Darwin, Dogen, and the Extremophile Choice

Fifty Short Essays

On What it Means to be Human in the Natural World

K.L. Christenson

Beethoven's Fire

If, in understandable frustration over the effort involved, you were to ask me why I think it's important to learn about something as intuitive as creative intelligence in the biological terms of ontogeny and phylogeny, I'd have to admit it's not important necessarily; certainly not for the sake of your being personally creative. But then I'd tell you the story of Beethoven's reply to a prince who felt overly important only because of his inherited wealth and power: "What I am, I created myself. There are, and have been, thousands of princes, but there is only one Beethoven!" He might even shout out: "Composers are made of Fire!"

So now when I say that ontogeny is the prince, it is literally inherited control (and like genetically imposed body forms, human presumptions are not meant to live beyond their times), while phylogeny is Beethoven, it is creative fire, you might understand I'm trying to get you to take a wider view of creative intelligence. What these terms help us to see is that evo-ecology is 'intelligence' too; in fact it's the only other persistently creative intelligence we know of! Ontogeny and phylogeny help us to understand how we fit into an intelligent universe. That's very important. It's worth the effort.

The genius of Nature is that it's never about just inherited control, about being the prince; Nature's programs (organisms) are always in the Darwinian fire. But it's important to recognise that this is a slow fire, a 'cooler' creative fire than ours. And even as human kind, as a whole, becomes less and less about control—less and less like the prince with his purely 'ontogenic' hold on the status quo—and more and more like Beethoven, the damage our hot fire is doing to Nature's cool fire is increasing. So now is the time for us to embrace our Beethoven's fire in a way that also contains it. Let us redirect this transformative flame away from Natural systems, and turn up the heat even more on our princely mindset of power for the sake of power and wealth for the sake of wealth, before it's too late to show our children where it all began. Phylogenic Nature has lessons still to teach us about our dangerous new techno-genic fire, and about our desperate need to control.

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on What it Means to be Human
in the Natural World

K. L. CHRISTENSON

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For my wife and best friend, Judy,
and our three beautiful daughters,
Martha, Jessica, and Emily.

And for their daughters,
Emma, Lily, Abigail, and Skylar—the Future.

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THE AUTHOR'S GLOSSARY OF SCIENCE AND PHILOSOPHY TERMS

Adaptive radiation The evolutionary process by which a species *diversifies* into a **clade** of closely related species when an ecological opportunity arises (e.g. new microclimate or volcanic island).

bio-association *neologism* An association of species (compare **ecosystem**).

Cartesian Related to the philosopher René Descartes; *esp.* in *math*, the coordinates plane that bears his name as the originator of analytic geometry, and in *philos.* his mind-matter dualism.

dialectics *Philos.* Arguing both 'sides' toward a novel resolution.

ecosystem A system of species and their non-living environment.

efferent *Physiol.* Carrying or conducting outwards, esp. from the brain or spinal chord. [Note: action potentials *to* muscles are efferent, kinaesthetic sensation *from* muscles is **afferent**; my use of **kinaesthesia** denotes motor awareness in both 'directions'.]

entropy The irreversible tendency of a system toward increasing disorder and inertness; the second law of **thermodynamics**.

epigenetics The process by which much of the genetic information in stem cells (descended directly from the **germ-line**) becomes permanently unavailable in subsequent **somatic** cells as these are allocated to specific functions or adapt to environment.

equilibrium A state of balance. (In **thermodynamics** it means a system has reached a state of maximum disorder or **entropy**, thus its use as 'harmony' in *punctuated equilibria* can be misleading.)

extremophile An organism that thrives under extreme environmental conditions (as in hot spring or ice cap)

genepool The total genetic information possessed by a species; not to be confused with **genome**: the minimum information needed to code for a single organism of a given species.

genotype An organism's genetic makeup (compare **phenotype**).

germ-line The continuity of reproductive information from one generation to the next; this is altered only by chance mutations, or it is broken by failure of the **somatic organism** to reproduce.

kinaesthesia The sensation by which bodily position, weight, muscle tension, and movement are perceived. [Note: a more general term for internal sensation, both motor-tensional and visceral, is **proprioception**. But, more obviously than the other senses, **kinaesthesia** is voluntary, which means, though it's technically an **afferent** flow from body to brain, our 'deep touch' is also *intimately correlated* with corresponding **efferent** impulses.]

metazoan A multi-celled animal. (Compare **protozoan**.)

mitochondria The energy-producing organelles in cells. These have their own DNA that is passed directly to offspring without recombination in the egg; thus their female lineage is unmixed.

ontogeny The genetically 'directed' development or course of development of an individual organism. (Compare **phylogeny**.)

organism An individual [Note: for higher animals 'division' is death] constituted to carry on the activities of a finite life-cycle by means of organs separate in function but mutually dependent.

phenomenology *Philos.* **1** the movement that concentrates on the detailed description of conscious experience. **2** the science of **phenomena** (the objects of perception, experience, etc.) as opposed to the science of being (essential nature; self). [Note: in Buddhist philosophy, self is the illusion, making the study of perception the more fundamental "science". This was also Husserl's view; but the 'practitioner's' phenomenology employed in this book might be better described as **method philosophy**: it's more about how to know what is, than what there is to know.]

phenotype The physical and behavioural traits of an organism as expressed by its **genotype**.

phylogeny The evolutionary diversification of groups of organisms, or features of organisms, due to the 'undirected' pressures we call natural

selection. [Note: languages are also organised by phyla, and so my metaphorical use of **'phylogeny'** (always with inverted commas) in this book for the 'evolution' of thought has a substantive precedent. (Compare **ontogeny**.)]

protozoan A single celled animal. (Compare **metazoan**.)

re-entrant Involving feedback into an adaptive system from its output (e.g. both psychological and biological 'mutations' are re-evaluated as differential reproducibility of actions or offspring); in *computation*, a feature of **algorithm** as opposed to **formula**.

resource partition *ecology* The prevention of niche overlap between species because of differential innate advantages in the competition for resources, i.e. **competitive exclusion.**

somatic Of or related to the body as opposed to the **germ-line**.

succession The orderly *reintroduction* of existing local species into a disturbed ecosystem. (Compare **adaptive radiation**.)

technology 1 The application of science and technical advances to industry. **2** A tool etc. used for this. **3** The means by which material things are produced in a culture. [Note: In these essays I assume there is no *continuous advance* in tool use by other animals, and will take 'technology' to be a uniquely human trait.]

teleology 1 The explanation of phenomena by the purpose they serve rather than by postulated causes. **2** (in Christian theology) the doctrine of design and purpose in the material world. [Note: this corresponds to *final cause* in Aristotle's *αιτια* system of explaining phenomena according to four 'natural' causes.]

thermodynamic Involving the flow of heat, or change in orderliness at the molecular level.

trophic level A position in a food chain: **autotrophs** are the 'producers' (using energy only from sunlight or inorganic chemistry); **heterotrophs** are the 'consumers' (herbivores are primary consumers and carnivores are secondary consumers).

Weismann Barrier The isolation of an organism's reproductive cells, or 'heritable information', from the developmental and environmental influences of a lifetime. In this way the **germ-line** of an organism is altered only by Darwinian natural selection *of* generations; not by Lamarckian 'acquisition' within generations. (It might be easy to confuse this reproductive concept with the ecological concept, **resource partition**. *There is no relation*.)

EXTRACTED GLOSSARY OF DIFFICULT OR PARADOXICAL TERMS

(CanOD) *Canadian Oxford Dictionary*
(ConOD) *the Concise Oxford Dictionary*
(CCEDT) *Collins Canadian English Dictionary & Thesaurus*
(FWCCD) *Funk & Wagnalls Canadian College Dictionary*

belief (CanOD)… **1a** a firm opinion or conviction (*my belief is that he did it*). **b** an acceptance (of a thing, fact, statement, etc.) (*belief in the afterlife*) … [Since **opinion** covers **1a**, and **faith** covers acceptance in the devotional sense, I will use **belief** only in the most provisional sense of **b**: meaning 'propositional' acceptance that *adjusts to further evidence*.]

Buddha (CanOD) … **1** a title given to successive teachers (past and future) of Buddhism, although it usually denotes the founder of Buddhism, Siddhartha Gautama (c.563-c.480 BC). … [Author's note: in Sanskrit, the meaning is 'the enlightened' or 'the awakened', and in buddhadharma practice, that is, from a non-judgemental posture, everyone and everything is *essentially* Buddha: everyone and everything is your teacher; and is 'you'.]

dharma (CanOD)… **1** (in Hinduism) the eternal law of the cosmos, inherent in the very nature of things, upheld (but neither created nor controlled) by the gods; in the context of individual action, it denotes the social rules codified in the law books. **2** (in Buddhism) the true doctrine as preached by the Buddha. [Author's note: dharma can certainly be taken as doctrine or philosophy, where every argument, or 'teaching', is treated as an abstract proposition, but our understanding of its meaning is not complete without acknowledging its primary

purpose: the **buddhadharma** is meant to be *used* as a 'skillful means' to awakening. Thus a **dharma talk** is "a talk given by a buddha to a buddha", in the egalitarian meaning of **Zen Buddhism**, and it is meant to have the same transformational effect as the Christian practice of "speaking to that of God in everyone".]

faith (CanOD)… **1** complete trust or confidence. **2** firm belief, esp. without logical proof…. **3c** spiritual apprehension of divine truth apart from proof…. [Since **opinion** covers **2**, and **Knowing** (in the absolute sense) covers **3c**, I will be using **faith** only in the meaning of **1**: thus faith *remains* when the **Knowing** of direct experience is deliberately absent during propositional thinking.]

insight (FWCCD)… **1.** Perception into the inner nature or real character of a thing… **2.** *Psychol*. **a** Discernment and evaluation of one's own mental processes, powers, etc.; self-knowledge. [I will be using only the second meaning, and even then without adding "evaluation", as this is experienced during silent meditation as an *interruption* of direct insight.

intelligence (FWCCD)… **1.** The faculty of perceiving and comprehending meaning; mental quickness, active intellect; understanding. **2.** The ability to adapt to new situations, and to learn from experience. … **7.** *Often cap*. An intelligent or rational being, especially one that is not embodied. [My use of the word will always assume meaning-**7** (but without caps), because it's the adaptability of bodies themselves (i.e. structures) that concerns me. And obviously 'mental quickness' is not a necessary factor in **eco-evo intelligence**, even though this *is* structurally creative.]

intention (FWCCD)…. **1.** Purpose, either ultimate or immediate; aim; goal. [I will be using **in-tend** to mean a strong **inclination** (a covert physical tendency, or re-iteration of action potentials, that can be *felt before thinking* as **bodymind leaning**) reinforced by conditioning in association with words. Thus we might define **ecological intention** as an inclination to 'reiterate' species reinforced by coevolution in association with sexually selected traits.]

iterate (CanOD)… **1** to perform or utter repeatedly. **2** make repeated use of a mathematical … procedure … as a means … to the solution of a problem. [I will generally be using iteration in the meaning of **2**; thus it should be understood that, when we are being mindful, our iterated utterances *and impulses* are allowed to "proceed" so as to be transformable, and transformative.]

knowing (CanOD)… the state of being aware or informed of any thing…. [Since being 'informed' of 'things' is well understood to be knowledge in the **relative** sense, I will reserve the capitalised **Know** to connote direct before-thought, or **absolute**, familiarity.]

mind (CanOD)… **1 a** the seat of consciousness, awareness, thought, volition, and feeling. (FWCCD)… **1.** The aggregate of processes originating in or associated with the brain… **11.** *Philos.* Spirit or intelligence regarded as the basic substance of the universe, and sometimes distinguished from matter… [Author's note: according to Dogen, "mind extends throughout all phenomena, and all phenomena are inseparable from mind."[1] Dogen's **Mind** then, in this non-dualistic sense, is not a thing among other things; but direct **bodymind** experience is essentially **the Way** of connection itself. (That I can't experience 'my own mind' except in terms of objects and personalities I've encountered suggests this wider application, and so we might say it's only the *speed* of these evolving interconnections that sets our experience apart from the 'experience' of bio-associations in general.) I will use lower and upper case to distinguish the narrow psychological meanings of (CanOD) **1a**, or (FWCCD) **1**, from the **dharma talk** gesture that's meant to connect us with the before-thought experience of mind as a *sharing* in Totality.]

nature (CCEDT)…**1** fundamental qualities; identity or essential character. **2** (*often cap.*) the whole system of the existence, forces and events of all physical life that are not controlled by man. [Author's note: I will take "life" as permission to use capital 'N' **Nature** to mean only the *totality of biological species* not domesticated by man; **ecosystem** has an intermediate meaning.]

perfect (CanOD)… **1** complete; not deficient. … (FWCCD)… **4.** Accurately or closely reproducing or corresponding to a type or original; exact: a *perfect* replica…. [I will be using **perfect** in a phenomenological context to mean that intimacy, or *selflessness*, is complete: "*I am the* bowling ball". When it appears with inverted commas, **'perfect'**, it will mean that a system of re-presentation, or *illusion*, is complete: "*this is a* 'bowling ball'".]

reality (ConOD)… **1** what is real or existent or underlies appearances. [Author's note: according to the **buddhadharma** it is illusion to assume a reality that "underlies" direct experience. Such reality is relative: often useful, but 'existent' only as mental construction. Absolute **Reality** is inseparable from appearances (i.e. real experiences in our real biological makeup that might also include real conceptual distortions). That we can argue about these meanings (for example we might say: "if anything, it is direct experience that 'underlies' our mental constructions") just demonstrates how **Totality** cannot be *grasped as a concept*. I will use lower or upper case to distinguish.]

