ecotheology immanent in much Orthodox thought and liturgy.

Through its articulation of the Lakota Philosophical system, Mehl-Madrona and Mainguy's paper “Aboriginal Connectivity and Human Ecology” picks up where Williams' left off with the shamanic nature of our Life World. The construction of knowledge is none other than the intersection of the energetic ecology of relationships – between people, places, spirits, rocks, trees and ancestors – all of which speak. Knowledge or the perceptions of constructions of the world is created through a participatory, iterative process. As Mehlmadrona and Mainguy articulate, major funding agencies in Canada are now considering these ideas of knowledge in formal policy documents. This section concludes with a discussion by Rose Roberts of her traditional Northern Cree culture in Northern Saskatchewan. In relating some of the traditions and stories of her people, Roberts issues us with a gentle reminder that our very survival is dependent on Mother Earth's bounty and beneficence.

Part III (“Hand”): “Human Ecology Practice” takes us firstly into the academy where McIntosh discusses the realities and intricacies of teaching radical Human Ecology. Such teaching and student supervision which moves us into the nature of human reality and being human is not to marginalize reason or science. Rather it is to ground these approaches in the essence and reality which has always been there – the pre-modern essential bedrock. It invites augmenting grounded theory with what he calls “discernment methodology” to serve as a yardstick of poetic constellation in seeking what constitutes “meaningful” data in human ecological research.

Goodman's chapter “Human Ecology as Peace-building” picks up on the theme of how we know. She situates peace as “wholeness” within a process of dynamic tension. Like Human Ecology, peace-building for Goodman is concerned with relationships and is implicitly linked to

the construction of knowledge – that is with processes which support paradigms of wholeness and relationship including our ability to listen deeply to what the earth is telling us.

Weiss' chapter "Migration, Aboriginality and Acculturation" connects to Goodman's peace-building theme as this is reflected in the acculturation of racialized immigrant peoples within contemporary Australian society. He is particularly concerned with this process as influenced by dominant society's positioning of Australia's aboriginal peoples. He contends that through creating an ecology of culture – that brings diverse cultures together in ways that are grounded in the local ecosystem and therefore builds on the knowledge of its indigenous inhabitants – one is in fact creating a culture of peace. For Weiss, work of this nature is deeply necessary to heal the toxic relationship that had inevitably occurred between many of Australia's western newcomers and the continent's indigenous inhabitants. Judy White also takes an ecological lens to migration and acculturation this time as it pertains to the immigration experience for racialized immigrant and refugee women living in Canada. She reminds us of the potentially important contributions that these women have to make to our societies and public policies from a human ecological perspective. For our common good, acculturation and exchange of different ways of knowing should never be one way.

Next we turn to Asia, where Zhang and Lovrod articulate the interrelations between global capital and development in China and the reconfiguration of gendered hierarchies through rural – urban migration for work. Drawing on discourses of eco-feminism they show how sustainability policy might look different if women, who form the base of the production pyramid were to have access to public voice in ways that welcome their values and experiences. Similarly, Van Dursen Varga and Moreno provide us with a compelling account of the impacts of capitalist expansion on the indigenous and rural peoples of the state of Maranhao in the Amazon region of Brazil. Here also, the development hierarchy becomes obvious when we consider that protection of indigenous areas requires the alleviation of pressure on rural peoples who are in turn under pressure from land owners and transnational development groups.

Eimear O'Neill tackles the thorny multilayered issue of trauma head on; an issue which is latent or underlying in other contributions to this section. Irish-born O'Neill demonstrates the potential of her artful heuristic research methodology to unlock and transform trauma at multiple levels towards increased human creativity and potential for ecological well-being. Such forms of cultural psychotherapy are significant, not least because they offer hope in a world where trauma constricts and contains our ability for human agency at this urgent time.

Through his articulation of first, second and third person action research and its relationship to Human Ecology praxis, Nick Wilding takes us on a vigorous journey of using this methodology to develop a community of practice for rural resilience pioneers in the United Kingdom. This is significant work in that it is ultimately about how we sustain the more emergent, organic and self-organizing ecological initiatives that come not from the academy but from the ocean of human being. He asks towards the conclusion of his essay, how this work might be scaled up to a broader system of influence. Sustaining work of this nature is about how one sustains and grows a community of practice; an issue also touched on by Williams' evolving Participatory Action Research which focuses on indigenous and intercultural approaches to ecological well-being. This work addresses the question of how we collectively apply ourselves to knowledge sharing in a time of post-colonial trauma. It picks up on Makere Stewart-Harawira's call for partnership, connectivity and knowledge sharing at the deepest levels as we go about the "Great Work" of recovering indigenous ontologies into knowledge for ecological action. As starts to become apparent in Williams' chapter such work of ecological alliance is inevitably complex as it requires holding highly divergent realities and psychosocial her-stories whilst negotiating the ways in which issues of identity, power and culture structure people's agency and ecological well-being in the here and now. It is as if the

ecological imperatives of our times now require us to collectively find our way into a global form of indigenusness in a world etched with peril and potential, grief and hope.