Zen (CCEDT)… **1** a Japanese school, of 12th-century Chinese origin, teaching that contemplation of one's essential nature to the exclusion of all else is the only way to achieving pure enlightenment.

… or according to *Merriam Webster's Dictionary*: … a Japanese Buddhist sect that teaches self-discipline, meditation, and attainment of enlightenment through direct intuitive insight

… or according to *Hardcore Zen* (© 2003, 2015 Brad Warner, *Hardcore Zen* Reprinted by arrangement with Wisdom Publications, Inc., wisdompubs.org.): "The difference between [the two major schools of Zen] is this: the Rinzai school believes in enlightenment and the Soto school doesn't. Alright, admittedly it's a good bit more complex and interesting than that. But for now, that's all you need to know to follow the story."[2]

Tyger! Tyger! burning bright in the forests of the night, what immortal hand
or eye could frame thy fearful symmetry? In what distant deeps
or skies burnt the fire of thine eyes? On what wings
dare he aspire? What the hand dare sieze
the fire? And what shoulder, & what
art, could twist the sinews of thy
heart? And when thy heart
began to beat, what dread
hand? & what dread feet?
What the hammer? What
the chain? In what furnace
was thy brain? What the anvil?
What dread grasp dare its deadly
terrors clasp? When the stars threw down
their spears, and water'd heaven with their tears, did
he smile his work to see? Did he who made the lamb make thee?—Blake [3]

Pan

Darwin [4] *— It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing in the bushes, with various insects flitting about, and with worms crawling through the damp earth and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us . . . Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals directly follows. There is grandeur in this view of life. . . . from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved.*

AITIA

DARWIN, DOGEN, AND THE EXTREMOPHILE CHOICE

OCCAM'S RAZOR[5]

Entities should not be multiplied unnecessarily.

GAUSE'S LAW[6]

One species, one niche.

INTRODUCTION

How do I write a book that covers territory so all-encompassing as "what it means to be human in the Natural world"? Best to do it with broad strokes I think, to keep the word count down and the many unfamiliar ideas within easy reach of a possibly overwhelmed reader. Besides, who would even bother to read a long book by an unknown philosopher? Easier to just skip to the conclusions and appraise these by the lights of known authorities.

My apologetic beginning is sincere, for it's not a trivial confession when I tell you the first drafts of this book were written as commentary on a poem I wrote in 2006 (I called it *The LAST Niche*, and I'll explain in essays **29** and **30** why I chose this acronym—for Learning-Acquired Structural Tools Niche—as a full accounting of the human ecological strategy). My mid-life honeymoon with the newly discovered silence of zazen had come to its natural end, and this was my way of picking up the threads of some big ideas I'd begun working on twenty-three years earlier—when my second daughter came into a world threatened by an escalating nuclear arms race. For me, the *structure* of verse was a test of the overall integrity of these ideas, but the reader who finds metaphors coming out of the blue from time to time must be warned: I've had a hard time cleaning up the after-shock of that initial poetic explosion on the book's philosophic imagery. In fact, the finished product still follows the original commentary format, but it does this by featuring the words of *other* writers and poets, and I can only hope you are able to follow the extended and broadly interpretive argument that I've tried to assemble on this framework. I sympathise with the reader who will undoubtedly find it hard enough to take in such a wide montage of ideas and maintain critical focus on the individual narrative figures. But real change is always a struggle, isn't it? Because it must touch *everything*. It's our mundane observations that contribute the lived substance we call 'meaning' to our lofty first principles, and the big picture of what it means to be human in the Natural world will only come into focus when we peer closely, as if for the very first time, into the everyday life of our human minds and Nature's ecosystems, and thereby disturb the familiarity that obscures.

With these concerns in mind, I have used ‘inverted commas’ to indicate metaphorical and ad hoc meanings, and reserved “double quotes” only for direct citations and some occasional imaginary dialogue. Furthermore, I have written certain essays only to put a finer touch-up on some earlier broad stroke of the metaphorical pen (I’m writing this on a keyboard of course, so in fact even the ‘broad strokes’ are heavily overwritten), and the reader can safely leave these until some familiarity has been acquired with the pivotal ‘two trees’ theme. In essence, this is:

A celebration of Nature, and Man, as two sovereign and mutually revealing (phylogenic and techno-genic) ‘evolutions’.

The headings for these nineteen follow-up essays (amounting to a third of the total pages) I’ve put in [square brackets] to indicate they are supplemental, and I have included in this category all the Part III essays in which I present my (Darwinian) introduction to Zen. Elsewhere, I have put the occasional paragraph aside in square brackets as well. It is my express recommendation that you pass over all of this supplemental material on first reading, because digesting such an ambitious theme might require attacking it one layer at a time, like an onion. If my personally integrated ‘big picture’ of what it means to be human in the Natural world is understood, in spirit, from these essential hundred pages, then a critical examination can be made more fairly in the supplemental reading. I don’t promise, of course, that the book is an easy read if you skip over the less congenial stuff and the supplemental essays. At least I hope it isn’t, because as you will soon be told, a mental ‘picture’ is actually more like a tree: it can shoot up quick enough when the conceptual ground is prepared and the attitudinal climate is right, but it still takes its characteristic time to spread a fully formed cognitive canopy.

Perhaps I should prepare the ‘ground’ and ‘climate’ this way: If you turn three pages back, you will see writings by William Blake and Charles Darwin, but you will also see some empty space. The text and the empty space interpenetrate. When you read the words, you will encounter two seemingly opposed views of Mankind in the Natural world, for it’s harder to see how these interpenetrate: Blake is seeing the life-and-death reality of a living organism that can ask questions about its mortality,

while Darwin is looking at the lawful unfolding of a reality beyond personal concerns. Each reality is independently valid when seen from its restricted vantage point. Now look at the largely empty spaces flowing into the text. The discordant word 'meanings' vanish like smoke. Even the figures ***AITIA*** and *Pān*, isolated in the spaces they seem to command, might not express clear meanings to you; perhaps they only elicit a vague sense of questioning, of wonderment: Are they different? Are they the same thing? Complementary? Can Darwin's lawful natural selection be reconciled with Blake's daring "immortal hand or eye"? The one is wholly impersonal. The other decidedly not!

That meaning itself is conflictive and ephemeral is surely the first thing we should know about what it means to be human in the Natural world. I will be arguing, with Dogen's help, that the capacity to treat meaning like 'bodymind smoke' is the living root of our un-Natural inventiveness, for this lets the 'tree of knowledge' branch. But I will also be maintaining that human culture is not the first invention tree to take root on this planet: our own roots are entangled in a confusing way with the branches of a much older tree of life. In the writings we just looked at, Blake and Darwin both wonder about the creative process. Blake, utterly unacquainted with Darwin's theory, confuses a biblical phylo-*Genesis* with the physiological (genetically directed) conception-to-death ontogeny of individual organisms. In asking the question, "Does a Creator feel the organic timidity of a mortal?" he conflates these two truths, one purely imaginary and the other deeply visceral, and it's this 'thought' that scares him. Not Darwin, he discovered the 'real' phylogeny, but then again, judging from his complaint in later years that he was "formerly excited" by grand scenes,[1] he seems to have suffered from a lack of faith in the moment to moment primal sufficiency of the more fully embodied presence that Blake aspired to—an embodiment that includes, but is not limited to, the culturally selected acts of thinking that can expand our world 'view' but not our emotional range. Curiously, Darwin did not seem to appreciate that the thinking mind and its cultural products might recapitulate in many ways the fluid process of evolution. Had his "grand view" become too finished? Is this why, curiously *unlike* natural selection, he fell back on a grasping at certainty in his uncharacteristically sloppy declaration that "the production of the higher animals

directly follows"? On a conceptual level Darwin understood the undirectedness of natural selection better than anyone; so why did Blake's plea for God to "keep us from single vision and Newton's sleep" not resonate with him?[2] But then again, where was this god when his beloved daughter Annie died, and when half the world hated him as the murderer of religion (literally body-world re-ligation) and the other half adulated him as the father of a brave new way of thinking? He was only human, and, even for the wisest among us, the thinking mind too easily enshrouds the empty wonder with its conceptual smoke.

If you take this journey with me I will be reminding you, from time to time, to step outside this name-and-compare work of framing arguments, and into the empty space you act-ually occupy: the breathing vastness into which these words, and your thoughts, vanish like smoke. But it's not so easy to get beyond even the crudest verbal bars of a conceptual cage, because this entails—if we accept the Buddhist view—stepping outside any egoist box we might find ourselves in. Not just the "I know this stuff already" box, but the "we are masters of nature" or "we are stewards of nature" boxes; or even the "we are part of Mother Nature because the ecosphere is our natural environment" box. To see and think from true emptiness, both the natural and the spiritual philosopher must cultivate the emotional capacity to step back a little from naturalism, environmentalism, and all other –isms. Even the -ism-ness you can identify when you honestly examine the doubts or attachments you might feel regarding a traditionally open-minded Buddhism. But it's you taking these steps. Your steps. All I can present in a book, all that even a Zen-master far beyond my common practitioner's skill can author-ise to point the way out of endless argument, is just …Dogen's smoke.

So, a note of caution here about my use of Buddhist teachings to score philosophical points. The buddhadharma is designed primarily to be used as 'skillful means' to bring about very personal changes in the singular lives of practitioners. It's not that philosophy is discouraged, but that where it's coming from is the most important 'point'. I have tried to make this as clear as possible, but clearness itself is, for everyone, a matter of practice, not argument.

So what points will I be trying to score? If we put aside the many unavoidably convoluted scientific entanglements, and the many poetical extrications, that must, out of fairness to the full humanity of my reader, complement one another throughout this book, then the book's premise can be made deceptively straight forward: Consider a bow-hunter's happy conviction that he is "playing fair with Mother Nature", while in fact he's contrasting himself against a gauntlet of hunters shouldering high-powered rifles by the side of a man-made road that effectively corrals the instinctive flight of every white-tailed deer for miles around. We all suspect that the bow hunter doesn't go far enough, don't we? We might have the same doubts about the "back to nature" farmer on forty acres of black bottom land who contrasts himself with the city folk who settled and paved a great river delta. What I want to say on the problem of Man vs Nature can certainly be whittled down to an inquiry into fairness. However, sentiments are no more convincing as arguments than they are healthy arguments, and a fuller elaboration of what playing fair with Nature might look like, if it's to have useful and deeply secured cognitive roots, must emerge at a rate not much quicker than a forest will grow a tree of its own.