We, the editorial team, conclude this volume with a brief discussion on where to from here for Human Ecology. We have tried to offer an invitation for deepening engagement as we invite the reader, to consider the various genres of inquiry that might illuminate the path. The journey, as we see it, is towards radical re-emergence into the fullness of community. As Makere Stewart-Harawira in her chapter points out: to “... represent our highest self and allow us to reach for the stars.”

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PART I

Head: Theories of Human Ecology

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Chapter 1

The Attitude of Human Ecology

Ulrich Loening

Human Ecology explores not only the influence of humans on their environment but also the influence of the environment on human behaviour, and their adaptive strategies as they come to understand those influences better. For us, Human Ecology is a methodology as much as an area of research. It is a way of thinking about the world, and a context in which we define our questions and ways to answer those questions. (*“What is Human Ecology?”*, Environmental Change Institute, Oxford University)

A Human Ecology perspective reminds us that we really are part of a complex living world. It seeks new relations – not instead of disciplinary ones, but in addition to them. Its interdisciplinary mandate invites crossing boundaries.

This requires a different kind of imagination, in pursuit of fresh combinations of ideas. Its aim, as Alfred North Whitehead (1951) once put it, is “wider points of view.”

Whenever someone leaves the comfort of a familiar world view, it is a first step towards Human Ecology. There may not be many who do so – but always enough, we trust, to carry its future. (Richard J. Borden, A Brief History of SHE, *Human Ecology Review*, 15(1), 2008)

Introduction

I remain deeply concerned that Human Ecology did not arise in the course of the last 200 years, alongside the general development of the sciences from the Renaissance onwards. There was a progression in scientific outlook. Copernicus put the planet in its place in the solar system and Kepler and Galileo the solar system into a large universe; and after Darwin and Wallace put humankind into place within all of life, one would have expected and hoped that the science of humans in their ecological position in life would also become a major study. But it didn't.

As a result, people still ask: what is *Human Ecology*? Most people readily appreciate what gorilla or elephant ecology is about; but not when applied to humans.

If we think of the study of Human Ecology as essentially the same as for any other animal, we raise doubts: study humans as though they were animals? If Human Ecology is about How, Where and Whether humans live on the Earth (Wally N'Dow 1995), it answers the question but omits the ways in which humans are imaginative, creative, conscious, spiritual and questioning. To include these special attributes of humans, I suggest we might add to N'Dow's questions an additional one, *Why*, because the human seeks answers to what life is about.

Beyond the basic needs of higher animals, for subsistence, protection, affection, participation and freedom, humans need time for idleness and creativity, understanding, and identity (Max-Neef 1989). To these, Max-Neef suggested adding transcendence. The big questions in life have to be understood somehow, and answers have had to be either discovered or invented.

Throughout history and prehistory, for at least 100,000 years, countless numbers of religions have provided answers to creation, birth and death and the future. Now the heritage of these instincts and myths, together with the attitude of modern science, shape *How* we live.

The Scope and Approach

Regardless whether the world is in trouble or not, it is important to understand these influences more deeply. This requires that we question every aspect of *How* and *Where* we live. In doing so we need to pose another more immediate and practical question: another *Why* in addition to the above one about the meaning of life: Why do we do things the way we do? That is a core question for Human Ecology.

The basic assumptions, dogmas, conventions and habits of any culture are opened for re-assessment and rethinking. Analyses of the ways humans live must be as comprehensive and as ruthlessly honest and rigorous and as any other philosophical study. This requires new thinking and new methods suited to the task: C.H. Waddington's *Tools for Thought* (1978) is one such work that makes us rethink our philosophical approaches and provides some means for doing this.

Waddington dubbed conventional dogma as COWDUNG, CONventional Wisdom of the DomiNant GroUp'. Dogmatic, religious and political pressures threaten Human Ecology just as conventional dogmas threatened Galileo. Indeed Garret Hardin (1985) called Human Ecology "the conservative, subversive science." For both purposes of conservation and of change, Human Ecology stretches to become a prescriptive applied science as well as the descriptive one of human nature and its impacts. Ways to conserve life can only succeed by questioning some of the ways by which we live, and criticising those that have turned out to be unsustainable.

In this exercise of re-evaluation, the arts and humanities have as great a part to play as the sciences since they reflect human behaviour patterns that determine our environmental impacts. The humanities together with the sciences have to be encompassed within Human Ecology (Stewart 1981). This global vision could perhaps have been achieved during the Age of Enlightenment in the eighteenth century, when the much broader *natural philosophy* led to new understanding that expanded human appreciation of the miracles of nature.

Perhaps the *natural philosophy* of the eighteenth century could be joined with the scientific/technical knowledge we have gained, to bring this combined wisdom to guide *How* we live. E.O. Wilson (1998) described such a synthesis of the disciplines and filling of the gulfs between them as *Conciliation*. Human Ecology then becomes an attitude for synthesis.

The Background

We can trace the historical emergence of Human Ecological attitudes alongside assessments of human relations to nature and environmental impacts.