What does fairness mean? Am I being fair with you if, from an advantage of long study, I start out with a single purely abstract statement of my premise? It might look something like this:

> *The tree of life and the tree of knowledge represent two distinct generative systems in which, to begin with, freely evolving structures predetermined functions (thus behaviours), and now, with technology, freely evolving behaviours predetermine structures.*

But I'm sure such a lofty accounting as this can be easily countered with your own thrust and parry of 'reduction to first principles'. And of course you can also just end this encounter, and pick up another book. Nature can't do this. Even if we were master and student, and you were forced to make sense of this, you can at least adapt your principles at my speed, while Nature's evolutionary response to a human 'master' isn't nearly so fast. In other words, you can let go of your ideas and replicate them again as fast as I can.

Now, notice here I've also implied that, other than this faster turnover of 'conceptions', your response isn't so unlike Nature's; for instance, neither cognitive nor eco-evolutionary intelligence can evolve without some smart 'culling'. Part I of this book is taken up with just such deconstructive work. Then, since Man the Inventor, again like ecosystem rather than organism, must re-construct *himself*, and do this not on first principles but one impulse at a time for a man, one molecule at a time for an ecosystem, we'll be entertaining a mixed bag of lofty and intimate propositions here. For example:

> *The evolutionary paradigm holds that natural selection is without purpose or design; but if we acknowledge a practitioner's insight that reveals 'intention' to be, operationally, a subtle bodymind 'inclination' reinforced by consistent repetition in association with words, then perhaps we can say Nature is literally in-tending when it establishes or maintains fitness reinforced by consistent reproduction in association with sexual traits.*

My own phenomenological investigations, and hopefully yours as well, will become more important with each subsequent section; beginning in earnest with Part III and, by stages, providing the plausibility of a personal dimension to the ecological and evolutionary propositions in Part II and the anthropological speculations in Part IV. The last section, Part V, is the longest, for it's meant to be a summary and a detailed practical development of these speculations about our human-animal past. It's a venturesome look at where we stand today, and concludes that we are a techno-genic animal *of* phylogenic Nature. But we are no longer *in* it.

So, in conclusion, I hope you'll forgive me if, in my quest for fairness, I've put too little aside; too little, you might fairly say, of this 'entangled bank' of philosophy that has inevitably arisen, through advancing age and curiosity, on the side of my own riverine but necessarily confined course of being human in the Natural world. On the other hand, some readers might understandably demur when I say nothing at all about burning issues like climate change. I can only respond that, as you will see, it is not my purpose, in what I hope will become a dispassionate Man and Nature conversation, to distract our minds with reflexive fears

of inconveniencing human self-interest; but it is my hope rather to broaden our focus, both positively and deliberately, so it might accommodate deeper causes and higher consequences. For is it *possible* even, to respond as we must, 'as a species', to climate change, without knowing who, or what, we are? There are many mental tracks that arrive at familiar answers, so we must step into the 'empty spaces' if we are to thoroughly question how we stand in relation to the rest of nature: Are we the masters? Are we dependents? Can we ever become wise stewards or even respectful partners? We're surely animals, but we are animals with gadgets. Perhaps we stand *alongside* Nature as two self-governing intelligences? Clearly we can't know beforehand where we'll end up once we've left the beaten path; but then, just so we don't lose track altogether of where we've been, perhaps we should start out by asking, like the very first human beings: Gaia, Pan, Mother Nature, just 'who' are you?

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I'm nobody! Who are you?
Are you nobody too?
Then there's a pair of us—don't tell!
They'd banish us, you know.
How dreary to be a somebody!
How public, like a frog,
To tell your name the livelong day
To an admiring bog!
—Emily Dickinson[3]

PART I

TROUBLE WITH GAIA

Gaia … **1** (also *Gaea* …) *Gk Myth* the Earth personified as a goddess, daughter of Chaos. She was born the mother and wife of Uranus (Heaven); their offspring included the Titans and the Cyclops. **2** the earth viewed as a vast self-regulating organism (*Gaia hypothesis; Gaia theory*). —*Canadian Oxford Dictionary*

Pan, like other gods who dwelt in forests, was dreaded by those whose occupations caused them to pass through the woods by night, for the gloom and loneliness of such scenes disposed the mind to superstitious fears. Hence, sudden fright without any visible cause was ascribed to Pan and called a Panic terror. As the name of the god signifies *all*, Pan came to be considered a symbol of the universe and personification of Nature …
—*Bulfinch's Mythology: The Age of Fable*

ONE

Philosophy is the unusually persistent effort to think things through.
—William James[1]

I have no reason to believe that the human intellect is able to weave a system of physics out of its own resources without experimental labour. Whenever the attempt has been made it has resulted in an unnatural and self-contradictory mass of rubbish.
—James Clerk Maxwell[2]

Once you have found your posture, breathe in and out deeply, sway left and right, and then settle firmly and steadily. Think not-thinking. How do you think not-thinking? Be Before Thinking.
—Eihei Dogen Zenji[3]

We start out with a warning, but in the nautical terms of drifting and discovery, and knowing the human condition is conceptually unfathomable (also we start out with this heads-up by way of demonstration that I have a fondness for metaphors …and for parentheses):

As human-kind's many varying ships of state rise to the crest of their breaking evolutionary wave, we must acknowledge we are a conflicted as well as a wayward animal. Standing upright, we gaze over uncharted horizons, far from the teeming main of co-adapted species, all the while holding a map of hidden treasure said to be everlasting gold in the one hand, and a compass or other instruments ever newly designed for the journey to find it in the other. Indeed, as an aid to navigation, and in hopes of keeping our cultural ships on an even keel, we in this 'Mediterranean' hemisphere have produced a Plato as helmsman for the one disposition, and an Aristotle as boatswain for the other.

But dreams and devices are not enough, and so we also look towards the rising sun, and to wherever the light of day steals through cracks in the seemingly solid conceptual planking of every culture; for here we've produced a long line of Buddhas, to teach us how to laugh at our philosophising, that we might have wind in our sails. Not only must we allow for poetical instincts that revolt against 'analyzing the life out of' our seamless intuitions on the one hand, and for gadget-loving natures that question everything but the toolbox itself on the other

(for, as one might see a carpenter use his tool-tote for a step-stool, even so a philosopher stands on his precepts), but we must also beware that our usual sense of conviction is a vestigial tail that mocks our marvelous new skill at grasping things. So here is the worst of it at the beginning.

Despite a well-intentioned consensus that living systems cannot be fully appreciated until we commune with their wholeness, we nevertheless can't properly understand technology's relationship to them without that numerical study of discrete populations which is the science of ecology. For that matter, we didn't even recognise the creative potential of Nature until Darwin provided us with the evolutionary rationale that divides the natural selection process into phylogeny and ontogeny. Also, despite the 'realistic' truth that says taking responsibility for our actions means calculating all their possible outcomes, nevertheless such calculations must inevitably falter, along with all statistical notions of causes and consequences, on the finest scale of analysis. What parameters can we use to *create* a future when the sample size is just 'this moment', or for Maxwell's Demon, 'this molecule'? We may stand above other creatures, but perhaps we will need a lesson from them after all, to show us a less calculating responsibility, as we witness, in their totality, the slow resolution of species through an open process of 'sacrificial' engagement. For, on various scales, is 'natural selection', by trial and elimination of ideas, not the basis even for human creativity? And if all truly creative agency ultimately turns out to be Darwinian, or 'phylogenic', where does this leave 'me' the inventor? Finally, consequently, and despite the utility of Lovelock's Gaia Hypothesis[4] as a banner for environmentalism, we find that super-organism becomes instead, corporate 'intelligence', as we let go of Nature's substantiality along with our own.

Indeed, here is my whole story, for I'm only trying to make good use of the hard-won insights of many teachers. So perhaps my warning boils down to this: we need stories, but we need them to be useful, not 'true'. And don't look for 'new ideas' here either; better to see with new eyes that which we thought we knew, and to make a continuing effort to stand fully upright on that pre-verbal existential ground we all have in common—a ground that remains untouched by either gadget-loving idealist, or poetical realist inclinations.

TWO

Organisms consist of germ cells that transmit heritable information and somatic cells that carry out ordinary functions. Germ cells are not altered by environment, learning, or the morphological changes of a lifetime. This information is lost after each generation.
—Weismann's germ plasm theory[1]

Let's begin by looking at *why* the phylogeny-ontogeny distinction isn't 'easy'. Is learning how to think inter-generationally the only problem? While we can all recite in a linear way how the local short-term process of ontogeny (the unfolding of an individual lifetime under the influence of a fixed genetic makeup) cycles within the long-term totality of a continuous phylogenic world (wherein natural selection 'generates phyla'), I am always assuming here that evolutionary theory is more fully comprehended as a dynamic which consists of more than just two temporal phases, because the cycling can only *advance* owing to the backstop of a third *archival* domain of genepools that convey, but don't directly participate in, either 'story'. So the 'difficulty' isn't just that speciation takes place on a time scale far beyond human experience, but given the nebulous and overtly timeless 'mediation' of genepools, there's nothing we can compare the total dynamic to—at least in non-subjective terms.

Before Darwin, the question of how we got here was either answered with "God", or with a dismissive "Which came first, the chicken or the egg?" In fact, the question of speciation was so easily dismissed that the answer (largely unwelcome) emerged only some years after Darwin had travelled the full circumference of our globe; for it was the scrupulous re-examination of his notes from the *Beagle* voyage that convinced Darwin that the lines between species could in fact be drawn and maintained naturally, as the countless wild organisms he had witnessed (impossibly numerous by tame European standards) were born, competed, did or didn't 'set seed' for a next generation, and then died. It's no small matter then that we can now say with confidence, "a mere proto-chicken mother laid the first true chicken-egg, sporting mutant mitochondrial DNA that never found its way back to the closest non-chicken branch of the genus"—for we are opening a mental door in what was for centuries held to be the logical analogue for a brick wall.

It turns out history, natural or human, doesn't repeat, as the proverb says, and we have only begun to look through Darwin's door to discover wholly new possibilities. Not least of which is that we might learn something about our own promethean creativity by studying eco-evolutionary intelligence, our only earthly analogue.

I am no fan of the kind of intelligent design rationalisation that denies the firm evidence for natural selection, but if we assume the role of the Weismann Barrier (as defined at the head of this essay) is to delimit a nebulous 'drawing board' (or 'model space' as we say in the computer-aided-design business) and if we give nature a capital 'N', then we might indeed imagine that the lines of speciation are intelligently drawn. Of course, to be biologically exact, the 'real' lines involve recombining chromosomes and slowly diverging genepools (though diverging rapidly by the geological clock) and they might start out somewhat fuzzy (replete with many racial hybrids on the cusp of a speciation event); but novel germ cells (and fertilised eggs) do come 'first' in a world where the stochastic game of innovative variation within amorphous genepools remains distinct from the morality play of their somatic expressions (commonly known as organisms) subject to a broader environmental selection. Certainly the idea of a 'Natural design space' can bring us by analogy to consider the question of creativity in general, and how Nature's way might compare with Man's.

Does the activity of undifferentiated DNA that is 'set aside' for recombination and reproduction in the widely distributed genepools of countless interacting species bear any resemblance to the activity that goes on in the stories and imagery that we humans have set aside as cultural models? Well, for one thing, as anyone who lives in a healthy democracy can attest, the creativity of our human playfulness at building political and technological models is directly proportional to the tolerance with which this play is met in 'the real world'. Ideally, for both Man (at play in his arts) and Nature (at play in gene pools), the morality of life's more consequential transactions is judged more severely (whole organisms die, with multicellular 'pain'), and our play less so. But differences are not hard to find either. For instance, when comparing human with genetic 'blueprints', we think our human models are more 'like the real thing'; and while behaviours may vary in ways that are

reminiscent of gene recombination, they are strung out with the help of language into storylines that are often hard to tell from 'real live' events.

It's worth looking at this more closely. First of all, each brilliant idea that comes out of the human imagination is judged to be so only after it's been taken off the drawing board and tried out in the real world. Up until then it's just another novel arrangement of rehearsed experiences awaiting whatever true discovery might come out of the uncertain results of a ground-truth experiment.[2] Nature too is very good at trial and error, and in fact much more 'fearless' about it than we are. Not only that, but I will be arguing later that those sexual traits which reproductively define a species, and thus its place in the ecological 'story', might be viewed as a kind of rudimentary language; it's all a matter of scale. And of course, even if we agree that human invention uses a more realistic model space than Nature does (and to be clear let us refer to Nature's version from now on as 'design space') might this have disadvantages as well as advantages? Dogen's teachings will be called upon to shed some light on this question later.

If anything has changed from August Weismann's time, it's that we now know the delimiting of Nature's genetic design space is well served by the primaeval convenience that nucleic acid has a separate chemical nature from protein. Like Darwin, Weismann did not know about the structure and distribution of DNA, but he and others of his time intuitively felt that without germ-line isolation (a systematic withdrawal of DNA 'seed stock' from direct ecological engagement) evolution would have no way forward. Further genomic and ecological details come to light every day, but however we constitute it, Weismann's Barrier represents the setting aside of a nebulous safe domain within the totality of physical and biological action, so that the death of organisms doesn't defeat, but rather enables, phylogeny. What get played with in this safe zone are the ontogenies of possible future generations: recycled 'blueprints' for localised lives that can't experience their altered continuity. It remains for phylogeny, the dispassionate, enduring, and global selection for both stability *and* novelty, to accommodate life and death.

I began by saying the three-phase evolutionary dynamic (ontogeny, phylogeny, and variation and recombination within a genepool 'archive') has no counterpart for us to compare it with in non-subjective

terms, so it follows that we shouldn't try to visualise the process with some kind of mental map or flow chart.[3] Ontogeny is as familiar to us as losing our baby teeth. But phylogeny is a boundless leaping in pure faith, and genepools are a ghostly dreaming. Rather, I leave it to you to relate however you can to a dynamic that involves 'habitual' programs being 'abstracted' from overt expression to enable preservation, variation, recombination, and finally 're-iteration' in the real world of unpredictable selection pressures. I hope you will find the full evolutionary dynamic to be somewhat less difficult after all, with this 'personal' approach. Phylogeny is pure invention: a Pan-piped ramification of ecological solutions where 'dreams' are altered by consequences, 'ends' are subverted by means, and 'hopes' die with each iterative 'act'.

[THREE]

Facts are stubborn things; and whatever may be our wishes, our inclinations, or the dictates of our passion, they cannot alter the state of facts and evidence. —John Adams[1]

The magic of life can be understood, in a gadget-minded way, once we recognise evolution's complete indifference to scale. A subtle change in the shape of a molecule today means a whole new species walks the Earth ten thousand lifetimes from now. Thus, with timeless persistence, life gives exquisite attention to the indistinguishable so the impossible becomes common place. In the two essays that follow I will be exploring how our inability, or unwillingness, to embrace uncertainty at the smallest scales of time and space can affect mental constructs such as Gaia theory, or even our moral standards (revealing that, in the moment, morality is a natural state and immorality is an adherence to mental construct). But first, I want to tidy up, for my gadget-minded friends, the last essay's excursion into the *large scale* action of genepools. A Platonist might be sympathetic with, or dismissive of, my little foray, but an Aristotelian needs convincing—demanding that I "account for all the latest facts" relating to genomics—and this is both a more demanding and a more consequential undertaking.

For those who follow the latest research on the human genome, and the genomes of a rapidly expanding catalogue of species, perhaps my

calling up Weismann's story from another era needs some justification. The bounty of detail in our new scientific picture of DNA self-regulation would seem to defy such generalising, and in this atmosphere I will certainly be expected to admit some even older caveats for my fellow gadget-heads. As, for example, the technicality that large animals, with their somatic DNA more clearly removed from the genepool, fit my three-phase evolutionary dynamic better than plants or protozoans do. But in fact the phylogeny-ontogeny-genepool 'difficulty' is utterly a matter of perspective, and attention to scale begins to show its value here. However a phenotype develops, however genetic algorithms conspire with environment to produce, maintain, and alter an organism over its lifetime, or perhaps even pass on some of these epigenetic alterations in the womb, such short term adjustments, like learning itself, are incommensurable with the changes that happen on the time scale of evolution. The devil may be in the details but a wide view also has its place, and natural selection can't really be appreciated without recognising a largescale-emergent logic that selects for stability but also embraces change. Take the case of vegetative reproduction: while asexual stem cell regeneration is more efficient at covering ground than reproduction by pollinated seed is, it's less efficient at not only dispersal, but variation. Sex is a kind of variation selection—a readiness to adapt.

In any case, however you look at it, even if somatic cells alone can regenerate a plant, and even regenerate with variation, the undifferentiated nature of these stem cells still qualifies them as inter-generationally reserved 'germ plasm'. And as long as the peculiar expressions of unreserved DNA don't translate as permanent innovation down the line, I can say that the role of Weismann's Barrier, as a 'pawl in the evolutionary ratchet'—where genepool isolation commits a body to play out its irreversible 'experiment'—still holds true today in the sense that a genepool is the 'design space' for functioning bodies, and novelty is known to arise only from chance errors here, not from environmental pressures that activate, deactivate, or irreversibly delete existing potentials. Biologists could not have known a century ago what we know today about development and heredity, but Weismann's contribution to biology has a feel of Truth about it not unlike Gautama's contribution to psychology: growth, maintenance and death belong to a playfully recycled 'self' that

can't experience its wider continuity, for life's magic can only be appreciated from the perspective of a death-transcending environmental 'host'. In the last section of this book, after we explore in detail this 'evolutionary ecology' of the body-mind, we'll be in a position to revisit Gautama's First Noble Truth: "Suffering is part of life". Why do we so easily get stuck in our thoughts and attitudes, and then speak of 'enlightenment' when we experience getting un-stuck? Is there some reason the verbal and artistic model spaces of cultural evolution must be, in a practitioner's terms, 'stickier' than Nature's genepool design space?

But now let's turn away from the unfamiliar long view, and ask ourselves why immediacy, the experience of space and time collapsing to here and now, is an increasingly elusive 'mystic ideal'. Why do our gadget minds *thrive* on Newton's sleep?[2] Why do even our poetical natures seldom hit the mark of perfect intimacy—as idealism, turning only upon ideas, makes *lots* of room for that incompetent tinkering that Chogyam Trungpa called 'spiritual materialism'?[3] In the next essay, Ludwig Boltzmann's statistical treatment of entropy[4] may be just unfamiliar enough to a reader with Platonic leanings to illustrate how all categorisation, realistic or idealistic, must overlook that which employs it—a momentarily divided, or self-ish, mind. Will this open up a window on ethical determinism wider than even Plato[5] would like? On the other hand, if this old chestnut is *too* familiar to capture the interest of a reader with Aristotelian leanings, I will try to correct that in essay **5**.

~ A PRIMER ON PHILOSOPHY EAST AND WEST ~

If our Western philosophy, literally 'the love of knowledge', is all, as they say, footnotes to Plato, then in the early pages of *Phaedo* we're offered a view of the conjugal 'head-posts'. Here we read that true existence is revealed in thought, and "thought is best when the mind is gathered into herself … and she has no bodily sense or desire, but is aspiring after true being".[1] Then Socrates tells us true being is had only amongst Ideas—the ideal Forms of which all imperfect and transient things are but imitations. Then again, at the end of Book 6 of *The Republic*, we learn that even though vision may be the best and "most sun-like" of the senses, the job of a true philosopher is to rediscover these eternal first principles, and to derive conclusions from them, "making no use of anything visible at all, but only of forms themselves, moving on through forms to forms, and ending in forms."[2] The following morning, Plato's student and first among footnoters, Aristotle, was inclined to allow that transient things are real, and it's our generalising that's not perfect.[3]

Antipodal in every way, the buddhadharma takes Aristotle's inclination to its beyond-logical conclusion: if recalled evidence is the ground of ideas, then direct bodily sense is the Truth of all knowledge. So "the wisdom of the East" is really just our human search for bodymind methods by which corporeal, transient, and vulnerable poets and comedians like you and me can drop through cracks in the mental models we build on philosophical foundations (this Buddhist view of philosophy as a 'skillful means' to whole-some living, I will be calling, 'method philosophy'). With the surety of intuition (and overlooking history's evolving sciences of the body), a sitting yogi will encounter Plato's 'science of dialectic discussion' as the final *barrier* to opening his bodymind. Perhaps philosophy is even 'the near enemy' to Truth—as condescension is to compassion, as clinging is to love, as indifference is to equanimity. And sometimes (when I become infatuated with Aristotle's *αιτια*, or 'explanation by natural causes'), as *Prunus Americana* is to the plumb tree in the garden.[4]

FOUR

Our Platonic heritage prompts us to view means and medians as the hard 'realities,' and the variation that permits their calculation as a set of transient and imperfect measurements of this hidden essence. But all evolutionary biologists know that variation itself is nature's only irreducible essence. Variation is the hard reality, not a set of imperfect measures for a central tendency. Means and medians are the abstraction. —Stephen Jay Gould [1]

Gaia theory, by covering over the phylogenic intelligence of evolving ecosystems with the ontogenic lustre of a super-organism, places a spuriously gilded crown upon the head of that which the Greeks knew to be an immortal goddess. Certainly the more popular early versions of the hypothesis, in playing up the image of Earth as organism, glossed over the timeless and global selection pressure that *subverts* the inevitable decay of sundry mortal organisms (the goddess's passing improvisations) for it is in the nature of, and in fact it is required of, an organism, that it be subject to irreversible epigenetics, and irremovable mutations.

The fixed genotype of a single organism is a closed system of information, orchestrating a narrow and brutal life that ends, with statistical predictability, in death. Thus death is inevitable simply because (if my own subversive intelligence may recombine terms from Eddington, Boltzmann and Machiavelli) time's stochastic arrow (entropic probability) points to those ends (easily identifiable macrostates) that can be achieved by the greatest number of means (interchangeable microstates). Here we have not only a physical and a biological, but an ethical slant to a thermodynamic principle; and I propose that the steps in this collision of mathematics and ethics are worth the trouble of following because, like the chicken and egg review, the effort allows us to update another misleading proverb for our post-moralist Darwinian times: it turns out it's not the goodness of our intentions after all, but their easiness, that "paves the road to hell". Of course, this update on the wide road to a state of dissipation overseen by the fallen angel of convenience is not meant to imply that, well before Darwin and Boltzmann, many enlightened pagans, and radical Christians, didn't appreciate that getting to heaven means taking "the narrow way".[2] Indeed this religious

insight is not so much overturned as overlooked by our modern consumer culture.

But perhaps my 'ethical math' needs illustrating: Picture life as a game of no-draw poker. In a 52-card deck there are 2,598,960 possible 5-card hands (the microstates). If we're only interested in the most favourable macrostates (hand 'types' that beat, say, a pair) then out of this there are 4 ways to deal a royal flush; 36 ways to deal a straight flush (excluding royal); 624 ways to deal four of a kind; 3,744 ways to deal a full house; 5,108 ways to deal a flush (excluding royal and straight); 10,200 ways to deal a straight (excluding flush); 54,912 ways to deal three of a kind; and 123,552 ways to deal two pair. Now this accounting of our decreasingly preferred, but increasingly likely, macrostates might give us hope, but their 198,180 microstates are still less than 8% of those possible! My point is this: our *limited interest* (ignoring 92% of the hands we can be dealt) defines what we see as one monolithic macrostate of "junk cards", so ethics comes in because an *agent* is clearly being very picky. If we must play by the rules of poker it's convenient for us to overlook the non-interchangeability (each 'way' is equally distinct) of all the 5-card microstates in our macrostate of ignor-ance.

But what if playing by the rules is *not* our only task? The second law of thermodynamics, as explained by Boltzmann's Order Principle[3] given above (the outcome or condition with the greatest number of approaches or complexions is the most likely), is a supremely useful tool for predicting what will happen in an agent-free closed system: like an oil spill (it spreads), or like a system of gas (add heat and the pressure and volume change in a useful way). In fact the principle can be applied as easily to a room full of partying teenagers (it gets trashed) as to a game of poker. For that matter, the formula works even better when applied to a whole universe (isolation of galaxies, stars, and planets, and ultimately 'heat death'). The manifold ways of disorder truly pave the entropic easy way, and the harder we strive for a preferred state, the faster disorder accumulates somewhere because, in an agent-free universe (let's pretend for the moment — as idealists necessarily must do — that "we" the preferers are not agents), un-'wanted' microstates are always the most plentiful. Disorder is a numerical certainty. We can even say that causality and duration themselves are statistical artifacts

when numbers alone break the symmetry of what's probable and point the arrow of time. The past dissipates into the future, never to return. By the numbers.