Plato was well aware of the ecological impacts of deforestation. He wrote in the *Critias*:

Contemporary Attica may be described as a mere relic of the original country. There has been a constant movement of soil away from the high ground and what remains is like the skeleton of a body emaciated by disease. All the rich soil has melted away, leaving a country of skin and bone. Originally the mountains of Attica were heavily forested. Fine trees produced timber suitable for roofing the largest buildings; the roofs hewn from this timber are still in existence. The country

produced boundless feed for cattle, there are some mountains which had trees not so very long ago, that now have nothing but bee pastures. The annual rainfall was not lost as it is now through being allowed to run over the denuded surface to the sea, it was absorbed by the ground and stored ... the drainage from the high ground was collected in this way and discharged into the hollows as springs and rivers with abundant flow and a wide territorial distribution. Shrines remain at the sources of dried up water sources as witness to this. (Quoted in Thirgood 1981)

It might be amusing to note that goats must have been left to roam those mountains; in which case the *country of skin and bone* and *nothing but bee pastures*, would have produced just *milk and honey*. That biblical phrase might actually describe late stages of ecological degradation in the Promised Land, in which case Moses leading his people to the *land of milk and honey* would have been an early example of political spin!

We can compare Plato's text with any modern environmental science text:

It is important to recognise, too, how tightly linked are the resources of soil, water and forest. Deforestation produces erosion and water pollution and makes run-off erratic, reducing the availability of water and causing more erosion. This process can become irreversible by altering the environment so drastically that reforestation is impossible. (Ehrlich et al.1977)

The eighteenth-century Enlightenment was a period of social, but not yet environmental concern. Charles Darwin's grandfather, Erasmus, gathered round him a group of people (The Lunar Society, Uglow 2002) to discuss all matters of natural philosophy. They saw that power (Watt's steam engines) commerce (Bolton's factories in Birmingham) and the arts (Josiah Wedgwood's pottery) could lift people out of poverty and they stimulated the start of the industrial revolution, but they could not foresee the urban poverty that emerged later.

The growth of applied science and industry soon had its critics in the Romantic Movement and then in political/economic critiques. John Stuart Mill (1848) clearly appreciated the connections in a manner that remains relevant now:

If the earth must lose that great portion of its pleasantness which it owes to things that the unlimited increase of wealth and population would extirpate from it, for the mere purpose of enabling it to support a larger, but not a better or a happier population, I sincerely hope, for the sake of posterity, that they will be content to be stationary, long before necessity compels them to it. (Mill 1848)

The quote clearly links population with economics and resources; it distinguishes quantity (large) from quality (happier) and fundamental human needs from assumptions about the need for growth. Then:

I cannot ... regard the stationary state of capital and wealth with the unaffected aversion so generally manifested toward it by political economists of the old school. I am inclined to believe that it would be, on the whole, a very considerable improvement on our present condition ... It is scarcely necessary to remark that a stationary condition of capital and population implies no stationary state of human improvement. (Mill 1848)

From the nineteenth century onwards a succession of now well-known thinkers expanded environmental awareness: those that moved our thinking in relation to nature and wilderness like John Muir, Henry David Thoreau, Aldo Leopold, H.J. Massingham; those that highlighted the

increasing impacts of industrial growth like Rachel Carson, Alvin Toffler, Kenneth Boulding, Paul and Anne Ehrlich, Barry Commoner; those that critiqued *Where* humans live by putting ecology into city planning, like Patrick Geddes, Ebenezer Howard, Lewis Mumford, Ian McHarg.

Alongside these were ecologists of natural systems, who gradually brought humans into ecological study, like Eugene Odum (1997). A classic was *Human Ecology* (Stapledon 1964) written in 1946–1948. These are just a few of the people who opened up new ways of looking at our world and warned that we were facing trouble by degrading our environment.

The Scottish Ecologist Frank Fraser Darling recognised the deep roots of environmental degradation writing in 1951 in his American journal (in Boyd 1986):

The phenomenon of accelerating devastation and increasing population has, in effect, been inevitable from the moment man began to break ecological climax and upset equilibria without allowing them to rebuild ... Most of us are not prepared to defer to this final logic, that the very achievement of humanness dooms us, and that civilisation is an ultimate contradiction.

The year 1972 then became an important one for ecological initiatives. Meadows et al. (1972) published the *Limits to Growth*, as a report to the Club of Rome, which had identified the interrelated global problems of development, environment and resources as *The Problematicum. Limits to Growth* – followed by *Beyond the Limits* (Meadows et al. 1992) and the 30-year update, (Meadows et al. 2004) – modelled the resources and human activities that demonstrated *the frontiers of the possible*, it spelled out not doom but challenge. This was much misunderstood.

Although the idea of limits to growth seems recent, all four of the great economists (Adam Smith, Malthus, Ricardo, and Mill) of the eighteenth and nineteenth centuries were aware of economic limits (Zweig 1979).

Edward Goldsmith, as editor and founder of *The Ecologist*, published the *Blueprint for Survival* (Goldsmith 1972) just before the Stockholm International Conference on Environment and Development, which linked conservation of environment with human development, after Maurice Strong had persuaded Third World nations that environmental conservation was essential for development. Strong also asked Barbara Ward (1972) to write *Only One Earth* as a lead into the conference. The United Nations Environment Program was founded as a result. In that year also, Waddington founded Edinburgh University's School of the Man-made Future, whose function was to teach the Problematicum, and the Centre for Human Ecology.