So where does agency come in? How does probability become possibility? We know we can't turn the arrow of time. And we know it's hard to clean up an oil spill or control our partying friends by assiduously following the rules when others fail to. But this is not what we mean by the narrow way. If human life is more than a game, then perhaps part of our task is to *witness* this flickering of attention that makes the arrow appear, and responsibility disappear; for then we begin to see how (in the dim light of macroscopic senses or cultural conditioning) the selection pressures in our un-Naturally drifting minds are overlooking the very particularities we must count when we specify our ends—when we recognise, or cling to, those ends as identifiable. An 'agent of change' plays *with* the rules; he pays attention in a way that sees (like Pan/Gaia) the non-statistical singularity of every deal (organism), and makes his move so that everyone (co-evolving intelligence) always wins.

[FIVE]

Now let us suppose that ... a being, who can see the individual molecules, opens and closes the hole, so as to allow only the swifter molecules to pass from A to B, and only the slower molecules to pass from B to A. He will thus, without expenditure of work, raise the temperature of B and lower that of A, in contradiction to the second law of thermodynamics —Maxwell[1]

At the risk of belabouring an already difficult point, I'll give some further qualifications to convince or confound my fellow sceptics. The mathematician Ian Stewart writes that Leo Szilard "saved the second law for all practical purposes" by showing that the information collected by Maxwell's Demon carries entropy. But he also cautions, "The vital concept here is not information as such, but meaning."[2] Isn't it wonderful how the broad daylight of *discrimination* tiptoes in and out of our calculations, like a well-trained servant in the night, as we darkly circle in on our terms? While the immediate purpose of a sense experience might be to whet our appetites, or to keep our fingers out of the fire, its

"practical purpose" is to inform our need to explain, and to foretell, as narrative. Thus the story goes that "complex life evolved in our far from equilibrium Earth system so the overall energy and order in the larger system centered on our sun can dissipate even faster". Well, here's another interesting cosmic story: If the ultimate effect of Life is to increase the number of 'wanted things' at the expense of 'unwanted things', then our calculations alone, where the entropic rate depends on the ratio of interchangeable microstates to favoured macrostates, might not reflect the fate of the universe. It all comes down to whether agency keeps discerning its place among "all practical purposes" we might aspire to.

For the purpose of manipulating an agent-free universe (i.e. science and technology) the Second Law Story works splendidly! In fact *any* narrative works if you follow the rules. Rule one: action is 'really' the re-action of an outcome determined by a past. Rule two: each character is fully defined in terms of the others. But all of us sooner or later notice that we can at any time end the narrative, and then we remember: when we saw "time" as real, this was just us pretending that past and future are not illusions in the very important sense that we don't live there. And when the story ends—let's say it's the "Universal Heat Death" story—we notice something else: when we foresee the vagueness of dissipating stardust, but not the details of any evolving organism, this is just us choosing to forget what we are missing when our characters are co-defined. When we look at our oranges in terms of apples.

Information is orthogonal to what I am pointing out here.

As angles are to orioles.

The "time" whose symmetry is broken by entropy's statistical arrow[3] (causes precede effects, but never the other way around) is an incomplete character in an incomplete story. "Time", "cause", and "effect" are the provisional choices of an 'ontogenic' intelligence that is always at risk of forgetting to step beyond its terms in order to accommodate a 'phylogenic' whole-some-ness. They are conveniences that help us define technological 'things' for a pre-existing purpose. But when we look at any creative experience of *generating* conceptual order (music, art,

literature) in purely phenomenological terms, disorder feels like an absence of interest, and order feels like increasing interest. Perhaps then it is only a flickering discontinuity in our mental constructing, allowing room for an immeasurably continuous Mind to oversee (in its inconceivably personal Way) but not enter into the models themselves, which makes 'phylogenic' intelligence possible in the first place? Perhaps the "Demon" is our living, evolving Reality!

But in a changing technological world, the thinking mind is never at a loss for its practical purposes, and as the horizons of this world expand, our provisional intelligence can always set up alternative stories, even alternative symmetry narratives. How about one that reflects *itself*: the shallow passivity of "mirror-ism", against an "increasing depth of engagement", or the top-down statistics of "prediction" against the bottom-up details of "history"? These symmetries are also plausible. What happens if we tell our "overall dissipation from life" story, knowing a hound can smell a single molecule? Or the "outcome is determined by the past" story, realising that a hominin's un-Natural interest in sticks and stones that fit comfortably in its hand has arrived here in the twenty-first century flirting with nanotechnology? (And by the way, what moralist, what prophet of inevitable doom, what top-down authority ignoring the magic of individuals, ever predicted the future we presently live in?) Can we Really be sure our universe—that vast uber-system passively feeding on all others—is "only following entropy's widest road to heat death"? Or are we in the hands of an ever-connecting, definitively unpredictable, "presence of Mind"? The complete mirror image—*everything* backwards—of "inevitable disorder" cannot be an order that is in the same way statistically given: this *gift* must be wholly un-looked-for. Admittedly, life's Darwinian choices, those unforeseen (but perhaps karmic) reversals that "don't seem to care" about the discontinuities they create in our lives, will feel inconvenient if you're one of the unprepared. But how can we fully prepare for a vital, and therefore indefinite, future? Surely, if present and timeless awareness—The Way of intimate connection—*creates* the future, it cannot be Any Thing Like those conceptual highways we engineer for the convenience of our pre-existing practical purposes.

But ultimately this is the only safe way to *live*.

SIX

"What is the Way?" Ordinary mind is the Way. "Should I turn toward it or not?" If you turn toward it you turn away from it. "How can I know the way if I don't turn toward it?" The way is not about knowing or not knowing. When you know something you are deluded, and when you don't know, you are just empty-headed. When you reach the way beyond doubt, it is vast and empty as space. You can't say it's right or wrong. —Ordinary Mind Is the Way *koan*[1]

So how can we possibly under-stand this ordinary experience of unfathomable Mind that oversees our cleverly shifting interests? Can that which watched over everything also be a thing? The question posed by Leibniz and Heidegger, "Why is there something rather than nothing?" can also take the form, "Why do I have experiences at all?" David Chalmers calls this "the hard problem of consciousness" because, unlike easy problems that address our *capacity* to discriminate, integrate information, report mental states, or focus attention—all of which can be formulated in comparative terms—the immediate Truth of consciousness does not yield to measurement and research.[2] With what do we compare it? How can such questioning reveal a truth that lies outside its own play of truths? If the audience becomes part of the play, who's watching its preoccupied faces? Nobody?

The "hard problem" has been approached in at least three essentially different ways: **1** If consciousness is defined, for practical scientific purposes, as "that which the brain does", then those who study the neurochemistry of the brain give the most detailed accounting of the machinery that 'underlies' consciousness. In *A Universe of Consciousness* (2000), Nobel laureate Gerald Edelman (the award was actually given for immune system research) described consciousness as a "continually changing selective process" taking place within a "distributed, re-entrant, and highly differentiated" stream of neural activity. He also said it was "private and serial, with a dynamic core of limited capacity",[3] and it's worth noting that this caveat reflects an implicit understanding that consciousness must, naturally, be attached to individual bodies as a sort of special organic product (more glorious perhaps than hair or toenails), rather than something pre-existing, like an immaterial soul (either

personal or universal). On the other hand, if a process is "re-entrant", must it not involve all exterior things that a "private and dynamic core" comes into contact with? How can meaning (presumably that which consciousness does) in its turn be produced without the shared cultural memories that interacting with a long succession of other interacting minds generates? But perhaps at this point in our deconstructive adventure we've moved beyond the practical purposes of science, to a place where the hard problem of one brain's product might seem to be a superfluous problem when compared with a globally and generationally extended body of questioning that goes far beyond the place and time of an individual person.

For why is 'subjectivity' required? Is it needed to 'make sense' of a mind's temporary embodiment? If so, then: **2** a *thoroughly* individualist school of thought says all consciousness is 'self' consciousness. If the body is essentially a Cartesian theatre, with an intrinsic spectator supervising its stimulus-response loops, then the definitive test of an animal's consciousness is that it can recognise itself in a mirror. Of course, if we accept this dualistic view, we must now discount the experience of a Harvard-trained brain scientist who, in 1996, 'suffered' a stroke in her left hemisphere and "no longer perceived [herself to be] a whole object separate from everything".[4] Jill Taylor's mirror revealed only "a collection of interlacing cells"[5] but her "soul was as big as the universe and frolicked with glee in a boundless sea".[6] If we take this report into account, then it's the self, the audience, that's 'made'—not sense.

So finally, and supported by stories like this that have been told by mystics and the mentally 'afflicted' throughout time, comes the oldest idea of all: **3** Consciousness, Dogen's "Primordial Awareness",[7] *is like* a pool of water that returns to its unconditioned clarity—empty of every thing—only when, in perfect stillness, the judging and self-ish agitation subsides. Perhaps what we really mean when we say the problem of consciousness is hard is that what we are calling Mind stands outside of everything we can possibly know, just as a mirror doesn't enter into its reflected universe. Brain scientists—Edelman would be no exception—must demarcate the objects of their research, because you can't understand the unfathomable. But it turns out the hard problems are lived, not solved: we might like to imagine we are about to touch the mirror itself,

but we're only reaching out with more of our (admittedly wonderful) reflections. And in the end we're forced to enter the poetical mood, so that metaphor can track The Way of our elusive (and illusive) quarry beyond the confines of academic departments. Indirect language allows even sensible researchers, like Christoff Koch, chief scientific officer at the Allan Institute for Brain Science in Seattle, to directly contemplate "the ultimate goal of identifying the footprints of consciousness in highly excitable matter."[8] The deep lineage of this metaphor is itself worth contemplating. In the early centuries of Buddhism it was considered profane to represent Buddha (awakening) with any overt image. Other than a footprint.

[SEVEN]

The human understanding is no dry light, but receives infusion from the will and affections; whence proceed sciences which may be called "sciences as one would." For what a man had rather were true he more readily believes. Therefore he rejects difficult things from impatience of research; sober things, because they narrow hope; the deeper things of nature, from superstition; the light of experience, from arrogance and pride; things not commonly believed, out of deference to the opinion of the vulgar. Numberless in short are the ways, and sometimes imperceptible, in which the affections color and infect the understanding. —Sir Francis Bacon[1]

It was not with any mystical aspirations that, when I turned fifty, I became a practitioner of mindfulness-insight meditation. Rather it was with the practical intention of following through with the mandate of Bacon, arguably the first patriarch of modern science. You see, his directive to "purge yourself of prejudices" was never followed up, as far as I know, by any Western philosopher with anything like an instruction manual. In fact, Karl Popper objected that "there is no such thing as an uninterpreted observation, an observation which is not theory-impregnated."[2] Even Husserl didn't recognise that there was a need for *silencing* thought in the sustained and transformative manner of Gautama, Bodhidharma, and Dogen; rather, for the purposes of his phenomenology, the objects of thought were only to be "bracketed"

within a constant stream of "transcendental thought"—more words.[3] Of course, there was also a personal reason for my becoming a lay practitioner in the no-nonsense Soto Zen tradition of sitting meditation (a form of vipassana called shikantaza, or "just sitting"): I was responding to the promptings of my *own* heart to discover the unique mandate of one life's journey before it was over. Still, I happily confess I don't have any exceptional insights to offer on the hard problem of consciousness. I acknowledge also that, since I don't have a degree in the cognitive or neurological sciences, my arguments here can't rely on that kind of evidence, nor can they deny it; rather, I will look for patterns that appear with a whole-some distance—for it *is* a layman's place to show what's missing from the discussion. Here's the thing: we all have (if that's the right word) this aware Mind, this sense of presence (in fact the *this* experience itself, which translates from Dogen as Suchness) that is difficult to conceptualise (a "hard problem") just because it's an unexceptional truth as well as an immeasurable truth. And, like others of my generation, as it will be for many in generations to come simply as a result of not dying young, I now have many years of unexceptional experience to draw upon that might throw a cumulative, if nothing special, light on this adventure of being conscious.

For example, I can say that Edelman speaks only for the conceptual point of view when he writes, "we all know that when we first learn a new skill we need consciously to control everything we do, but after some time our performance becomes automatic and soon fades from consciousness". Thus, with practice, he says, what starts out "slow, laborious, and prone to error" becomes "fast, easy, and accurate" as "conscious control becomes superfluous, and disappears."[4] Now suppose, for the sake of argument, we're learning to shingle a roof. My problem with this truism, as a *complete* accounting of my own experience, is this: just because I've acquired the skill of shingling and I'm no longer breaking down the process into separate actions, this doesn't mean I'm not conscious of the action. In the past, I *have* shingled roofs automatically: my mind on more 'important' things (like how I'm going to spend my pay). Trust me, the job is done faster, better, safer, and more profitably when I'm *fully* aware of what I'm doing: when I feel the grit on my fingertips, the sun on my back, and my hammer blows shivering

the same clear air as the white-throated sparrow's all-penetrating song. At these times it's true that I can't conceptualise my actions without losing my focus. But my action is deliberate. Perhaps you too have noticed that most carpenters (I would go so far as to say the most productive ones) have a problem putting their skill into words. They ask you for a "thing-a-ma-gummy" when they don't have a free hand. And just as intuitively, you "get it"!

I accept that habits are convenient when you want to turn your attention to other things—indeed if you think about tying your shoe lace you might discover you no longer know how! But there are many ways of knowing, and if you let your fingers take charge, without thinking, you can still be fully aware of what you're 'doing'. Thought is reluctant to question its sufficiency, and it's this 'failure' to reduce whole body intelligence to head-games that is subsequently construed in the thinking mind of even our otherwise competent carpenter as evidence of work 'unconsciously' done.

Personally, I (as a thinking mind) prefer the reflecting pool simile given earlier (item **3** in essay **6**) over the other more discrete conceptions of consciousness listed there; for if similes, metaphors, and analogies are also incomplete, they are honestly so. Certainly this one must change with the times, for we now know, whereas the ancients did not, that the reflective surface of a pond overlies a 'dead' balance: a static equilibrium rather than a dynamic harmony of molecular motion. So we might want to characterise our own experience during especially 'conscious' moments in more active terms: "It was like my mind and body were in perfect balance and I was open to any challenge. Every step on the dance floor (stroke of the brush, swing of the hammer, grip on the rock face …) belonged to its own moment in time where the right (as in the eightfold path meaning of 'uncalculated') response just happened."

Does the true nature of consciousness reveal itself in such heightened states as these? Then perhaps we can find a comparable for our hard problem after all. On a geological scale that our less patient 'brain streams' must happily fail to experience as consciousness, the fossil record tells us the story of a "selective process" at work in another "perfect balance" that is "distributed, re-entrant, and highly differentiated". Who

are we to say there is no wit-ness, no geologically-paced "footprints of consciousness in highly excitable matter", when environmental challenges cause species to "just happen" in the uncalculating readiness of that selectively balanced stream of variation we call an ecosystem?

This brings us back to "the neural processes underlying conscious experience", for it turns out Edelman is also an advocate of the Darwinian analogy: "Moreover, as we shall see, selectional principles akin to those of evolution apply to the actual workings of individual human brains well before they operate according to logic. This view has been called selectionism." It seems the analogy doesn't work the other way however; Edelman's "theory of neuronal group selection" only helps us to "avoid the paradoxes that result from attempts to explain consciousness solely in terms of computation",[5] and he cautions that it doesn't permit us "to imbue the world at large with conscious properties—the view of panpsychism."[6] Furthermore this is not the only strictly poetical supposition that a practical scientist must quibble with, for "subjectivism itself is no basis for a sound scientific understanding of the mind. Consequently, we reject phenomenology and introspectionism, along with philosophical behaviorism."[7]

My mission in this book is not to reject any quibble that allows us to do good science. But, once again, there will inevitably be something missing in any objective account of subjectivity, and Edelman's characterisation of introspection as "taking thought alone [to] analyze the underlying bases of conscious experience"[8] falls far short of the inner-seeing prescribed by my teachers when they tell me "you can think about an insight, after you've had it, but you can't think your way to an insight."[9] An unfortunate result of this common misunderstanding can be found in Edelman's rejection of behaviourist psychology on the grounds that it "necessarily stops at the stimulation of receptor sheets—the retina, the skin, the taste buds—and … it leaves the inner workings of the body and brain untouched."[10] Clearly it's not only behaviourists who are 'out of touch' when trying to 'make sense' of their mental operations. That the validation of direct bodymind awareness must occupy so much of this book seems just sad when, with a little practice, we find that introspection means nothing other than *seeing* the "inner workings of the body and…" well, let's say: the pushing, pulling, avoiding and

rehearsing that kinaesthetically in-form our thoughts of self and other in the bodymind. Something is seriously missing here, especially if we want to become *familiar* with "the processes that underlie conscious experience".

A less practical-purposes-oriented line of questioning might go something like this: Is body sensation, as Hume thought, the whole content of consciousness? Consciousness then would surely need bodies, and panpsychism, "to imbue the world at large with conscious properties", must fail. But consider this: if 'awareness', which can minimally be defined as *the capacity to appreciate,* depends upon this exclusive condition of an embodied brain, doesn't this make all that went before the geologically recent arrival of humans, or mammals, and the vast universe beyond our little planet, a huge waste? (In fact, even worms' brains evolved only in the last twelve percent of our planet's history.) Like Darwin, I have trouble seeing in the works of Man anything that makes us more intelligent than Nature. (See Part III intro[11]) And in the end, if a good scientific reductionist must honestly ignore the hard problem to fulfill his mandate, he must also admit his definition of sensation is strictly utilitarian, for in its fully deconstructed essence, it need be nothing more than the impression made on one thing by another. Then, if we assume Hume was right in confining mind to sensation, the essence of consciousness is that *this* connects 'things' as a Whole.

[EIGHT]

Primordial Awareness [the Way] is perfect and all-pervading. How could it be dependent upon practice and realisation? The movement of Reality does not need us to give it a push. Do I need to say that it is free from delusion? The vast expanse of Reality can never be darkened by the dust of presumptions. Who then could believe that it needs to be cleaned of such dust to be what it is? It is never separate from where you are, so why scramble around in search of it? —Dogen[1]

If we must say anything at all about the "hard problem" (for *where* is the problem?), and if we aren't constrained for practical scientific purposes to reserve the word to mean only that which the central nervous

system does, then it doesn't make any more sense to say that consciousness is a property of certain brain-states than to say that brain-states, and forests, with all their measurable 'easy' problems, are the properties of consciousness. I think of this kind of argument as 'method philosophy', to distinguish its transformative approach, as found in Dogen, from both classical philosophy and the more recent tradition of process philosophy as found in Nietzsche, Whitehead, Alan Watts and, within physics, Prigogine. Process philosophy, by focusing on *change* as the dynamic principle in our models of reality, was an attempt to break free from classical models that were primarily focused on substance and permanence; but in fact all modelling keeps our attention on fixed concepts, until we turn away from both substance *and* process. Even if the word 'method' implies a previously modelled goal, this is not what it ultimately points to; for it is prescriptive in effect. So I'm not thinking, method of philosophy, or philosophy of method, but philosophy *as* method. We live with a philosophy as we would a koan, where the whole business is discarded in the moments we 'arrive'—in the same way as all teachings of the buddhadharma are meant to be used as a "raft to the other shore".

The philosopher Thomas Nagel gave us a useful method for addressing subjectivity back in 1974 in an article koanically entitled "What is it Like to be a Bat?" The example of a bat, with its unfamiliar echolocating sensorium, warns us that there can be many consciousnesses (lol, say this three times fast, then go woo, wooo... See?), perhaps infinitely many, morphing even within individuals: What is it like to be a philosopher, or a comedian? What is it like to be born? To die? To be a sentient being without language? To be a woman (for a man)? To be a man (for a woman)? To be at different times afraid, indifferent, or unshakably calm? To be a swarm of darting bees? To be very, very, very slow? …To be a forest, unbounded?

In the Heart Sutra, Gautama tells us "in emptiness there are no forms, no feelings, no discriminations, no compositional factors, no consciousnesses; no eyes, no ears, no nose, no tongue, no body, no mind …"[2] and on and on, but you get the idea. Gautama is only saying "this is what it's like to be empty". And he goes on to say that it's from this primordial awareness that all the things on his list, in their different

ways, arise; not the other way around.[3] How can there be a proper name for this? As psychologist and Zen teacher Albert Low warns us, "that which knows is not a something. It cannot be found among other things."[4] Because of this, and because the Nameless will always tug at a gadget lover's "other hand", I will continue using a style of argument that asks the reader to be attentive to shifts between the informative and the transformative moods. I would apologise, but I know if I tried to give a scientific account of Man and Nature without the thoroughgoing diversions of this other voice, I would be missing half the story. With luck, the honesty of metaphorical error will help us climb to undiscovered outlooks on humanity. Then again, the attempt might just be foolish. So I will take a cautionary lesson from a well-cited, seldom read, linguistic philosopher, and repeat to myself the following koan at every switchback:

When Wittgenstein, without broaching the need for silent not-thinking practice, said of his densely written *Tractatus*: "The book's point is an ethical one. … My work consists of two parts: the one presented here plus all that I have not written. And it is precisely this second part that is the important one."[5]

…was he taking too much, or too little, upon himself?

PART II

DARWIN AND THE TREE OF LIFE

… as a result of competition two similar species scarcely ever occupy similar niches —Georgii Frantsevich Gause[1]

I have called this principle, by which each slight variation, if useful, is preserved, by the term of Natural Selection, in order to mark its relation to man's power of selection. We have seen that man by selection can certainly produce great results, and can adapt organic beings to his own uses, through the accumulation of slight but useful variations, given to him by the hand of Nature. But Natural Selection, as we shall hereafter see, is a power incessantly ready for action, and is as immeasurably superior to man's feeble efforts, as the works of nature are to those of art. —Charles Darwin[2]

NINE

This I of which you speak, no matter whether it be the great I or small I, is only a pure concept which does not correspond to any reality. That is what Buddha meant. —*Thich Nhat Hanh*[1] (Italic and regular fonts as in original)

If we accept the insubstantiality of 'self', then there is nothing to hold human intelligence above that original phylogenic intelligence which dwelt long before Mankind in the bio-associations of Earth. Certainly this pre-human intelligence was a prerequisite for our human intelligence, and our ancestors were obliged to shape their techno-logical wisdom in response to the eco-logical patterns that in-formed the tree of life, perhaps even to model it upon them. Furthermore, it can be argued that even today our *cultural* associations must be overseen by at least a convention of selflessness that contradicts this trumped-up superiority over Nature. But here's the paradox for us gadget-heads: even if we imagine the self to be substantial, an emergent property of an embodied brain, then given the success we've had modelling our evolving artificial neural net (ANN) algorithms on natural selection, we can now just as easily argue that the bio-associations of Earth have a self as well—as creative as our own if not as quick, and as complex as our own if not distributed in quite the same way. For that matter, if we protest that Earth's evo-ecological intelligence seems to be radically fragmented among its islands and geographic zones, does this observation not really make the similarity with human intelligence—which has as many divergent personal and cultural zones—all the more compelling? And if the intelligence of evolving Nature operates enough like our own minds that we can postulate a primordial Mind at work here too, then perhaps it is wise after all, if not to anthropomorphise, at least to empathise with

a Natural selection that distinguishes between the minute chemistries and activities of biological bodies as fit, or unfit, for an ecological niche. Perhaps we can learn something 'personal' after all from this sacrificial Way of at-tending that pervades evolving bio-associations. Whether we call it selfless, of not.