Yet as a subject, Human Ecology has still not become a generally accepted attitude or study. There are still very few university courses in Human Ecology; the Centre for Human Ecology was closed in 1996 and restarted two or three times; others have been closed, such as the Masters course in at the Free University of Brussels. Some Human Ecology courses are (surreptitiously!) tucked into other areas within a university. The College of the Atlantic had been founded in 1969 to give Human Ecology degree courses, there being no other universities that did that.

International efforts after 1972 were stimulated by the oil crisis of 1973 which at least created awareness of limitations of energy. Then the 1980s became a period of intense ecological reappraisal. The Brundtland Report, (World Commission on Environment and Development 1987) (only about 65 of the 900 acknowledgements gave their affiliations as universities) re-emphasised F. Fraser Darling's prognosis by opening with "Humanity's inability to fit its doings into this [nature's] pattern is changing planetary systems, fundamentally." And then: "The next few decades are crucial. The time has come to break out of past patterns. Attempts to maintain social and ecological stability through old approaches to development and environmental protection will increase instability. Security must be sought through change."

Now, more than 20 years later, these challenges remain. Jared Diamond (2005) documented how humans have degraded their environments throughout history and prehistory and civilisations have moved or died out as a result. People have always exterminated whatever was eatable wherever they migrated, over thousands of years. This has not happened in Africa where humans first evolved, at least not to the same degree, until now with massive poaching activities. This raises old questions about *Where* as well as *How*. One needs to find ways to limit human aggressiveness towards nature.

The overall picture that emerges shows how the present is a unique period in the whole history of the planet (not just of human history). Never before have there been so many of any one large animal species to inhabit the Earth, never before has any one species had such a large impact. By any of the usual criteria that we apply to other animals and species, the human species can be said to have reached plague proportions. But also, never before has there been a species that could consciously control its own further development and evolution and been consciously aware of that position. Human responsibilities for the future are thus awesome.

Even if this were not so, even if human life on Earth was integrated in equilibrium with the biosphere, Human Ecology would still be a vital subject, to understand how it all worked.

Human Ecological behaviour is determined by the combination of our natural and cultural heritage, by science and its applied technologies and by the social structures like religions and economics.

I think I have found the missing link between animals and civilized man. It is us. (Konrad Lorenz, date unknown)

Heritage

The potential to multiply far beyond the capacity of their environments is universal among all species. This must include humans; the command to *go forth and multiply* probably has a deep-rooted biological basis, although White (1967) attributed our ecological ills to the Judeo-Christian heritage. Whether due to natural or cultural heritage, any discussion about population limits or controls evokes strong emotions – we find it hard to look at the situation dispassionately; our instincts tell us that it is unethical to question the values of having larger families. Other features of our behaviours may also have their roots in our natural heritage.

Many other animals that live in social groups like humans compete and often fight with other groups. War thus seems to be deeply naturally ingrained; and further entrenched by cultural development extending over more than 100,000 years, during which it paid to covet your neighbour's wealth. Any early philosopher sitting on a rock thinking out the future would have had his cattle stolen by a neighbouring gang (George Mc Robie, at a talk). What we now like to think of as civilised behaviour did not pay then. *Civilisation* and cooperative ethics evolved slowly.

Communities must have invented thousands of religions over the millennia, of which we have almost no knowledge but we must assume that they were needed, and evolved together with art and music (Dissanayake 1992) to hold the community group together. For most of the time, these old religions must have been valuable ways of controlling individuals' behaviour within the group, and of maintaining ways of life sustainably. There are many examples about how tribes and communities organised the fair and sustainable distribution of their resources. Many old surviving myths and beliefs are based on sound experience and many modern ecologists admire vernacular communities (Goldsmith 1996).

However, the competition and aggression between tribes or communities is age-old. Hardin (1968) in his famous essay "The Tragedy of the Commons" assumed that any individual within a community acts selfishly in grazing the extra cow on the commons, at the cost to the rest of the community. This essay gave a powerful international rationale for privatisation (enclosure) of the commons. This incorrect view about local communities does, however, apply on the larger scale between tribes and within the international community.

The irony is that the perceived damaging free-for-all that international agencies tried to cure has by that very process of privatisation become far more damaging on the global scale where there is as yet little or no control. The Tragedy of the Commons applies internationally but not to local herdsman. For example, the international law of the seas, taking many years of consultation, even now does not prevent gross over-fishing with little effective control. Similarly all other global commons are under threat, the most politically apparent just now being the atmosphere, which is different in kind from all other resources disputes, because it is truly a Global Commons.

The heritage of bad has been handed on more effectively than the heritage of good. The ancient patterns of communal management from vernacular societies are being lost, while the old aggressiveness between communities has become the inappropriate heritage for the modern globalised world. The task for Human Ecology is to understand this more deeply and to suggest ways in which human behaviour can *grow up* to match what is needed now and which aspects of this heritage are appropriate for modern technological humans.

Some old traditions have indeed become extremely dangerous; as Koestler (1967) pointed out, individuals are unable commit acts of extreme violence and evil unless backed by strong communal myths. Few wars were more gruesome or more passionately pursued than religious ones, especially by those with high ideals of brotherhood and love. Many of those disputes are triggered by shortages of resources. It is a sad indictment of society that war is still an honoured, if regretted, method of making decisions. Territoriality remains a primal force, and we can expect more wars in the future over space and resources, (Malmberg 1980). This becomes part of the question about *Where* humans live.