Extraordinary parallels can be shown to exist between our planet's slowly evolving Earth Spirit, and the much faster creative spirit of human intelligence. But then extraordinary also must be the consequences, and thus strange the tenacity, of our disinclination to look more closely at a naturally arising question:

> *Given our growing capacity to out-compete all other species, is it still possible for the two evolutions—one branching into a geologically slow tree of life, and the other into a techno-logically accelerated tree of knowledge—to continue patching together a single, increasingly thread-bare, 'canopy'?*

For 'who' then will uphold it?

Certainly we are right to reject any thought of returning to a pre-Darwinian mindset that puts Man above Nature. But perhaps Darwin's romantic inclination to put Nature's "power incessantly ready for action" above "man's feeble effort"[2]—in that it encourages a pre-Christian (not to mention a pre-Darwinian) idolatry of an implicitly caring and 'ontogenic' Mother Earth—isn't a viable model for the relationship either. Perhaps it would be better to consider a more friendly approach? I would suggest a model based on these lines penned by the poet Rainer Maria Rilke: "Once the realisation is accepted that even between the closest … beings infinite distances continue to exist, a wonderful living side by side can grow up," for only then might we "succeed in loving the distance between" us "which makes it possible to see the other whole against the sky."[3]

TEN

Look again at that dot … every saint and sinner in the history of our species, lived there—on a mote of dust, suspended in a sunbeam … In our obscurity, in all this vastness, there is no hint that help will come from elsewhere to save us from ourselves … There is perhaps no better demonstration of the folly of human conceits than this distant image of our tiny world [sent from Voyager I as it swept beyond Saturn in 1990]. *To me, it underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known. —Carl Sagan*[1]

Just as the tangle of belief-pooled impulses expressing our culturally shared tree of knowledge formed in the context of challenges from a non-human natural environment, so these natural systems of species-pooled genotypes (expressing the taxonomic history we see as a tree of life) also evolved in response to challenges from 'outside'. The assaults still come, gradually or episodically (as in Eldredge and Gould's *punctuated equilibria*[2]), either directly from the dynamics of an uncaring cosmos, or indirectly from the thermodynamic stresses of its gravitational energy still lurking deep inside our slowly cooling, blindly whirling, "pale blue dot" of a planet. Can we really say this inorganic conveyance for our two trees is more "motherly" than the broader cosmic environment?

The *adaptive radiation* that has followed immediately in the wake of even the most destructive challenges from 'outside' is a persistent feature in the fossil record. When the strokes come at the slow pace of continental drift and climate change, the life systems that ride upon our heat-stirred star-swung planet are given reasonable time to adapt; but when the cosmos strikes with more deadly force, when an incoming space rock causes the wholesale replacement of species and changes the face of the planet forever (as co-evolution echoes far beyond the areas and times immediately affected) then the phoenix-like character of evolution seems miraculous indeed. On the one hand, it would be natural to think that undisturbed diversification leads inevitably—as 'ecological barrels' get filled and finely adjusted—to more and more interdependent, and thus fragile, strategies; but on the other hand, how do we explain

this evidence of long-term resilience in the fossil record? If the rebound flourishings involved only a return to the ever-increasing interdependency of normal times, how would such a system continue to sustain the widely spaced, and therefore abnormal, blows of an outlandish cosmos? Consider for instance the comet impact that conspired with one of 'Mother' Earth's volcanic episodes to end the Cretaceous Period: every school kid knows that sixty-five million years ago the Chicxulub event decimated the great saurian ecosystems of that time, but we are living proof that something was left intact that was 'prepared' to seed the proliferation of mammals.

Nature obviously can't adapt species directly for such unusual disturbances of such unusual magnitudes; however, in responding to the background stresses of local events, like fires, landslides, and windfalls, there is resilience built into *successional pioneer* strategies that lead to the repair of ongoing ecosystem disturbance. In much the same way as the handiest skills (fixing the step, doing the laundry, basket-weaving) promote recovery after emotional breakdown, or as broader interests, beyond the desperate focus of a flawed paradigm, make the 'shift', so the flexibility of opportunist species like black bears and phoebes, or of edge species like aspen and fireweed, naturally positions them to become (along with a few very lucky specialists) the *evolutionary pioneers* in a totally transfigured world after an ecologically 'unfamiliar' disaster.

So what about us? Should we suppose the pioneering flexibility of our technology will benefit Nature? Or is our capacity for unbridled opportunism a recipe for further disaster? In normal times there are subtle strings attached to ecological flexibility. Physical endowments must, in Nature, be compromised to allow for versatility, making their opportunist phenotypes vulnerable to unrelenting specialist competition. And, what's more germane perhaps to human origins, it seems only logical that versatility, without the coordinating power of language, does not lend itself to cooperative behaviour. Opportunists must naturally have more difficulty coordinating their wide-ranging interests than specialists do, and specialists derive more benefit from cooperation in a niche narrowly partitioned from other specialists (think of the opportunistic but solitary black bear in contrast with the highly specialised pack-hunting

timber wolf). Our earliest unshared ancestors were probably opportunistic, and might even have contributed something back then to Nature's bucket brigade of successional pioneers, but our technology has long since broken the genetic contract that once limited hominin ambitions. It's an insane boast indeed to be at the top of the food chain when you get there by consuming or displacing every link along the way! How did we "go wrong"?

[ELEVEN]

If, wherever you are, you take the role of the host, then whatever spot you stand in will be a true one. Then whatever circumstances surround you, they can never pull you awry … these will of themselves become the great sea of emancipation.
—Ch'an Teachings of Master Lin-chi[1]

By recognising means as ends in themselves, with each passing iteration, and letting go of a narrowly focused in-tending for all embracing at-tending, unpredictably ramifying gifts can be panned from the dream-like flow of variation. Charles Darwin did not deny time's arrow, but simply showed that if you open your eyes just right; if you look at all nature's details, even her mistakes; and if you look on all scales, so you're not just seeing the next moment, nor even just the next life cycle; and if you're not just imagining today's certainties pushed forward into a time so distant, and with effects so random and irreversible, that the rules *you* know might no longer apply; then, "most beautiful and most wonderful", time's trajectory becomes a creative Path in the openness. Darwin opened everyone's eyes to a new perspective on Nature by showing how improbable means (random variations) were being selected in living systems to evolve novel ends (stable species) by a pathway that advances (yes, I've read Gould, and I still say "advances"[2]) ratchet-like in the non-stochastic activity of burning its genealogical bridges: Darwinism is a detached way to see the Zen Way to create.

The non-judgemental silence of mindfulness meditation opens us up directly to insight meditation (the Sanskrit word, vipassana, has both meanings) because a clear view of what's going on inside our

bodyminds becomes not only possible, but inevitable, as those entangled thoughts that meditators call "monkey mind" and William James called a "blooming, buzzing confusion",[3] begin to slow down and resolve into their free flowing speci-fics. In fact, during meditation, what we 'see' arises between the (truncated) words.

Now, in comparison to the busyness of human minds, the specifications of Darwin's evolving "entangled bank" are slow to begin with, and so we might expect that evo-ecology can be easier to understand than our own mental processes. But evolution moves unnaturally slow compared to the pace we live our lives, and the out-of-scale workings of natural selection only came to light a century and a half ago, more than two millennia after Gautama opened his window on the human mind. So it's no wonder then that even today we have a difficult time accepting that the hard won evidence for evolution points in the same direction as the Buddha's fourth noble truth: the "right" path[4] for natural selection is also selfless and undirected. To the extent that we identify with our animal bodies we will feel pain, and 'we' will die, like any other animal body. But just as our global and undying Phylogenic Host accommodates all this animal sensation and discontinuity, so human selflessness can pass beyond identification with the thoughts and sensations of our unique life trajectories (our ontogenies) and learn to simply accommodate them: to play the Culture-genic Host.

Darwin's insight, the evolutionary pathway of selected accidents, ultimately differs from narrowly teleological theories like Lamarck's (where traits acquired by the efforts of one generation are inherited by the next), not only in its 'abstraction' of heredity,[5] but in its radical, paradigm shifting, acceptance of unpredictability and irreversibility in the creative process. Natural selection, being the evolution of 'intention' itself, can't be grasped as a means to an end. Evolution is not a mechanism; it's a sacrificial process, a selfless act. 'Selfless selection' entails an anonymous gifting, that can't be compelled—or for that matter even be acknowledged except by the direct courtesy of mindfulness, or perhaps indirectly through poetry, as in these lines by the Sufi mystic, Rumi:

Friend, our closeness is this: anywhere you put your foot, feel me in the firmness under you. [Reply:] *How is it with this love, I see your world and not you?*[6]

Let me say that again: *this* pathway, with entropic variation as its means, cannot be minutely predicted, or retraced; but also, by continually remaking its ends, neither can it be ultimately predicted, nor can its absolute freedom, and its covenant with unwavering goodwill, ever be taken as 'proven'. Does this state of affairs sound familiar? Perhaps this selfless selection we see in the Natural world can be rephrased in a simple injunction cobbled together from the world religions of Moses, Lao Tzu, Gautama, Krishna, and Jesus: *Do all things with mindful attention (*this *love) without lingering attachment to ('consuming' as 'self') previously selected outcomes (making them calculated 'fruits' of the living act).*[7]

TWELVE

The heavy is the root of the light. The unmoved is the source of all movement. Thus the master travels all day without leaving home. However splendid the views, she stays serenely in herself. Why should the lord of the country flit about like a fool? If you let yourself be blown to and fro, you lose touch with your root. If you let restlessness move you, you lose touch with who you are. —Lao-Tzu[1]

At first glance, it's clearly legitimate to speak of evolutionary divergence as tracing out an extended family tree, by which we are related to every animal, plant, and fungus on Earth; but as we look closer at species relationships, we find the charting of our immediate relations tells us *nothing* about that resource partitioned branching by which the greater history of co-evolution unfolds the self-contained, outreaching, eco-logical canopy for a tree of life.

It takes only a few generations before the branches of our little family trees begin to rejoin, eventually melting into a *genepool* big enough to distinguish itself as a *species* among other species. At this point we have an inbreeding network (not yet an ecological network) that behaves more like a 'family vine' than a tree (or 'bush', as Stephen Jay Gould would have it[2]). Unborn, undying, and inspired rather than aged

by the winds of change, a species flickers and fluctuates like (to mix similes) an enduring flame through countless deaths and births. But we must step back further, far beyond local family trees and even beyond their speci-fied perimeters, in order to watch diverse genepool vines extend through their loosely interwoven lifetime cross sections; for it is here we witness the true, and irreversible, branching of Life's phylogenic tree. From this grand Darwinian view, even the manifold flickering of true forest-tree populations that span many human lifetimes, is but a brief testament to their deep past of adaptive radiation, during which occasional loose strands trailed off into non-interbreeding species. What mortal tree sports leaves as various as the siblings on a family tree, let alone the diversity in a forest of *species*?

It's ironic and confusing that the best image we can call upon to represent the branching progress of phylogeny is a tree: an ontogenically programmed organism recycled from soil-made seed and back to soil again. It's difficult enough to keep the intentional category errors of analogy and metaphor in line without adding to them unintended errors of scale. Since the book you have before you is an attempt to extend this difficult cross-scale analogy so as to shed some light on phylogeny's one truly comparable process—the evolution of culturally-selected behaviour—I must now qualify my use of the conventional tree image to reclaim its instructive power. Even if it turns out you can't accept my phenomenological 'evidence' for this singular correspondence (for I acknowledge that it's not only impossible to objectively verify reports on internal phenomena that are by definition subjective, but that my full-body Zen perspective runs counter to the mostly visual-graphic foundation of traditional science), nevertheless you might find that the 'tree', as amended in this section by the evo-ecological evidence alone, reflects an oddly familiar light back on ourselves.

~ NATURAL HISTORY PRIMER: ECOLOGY AND EVOLUTION ~

Although the sentiment is as old as "Mother Nature", the term ecology, meaning Nature's "household", was only coined by Ernst Haeckel in 1866. This was about the same time Thoreau did the first serious ecological fieldwork by tallying pine seedlings to plot forest succession.[1] In 1904, Joseph Grinnell formulated the *competitive exclusion principle* based on his own field observations, and in 1917 he coined the word "niche" to describe that set of resources and conditions minimally exclusive to each species.[2] Gause's experiments in 1932[3] gave legitimacy to competitive exclusion as the means by which these *resource partitions* are established and maintained (although, "Gause's Law", like Occam's razor, remains an intuitive *principle*, because the complexity of highly diverse systems makes for unpredictability). By the mid-1960's, these advances in working from field to formula had produced equations for population growth rates, predator-prey dynamics, and MacArthur's and Wilson's *theory of island biogeography*: diversity increases with island size and decreases with distance from the mainland.[4] These are important tools today as we try to control invasive species and establish reserves and corridors in response to human development.