Poverty is similarly deeply imbedded in natural heritage. Most animals have a *pecking order* of some sort, which leaves those at the bottom, poor. To *make poverty history* will require fundamental changes in society, that revise millions of years of evolution and hundreds of millennia of human cultural development. Now that the world population has grown so large and is still growing, the physical limits to alleviating extreme poverty have made the task more and more difficult, perhaps impossible. If the majority poorest consume less than 1/100th of the minority rich; the global commons can no longer provide adequately on a per capita basis. This may yet be the problem with the current international negotiations on climate change, such as the Contraction and Convergence proposal (Meyer 2000), which has been widely accepted in principle but not followed in practice.

This mixed heritage of natural and cultural instincts determines *How* and *Where* we live. The ways in which we make decisions, and the influence of the heritage, is the subject of psychology.

Psychology spans the gulf between the humanities and the sciences, and becomes a vital area for probing our Human Ecological attitudes. I am not competent to write about this vast field, but it clearly has a main part to play in the attitude of Human Ecology. The evolution of consciousness is central. Understanding this is now advancing with new insights into the workings of the brain, and the processes of decision-making. Psychology raises questions about who am I, the conscious individual or my unconscious self?

Science and Technology

I have travelled all over the globe, and studied many different cultures; finally I discovered a culture that still believes in magic: it is us, we believe in technical solutions to our problems. (Harry Dickinson, Dept of Electrical Engineering, University of Edinburgh (died 1984) personal communication)

I must emphasise that the English use of the word *science* is much narrower than that in many other cultures and languages. The Russian Academy of Sciences for example includes the social sciences and economics. The German *Wissenschaft* really means the management of knowledge. These continental uses of the word *Science* are therefore more akin to the Enlightenment *Natural Philosophy*.

Francis Bacon in the early seventeenth century defined the means for scientific investigation and held that *Knowledge is Power*. It remains a question why it was the white man in Europe and not others in some other parts of the world like the Far East, who developed science in this way with its applied technologies. It led directly to white domination of the world (Mendelssohn 1976) as well as to human domination over nature. That may or may not have been its primary purpose, but the Baconian power of science for the betterment of mankind certainly was.

Those other older civilisations seemed to reject European science. Still now, the Western scientific attitude has probably not sunk deeply into many other cultures. We should not necessarily blame scientific advance for the colonial conquests; but science and technology did make them possible. Other than Henry the Navigator's Sagres group in Portugal in fourteenth to fifteenth centuries, science was not invented for that purpose.

The other major impact of science was of course how it changed perceptions of the Earth as the centre of the universe, as indicated in the Introduction. From science first cataloguing the diversity of nature, the knowledge and understanding shifted to seeing the interactions between species; this led to the science of ecology and now extends to the Gaia theory that life itself created the present conditions on earth. Now the lesson from ecology is that humankind does not stand above but is imbedded within life on Earth, in the Biosphere (as indeed many vernacular cultures have always believed).

Since, whether by design or not, science has served to overcome nature's constraints, we are left with a serious dilemma, expressed by A.V. Hill (1951), "If ethical principles deny our right to do evil in order that good may come, are we justified in doing good when the foreseeable consequence is evil?" Hill was referring especially to growing population pressures. There is now widespread disquiet about the rapid advance of science, exacerbated by various events, from the atom bomb to highly intensified farming and pesticides and so on (indeed that is how the popular environmental movement was born, with Rachel Carson's *Silent Spring*), and more recently Mad Cow Disease, the mishandling in the UK of the Foot and Mouth outbreak, GM crops, and various worries like the triple MMR vaccine (probably a media fabrication), and embryo research (especially in the US).

A.V. Hill's dilemma clearly has widespread ramifications. Science has fulfilled its promise of understanding (some of) nature and of applying that to controlling nature. Now that we are beginning to understand how we are connected within all life on earth, that we are a part of (and not apart from) the biosphere and its services, it would seem time to apply that new understanding too. This would shift one motivation of science away from that of power as Francis Bacon saw it, to that of how to fit our activities into the eco-structures of the planet (WCED 1987).

This demands another scientific revolution; a revolution of attitude, of new priorities to pursue. This is not to question the scientific method, as refined and developed over these 500 years, with its investigative approach from creation of an idea to measurement, testing, experiment, hypothesis and confirmation or refutation. These are common sense ways of thought. I am not suggesting

some wacky alternative science. I am suggesting that scientific motivation has to take into account not only what is immediately relevant, but also all that is conceivably relevant. I am suggesting that the scientific endeavour joins together its many specialities as described by Wilson (1998) in *Consilience*. And then, that it takes into its motivation social and ecological imperatives, as indeed already presaged by Waddington (1948).

In doing this, of course science must remain *objective* (in the popular sense, not actually philosophically possible) and free from interference of its process by either dogma or vested (corporate) interests (otherwise we would return to a pre-Galileo state). The choice of what aspects to pursue and what direction of application to take, is a social and ecological matter which cannot be decided by science alone, however objective. The development of agriculture illustrates this very distinctly, in which high intensity modern farming, GM crops and organic farming are all players with equally sound and thorough scientific rationales behind them, and the choice of which ones to apply cannot be made on scientific grounds alone (Loening 2009). Human Ecology includes that new scientific motivation.

Economics

As mentioned above, this comes under the heading of science in some other countries, at least within the social sciences. Yet any conventional scientist who examines economics as though it were a science would be aghast, such that a student doctoral thesis on it must surely be failed. Of course economics is highly rigorous and consistent within its own discipline, but it fails when one looks in from the outside. COWDUNG applies even more to economics than to science. Economics deals with a human construction, not with nature. Human constructions can be questioned and changed, nature cannot.

The assumptions that underlie positive economics can be seen to be myths when pitched against the realities of nature. The myths were summarised among others by John Peet (1992). Earlier, Frederick Soddy and George Georgescu-Roegen had shown how economics must ultimately be based on physical reality, the laws of thermodynamics – summarised by Daly (1996). How can it possibly be reasonable for any economic means of distributing value, not to account of the ultimate material sources of value, which are ecosystem services?

The Solar energy that flows through nature and society degrades. But money does not degrade in flowing. Ordinary economics and the laws of thermodynamics are thus fundamentally irreconcilable (Daly 1996). Money is no measure of a true economy. Most ecological costs of human activities are treated by economics only, if at all, as externalities. Economists see environment as within the economy, when actually economy is enclosed within environment. For example the external costs of agriculture, including the costs of pollution, are greater than the normally accounted costs of crop production (Pretty et al. 2000). If one tries to estimate a value of the world's ecological services, it comes to at least three times the world's aggregated GNP (Costanza et al. 1997). Further, discounting the future means that many valuable activities like planting trees are not economically worthwhile. One pound invested in planting a tree at 5 per cent per year compound interest, would need to yield timber worth £17,293 after 200 years! Therefore short rotation forestry plantations are the only economic possibility. This encourages logging old growth forests, which means that foresters remain still nomads! Actually, the ecological and social values of trees are among the most valuable things we have; that is the Human Ecological conclusion.

Ecology Applied to Humans

There are many lessons from all branches of ecology that can be applied to *How* and *Where* humans live and perhaps to assure that they continue to do so. Here are some pointers.

Holling and colleagues (Gunderson and Holling 2002) studied many natural ecosystems over several decades. They showed that sustainability may not mean stability or constancy and that seemingly stable resources could collapse unexpectedly. Holling coined the term *resilience* for the property of being able to resist or recover from challenges and *brittleness* for the often invisible fragility of a system brought closer to collapse by abuse.

All ecosystems studied that were managed for their resources, however carefully, became more brittle over time and sometimes finally collapsed. Fisheries are typical where the collapse can be sudden and unexpected. One wonders whether, despite all the technical advances in medicine and agriculture, the insidious spread of some new diseases is a symptom of increasingly brittle environments.

Garret Hardin (1985) summarised 12 key principles of Human Ecology that advise us *How* to live. Thus *One can never do merely one thing* means that any *magic bullet* drug or pesticide to cure a disease or pest is an impossibility because *there is no such thing as a side effect*; all effects are effects, whether we happen to want them or not. The same applies to products; there are no by-products, only things we don't want. A most important principle is that *no system can long survive the effects of unopposed positive feedback*, from which it follows that *Thou shalt not transgress the carrying capacity or negative feedback can be a positive boon*. We will return to this at the end.

To try to reach a more systematic understanding of what is wrong with *How* we live, I made a table to compare *Man* with *Nature*, corrected by students and colleagues to *Industrial Society* and *Nature*, as below. While the original was just descriptive, (Loening 1993) the updated table now serves as a check-list for evaluating technologies. I use agriculture for most examples, since this is the most widespread and damaging of technologies.

Table 1.1 Man with Nature

	Nature	Industrial society
1	Driven by solar energy	Driven mainly by stored fuel, fossil or biomass
2	Works in cycles	Works linearly
3	All materials are recycled, there is no waste	Resources are consumed to waste
4	Competition and cooperation in ecosystems	Conquest by overriding natural systems
5	No great excesses	Large excesses
6	Complex: increases biological diversity	Simple: decreases diversity
7	Global stability	Global changes
8	Multiple feedback controls, mostly negative	Little feedback control, mostly positive

1. Solar Energy. If industrial civilisation still exists in 500 or a 1,000 years time, we can be fairly sure that it will be driven largely by solar power (someone at a lecture interjected, “But it’s driven by greed”!). There is plenty of solar energy. Seen on a global scale, fossil fuel use represents only one ten-thousandth of the solar energy reaching the Earth. All technical developments now need to be judged by the degree to which they run on direct and indirect *ambient* energy. Ambient energy is *perpetual* or *continuous* rather than strictly *renewable*: it flows to *waste* anyway, whether we use it or not. Our use makes no direct impact (although there may be some indirect environmental effects).

Fossil fuels are not the only stored natural capital. We also live by the accumulated capital of the biosphere; potentially renewable resources that have accumulated over hundreds to thousands of years, and that have been destroyed, often along with their productive capacity, like soil or forest loss. This is a case of civilisations seeking sources of low entropy, scattering the resource, and moving on!

If science/technology were ever able to release unlimited amounts of power through nuclear fusion or some such means, this would not become a source of freedom from want, but the biggest ecological disaster ever, because nothing would be safe from damage (Meadows 1992).

Most agricultural technologies could change to run by solar power, except possibly the Haber-Bosch fixation of nitrogen. Here the question is whether biological nitrogen fixation can meet needs (Smil 2001). Industrial nitrogen fixation has certainly doubled the polluting flow of nitrate through the biosphere (Nosengo 2003), and half of your protein is made from Haber-Bosch fixed nitrogen. (Haber invented and Bosch engineered the technology for reacting nitrogen of the air with hydrogen to make ammonia, then oxidised to nitrate; this has become the world’s largest source of nitrogen fertilisers and of explosives.)

2 and 3. Cycling and waste. Waste is a human concept for what you happen not to want; you cannot throw *your waste away*, there is no *away*; in nature everything is cycled, on time scales ranging from minutes to thousands of years. *How* we live is becoming more and more a linear process, as in farming in which the inputs are fertilisers and so on, plus mechanical power and the ultimate product is sewage. Agriculture is eminently suited to becoming a closed cycle of resources in which sewage is indirectly recycled back to the land (but not like the traditional direct cycles in China (King 1911). (See *The Land Institute* reviewed briefly by Morris 2008.)

We not only act linearly, we also think linearly, by picking on individual causes of individual effects, whereas ecology actually teaches that life systems are complex multiple networks of interactions. GM crops, fertilisers and pesticides, are all examples of linear thinking and application. This is the strength of conventional applied science, but it ignores the cyclical complexities of nature.

4. Cooperation, competition, conquest. In spite of micro-competitive selection pressures, nature works by macro-cooperation. Just consider the world’s largest symbiotic system, the mycorrhizal fungi that live with most plant roots and exchange nutrients. Indeed plant life might not have been able to colonise land in the first place without that association. In contrast, industrial society measures its successes by the extent to which natural processes are circumvented, bypassed or short circuited. There is pride in the successes of overcoming the constraints of nature, without us being fully aware of the extent of ecosystem services. Any technology now must stand up to the test of fitting its doings into [nature’s] patterns (WCED 1987).

Industrial agriculture is at present feeding the world, but it has failed to take full account of soil symbioses; soluble fertilisers inhibit many soil organisms, and pesticides inhibit some natural plant self-protective mechanisms (Chaboussou 2004). Human Ecology questions the food security and sustainability of these processes.

The same issues of competition apply to our dealings with each other – in the end, human communities have to work together cooperatively.

5. *Excesses.* The rises and crashes of natural populations are not usually on the scale engendered by man (especially extinction, now 100 to 1000 times the natural rate). Even the excessive use of many *simple* materials such as antibiotics leads to trouble; after millions of years of evolution of antibiotics, our uses of them led to bacterial resistance within a few decades. Society tends to be proud of its excesses – the biggest super store, the fastest cars, *it's only natural* to think like this; but such thinking is now unsuited to progress and survival.

The largest excess is of course the human population. It is difficult to face up to this complex issue and even a small population can do a lot of damage. Environmental NGOs dare not now touch the population question for fear of losing public support. But Human Ecology could promote the concept of optimum population. Meanwhile we might celebrate those countries whose population is falling, like Italy, much of Eastern Europe, and Europe as a whole.

Our attitudes to excessive growth may ultimately determine *whether* humans continue to live on the planet. All the great religions have in many respects become unsuited to the modern world, but they did preach frugality. Modesty is now required of technological developments.

6. *Complexity.* The complexity of biological diversity is part of the natural capital that has built up over millions of years, and which modern society is now degrading. Nature is more complex than we understand and maybe is more complex than we can understand (as Einstein pondered). Modern western industrial society cuts through this complexity with simple technical processes; these may be *complicated*, like a machine, but they are not usually *complex*, and they override natural complexities, like fertilisers overriding plant nutrition systems (Liebig ed. by Siebenacher 1989). Liebig himself was aware that there is more to soil than his chemistry, but that modesty was not followed.

Similarly big dams in tropical regions destroy the forest ecosystems, as well as the communities of peoples that live there. However, increases in biodiversity can be witnessed in some cases; farm land that is abandoned can re-grow a diversity of species within decades. However, if nitrogen fertiliser is applied annually (with other nutrients too) to such a farm field, the species number and complexity of that ecosystem is reduced, in the end to one or two (see Leigh and Johnston 1994). Most human activities, including forestry, urbanisation, industrial developments, tend to simplify and reduce diversity and increase the *brittleness* of ecosystems. Most farming still depends on the few species that were domesticated 10,000 years ago yet there are many more options for domesticating other species which would lead to greater food security and less ecological degradation (Wilson 2001).

Modern global agriculture has even reduced its own agricultural diversity of those domesticated varieties that have been built up over hundreds of years. So-called Genetically Modified (GM) crops have become an extreme of monoculture (a badly named term; Genetically Engineered (GE) crops would be more exactly descriptive (GM has been a feature of evolution since ever!) and have made irrelevant all the evolved diversity of ways that prevent hybridisation between species. Here is a well-researched and highly regulated technology applied within a sea of ignorance, much as the three soluble fertilisers (N, P and K) were first applied in the absence of any understanding of plant physiology and nutrition and without knowledge of the complexity of soil life

Discussions on food security could with advantage take into account the opportunities given by biological diversity and complexity (see the report of IAAST 2008). The approach of Human Ecology opens the visions, the ecology provides the solutions.

The evolution of humanity itself over millennia had increased human diversity, partly biologically (hence one can distinguish different races by colour and various physical features),

and of course largely culturally, into thousands of languages, religions, artistic developments and so on. Now under the pressures of global industrial *growth*, this rich cultural diversity is also being severely eroded. In place of the global pressures towards uniformity, a celebration of the diversity and differences between our many cultures would enrich human life.

The losses of human cultural diversity are reflected in losses of how we think – mostly along simple lines, dumbed down by the media.

7. *Stability*. Gaia theory provides the answer to the (thermodynamic) question of how the stability of the global environment is maintained when all its components exist out of equilibrium. The complexities of life itself maintain conditions provided there is enough of it (Lovelock 2009 and his earlier works). Industrial society has interfered with these natural balancing feed-back systems, and caused global changes. Politics and the media have reduced the real complexities of global climate change to excess emissions of carbon dioxide and global warming. So even if global warming were to be minimised by the techno-fix of *geo-engineering*, the problems would remain, the extra carbon dioxide alone causes lots of other damage. The issue challenges all aspects of *How* we live.

8. *Fee-back controls*. The great success of humanity has been in over-coming the feedback controls of nature and continuing to be a pioneer species by increasing the carrying capacity of the Earth for humans. Positive feedbacks have been the means, in which increases lead to further increases, supported by economic growth and new technologies which in turn create more new technologies.

This has been called *the technological imperative*, summed up as *I can, therefore I do*. This process has been so successful in averting the many prophesies of doom over the centuries that it is now difficult to envisage fundamental change. But to avert collapse, there will need to be major change in how society is organised, from positive to negative feedback. Reducing or stable populations will need to cope with the more balanced age distribution of fewer children and more elderly. Europe, which led the world in technology, economic growth and development, could now lead again towards a reduction in population and the development of appropriate or *wise* technologies (Loening 1990 and Harm van de Veen, in the pages quoted). It is a possible task.

Conclusions

Any new technological developments now have to be judged by some such criteria as in the table. We are now obliged to seek negative feed-backs to our activities to replace the natural feedbacks that we have successfully overcome and which are not and never have been, acceptable. That is the ultimate task for applied Human Ecology.

But this way of thinking necessarily suffers from a lack of symmetry in arguments between proponents of new technologies like GM crops, and the objectors. The direct technical proposal is simpler and arguments for it are simpler than the more complex ecological cases against it or for alternatives. The latter often has to be presented crudely with distortions or omissions to match the proponent's case. Examples abound in the climate change debates, in the older nuclear power debates and in the GM debates (Waltz 2009). The abuse that the COWDUNG of scientific opinion can mount against ecological criticism matches that suffered by Rachel Carson with *Silent Spring*.

Human Ecology raises questions about *progress*, and further ethical issues. There are popular examples for progress in new directions such as the idea of voluntary simplicity (Elgin 1993). As Elgin says: "All of the world's spiritual traditions have advocated an inner-directed way of life that does not place undue emphasis on material things." And, as quoted early in this chapter, Max-Neef's (1991) inventory of fundamental human needs, with ways of evaluating satisfiers for these

needs provides a route to finding the *human improvement* in Mill's quote above, for which he saw no limit. The New Economics Foundation, the International Society of Ecological Economics and FEASTA, the Foundation for the Economics of Sustainability and many others are developing new economic methods and indicators. Brown (2009) has just published a further *blueprint*.

I have written elsewhere (Loening 2009) how the attitudes of science are also changing and could be moved further in public policy towards *fitting our activities into nature's patterns* making us more *fit to survive*. There have been major international moves in this direction, such as the IAASTD (2008), which concluded that the present methods of intensive agriculture have to reform (see also Tilman 1999).

Just as this chapter was being completed, Rockström (2009) with many colleagues published a study of nine critical biophysical boundaries which if over-stepped would have disastrous consequences; three of these have already been exceeded. This is environmental science at its broadest and best, but solving how to manage our uses of these global commons remains a core challenge for Human Ecology. Martin Rees (2003) President of the Royal Society, has given civilisation a 50/50 chance of survival beyond the century, not because of ecological collapse, but due to bioterrorism, human strife. The attitude of Human Ecology is vital to stimulate imaginative creativity for solutions.

The universities should be good at that, but in practice have not seemed able to carry out the task. This may be because the syntheses needed are difficult to fit into university faculty structures; also because Human Ecology is necessarily *subversive* or political. But this again is asymmetrical: the COWDUNG is not regarded as political because it is conventional, but to question it and to rethink is regarded as political (Waltz 2009). It should be the other way about: the basic attitude of science is to question and rethink; that should be the norm and now has to be applied to *How*, *Where* and in the end *Whether* humans live on the Planet.