The systems approach, which enables many of today's technological miracles, took root in the 1950's with Howard and Eugene Odum's work on ecosystems shaped by energy flow between *trophic levels*.[5] Since such systems are notoriously sensitive to the "butterfly effect" (small perturbations can have big effects) it's tempting to think that systematics is all we need to know about Mother Nature's miracles. A short-term "organismic" mindset, however, trivialises Darwin's insight that *phylogenic* change requires a system to be *minutely prepared by long history to take advantage of mutating information*. There's a second system on our planet now with this 'phylogenic' intelligence, and since techno-genesis is not subject to competitive exclusion by 'other species', we are naïve to think it belongs in Nature's "household". If Mankind is a species at all, we can't be fit into *any one* of the ecological strategies to which convergent evolution typically constrains species in Natural ecosystems: we are irresistible hunters, specialists and opportunists at the same time, and omnivores who can also make use of the sun's energy directly like plants. Are we finally ready to call ourselves *adaptive extremophiles*, and give Natural species back their "house"?

THIRTEEN

… the result is not death to the unsuccessful competitor, but few or no offspring. Sexual selection is, therefore, less rigorous than natural selection. —Charles Darwin[1]

From the ecological standpoint, a species is a population of organisms that can't breed beyond itself without compromising the ability of offspring to compete for resources or withstand the elements and predators they are exposed to. The genetic traits of a species are generally fine-tuned to a set of resources and conditions that, in the aggregate, define its ecological niche. Since a deviation in these traits means an organism would likely be competing in the awkward area where its niche overlaps that of another species, the natural fact that disadvantaging traits aren't likely to show up in a next generation ensures that there's no unnecessary overlap among well-contested ecological niches. This *competitive exclusion* near the boundaries of a niche establishes what's called a *resource partition*, and as long as ecosystems are undisturbed, the forms and behaviours of species will remain within their defining partitions.

But of course ecosystems are not always left undisturbed; sometimes an entire species disappears, leaving resources to spare; and sometimes whole new ecological vistas open up—as maritime or mountaintop 'islands'. When a species then finds itself largely uncontested, some divergence in its species-normal set of genetic traits can be expected. And once a critical threshold of resource-use disparity has been reached within the niche—where hybrid compromises might be a disadvantage[2]—the splitting of its genepool, or its adaptive radiation into more efficient resource-sharing strategies, is accomplished very quickly in geological time.

If speciation events can be relatively quick, in geological time, it's because selection, in its own way, uses 'two hands' for raising its partitions. In evolutionary terms, competitive exclusion implies not only that an organism's immediate prospects must decline if its genetic endowment predisposes it to compete for resources better suited to another species, but its prospects for finding a mate will, by innate sexual preferences, become subject to selection as well. So when we now consider the critical stages of speciation, it should be kept in mind that this double

jeopardy is encountered even when an organism competes across racial lines; and it is *sexual selection*, working directly on DNA 'bloodlines', which makes the definitive cut between single-species populations that are already branching due to a more immediate natural selection for the efficient use of resources. (There will be more about sexual selection as 'definition' later, but even here we might see how this evolutionary dynamic is similar to the way simple word behaviours 'archivally' define the more behaviourally nuanced concepts in human cultures.)

FOURTEEN

According to modern ecological theory, high diversity at any trophic level of a community is possible only under the influence of cropping. —Steven M. Stanley, 1973[1]

The wolf makes the deer strong. —Oji-Cree stone-age wisdom

Now, in the last case of natural selection for immediate survival, the only resources in play, if you're not a photosynthesising plant, are adjoined to the real blood (or sap) of other species. And of course, even if you are a plant, your resources still come partly from other organisms ultimately reduced to compost by microbial grazing. In fact, to fully appreciate this most straight forward case of Darwinism, and so as not to overstate the case for sexual selection later on, we must understand why Darwin said sexual selection was "less rigorous than natural selection": he meant death and consumption typically end the germlines of those individuals who are less fit for their niche long before competition for a mate comes into play. So it's this cropping—the physically negotiated recycling of bodies—that gives meaning to a species in practical terms. An unsentimental look at life's resource partitioned co-adaptation must accept that Darwin's "endless forms most beautiful and most wonderful" to behold in the undying collective, naturally resolve, as we witness their one-on-one daily interactions, into the archetypal picture of brutality. Hence Darwin's "war of nature".[2]

Though the young of a species are generally more expendable than its more heavily invested adult organisms, most species do not normally prey upon their own. This is just good ecological accounting. Evolution, on the other hand, relies on the broader truth that species are nothing

other than inbreeding populations that sometimes grow to more expendable proportions, and in the process might increase their ecological scope. When a species reaches this advanced stage of ecological disparity, a new set of rules begins to apply: if (and indeed, given sexual selection, when) such sub-species diverge beyond the point where they no longer interbreed, these now non-familial products of true *population* branching, must subsequently relate to each other in a mostly dietary way. Here organisms, though they remain inter-breeding members of a single species, become diners or dinners (or in the case of predator leaving food for scavenger, 'utensils') in an even larger club whose interfeeding members are species themselves.

With our view limited to a lifetime, this non-interbreeding, non-family club takes the mosaic form of a vast inter-validating food-web that casually links many tighter but shorter feeding-chains;[3] and yet this is only an immediate eco-logic section of that age-consuming phylogenic 'tree' we imagine when we view the geologically compressed record of dead organisms and extinct species. Organisms are the acts, and species the concepts, in the larger story of evolution, but the real characters are fully deployed ecological 'canopies'. These mature ecosystems can 'shade new growth' for millions of years, then, 'suddenly', in response to some unearthly or in-earthly pruning, they 'learn' to reform themselves entirely. At such points of upheaval, new and vigorous branches punctuate our narrative, and Natural history is captured with this image of an unfolding, non-seeding, endlessly speci-fying, dietetically reticulating tree of life.

Though we can argue that the connectivity logically extends to a larger context, inter-feeding is a distinct form of interconnection *set apart within* the natural laws of a physical universe: Natural species alone serve 'the feeding connection'. Even extremophiles that thrive around 400-deg. deep-sea vents where no common animal can survive, feed on the dead bodies that sink beyond the reach of surface feeders. And though some bacteria can live within polar ice, or even within solid rock, no metazoan has yet been found that is 'un-coevolved'. Without technology. But that's a story for later.

This story, of bodies in Darwinian opposition, is just that: a story. There's a cooperation story too that explains multi-species 'organisms',

like lichens and green anemones, in terms of symbiotic evolution. Over two centuries ago Constantin Merezhkowsky coined the term *symbiogenesis,* which Ivan Wallin then used to characterise the organelle-filled cells in our bodies as "the cooperation of bacterial precursors". (Lynn Margulis was the latest to revive this alternative evolutionary narrative.) In their story, the tree of life takes root with the convergence of tiny bacterial threads; and even farther 'up' we might see other microscopic threads converging on to the 'branches' of familiar species. Every story has its uses. These writers felt a need to challenge the notion that order arises only in a world of "each against all"; I want to challenge the assumption that the solution to human destructiveness is to be "better stewards of Nature". That story goes: "we need to do this, because of dependency, and we have the right, since we are Nature's intelligence".[4] As recently as 2002, Edward O. Wilson wrote: "the biosphere as a whole began to think when humanity was born".[5] But in my story, where the characters "organism", "species", and "ecosystem" remain well defined, the biosphere is already intelligent, for we may easily recast these characters as "behaviours", "ideas", and "cultures" to play at their distinctive evolution—though with one, pre-narrative, caveat: we must always keep in mind that these stories within stories can never give us a "full accounting".

FIFTEEN

A bird might marry a fish, but where would they live? —Tevye character, in Fiddler on the Roof

Now, the other 'hand' in Creation's work is reproduction; and in comparison to the eco-logical determinations that say who gets to eat whom, and reveal to us in crude retrospective the immediate survival of the fittest, the process that plays upon reproductive traits seems to be less 'natural'. One could even say that, whether resources are being phylogenically re-allocated to accommodate a changing environment, or existing partitions are just being maintained to affirm the Natural order of the day, the business of finding a mate plays an *active* role. The bizarre and arbitrary nature of mating features and behaviours suggests there is something less obvious than fitness for immediate survival at

work here, and this something is not less intelligent for being less calculable. But are those cultural gestures we call poetry, art, and music, which often mimic these extravagant Natural gestures (body display, bird song, flower blossoms), really any more natural? In both cases the arbitrary is being used, as stylised conventions, to *define* the speci-fic.

For the need of a niche, or for the good of a 'race', sexual traits intensify the cut of new species, just as they call out the daily pageant of who's who in the forest. In fact, when we enter here we really don't get to see much of the inter-feeding that gives a niche its practical meaning (this might not be as true for a pre-human forest, or for an ecosystem that's been rewilded, but we'll come back to this in Part V). Instead, we are overwhelmed by a sensory feast of colour, and music, and erotic fragrance that binds both visitor and resident alike in its spell. This show, announcing the whereabouts of both mate and *prey*, contributes nothing to the immediate survival of its participants. In fact, we could say mating display is genetically scripted in defiance of death by a complementary selection process; one with the larger purpose of 'asserting' species integrity and 'shepherding' further speciation.

My active wording here touches on an old ecological mystery. The dense tangle, and even overlap, of ecological speci-fications found in ancient and evidently undisturbed ecosystems, like the Amazon rainforest, seems incredible when we treat Gause's Law like… well, like "trial without a jury". The mystery gets even deeper (says Paul Colinvaux, who collected much of the evidence for a surprisingly old and undisturbed Amazon) if we've been taught that a history of geographic isolation is a necessary precondition for speciation at all.[1] But, and here's my point, if we recognise that sexual selection within superfluously large populations can lead to the definition of species by genetic 'convention', then we can touch the mystery at a more personal level. We might even be excused for imagining that the super-speciated Amazon was 'Pan-piped' into existence!

Some questioning of a patently inadequate 'Law' is of course always in order, but for me to conjure a whole new Transcendental Being to take its place contravenes Occam's razor (Gause and Occam really gave us only principles, not laws). So how about we allow the same sense of truth to peek through here that we allow when we are faced

with our own 'hard problem'? A conscious intention, in its phenomenological essence, *feels like* a rather strong 'inclination' that's been further reinforced by words. So if we can say species are inclined to reproduce their kind, then we can also say that Nature is literally in-tending when it reproduces, or establishes, ecological fitness further reinforced by sexual selection. Sexual traits now become the 'words' in the story of evolution, for they define and elaborate species as 'gestures' that point reproductive behaviour toward proven fitness in the real world. Sexual traits guide organisms to reproduce established species, just as words guide our thinking to reproduce established ideas.

[SIXTEEN]

… novel behavior, (including the verbal and conceptual behaviors we call "ideas") is the result of an orderly and dynamic competition among previously established behaviors, during which old behaviors blend or become inter-connected in new ways. … New ideas often seem to come out of the blue, mainly because we cannot track the antecedent events or processes. [i.e. trial and error, reinforcement, resurgence, automatic chaining, and extinction]
—Robert Epstein's Generativity Theory[1]

So killing and eating are good, and sex is a law unto itself. Still, a kind of 'morality play' comes into the picture when we look on a scale where the life-cycling 'play of mortality' blurs. At the evolutionary level, gene-pools actually thrive in the turnover of their expressed organisms, as birth follows death on the tirelessly flickering path that maintains their viability. The threat of extinction, however, can be very real for the conditionally immortal 'vine' that is the species itself, and the consequences of its failure can be widely disturbing. Justice, at the level of phylogeny, is absolute. In each new encounter between organisms, the story of who gets to eat whom in the forest can be re-told with a different, but endlessly prosaic, outcome for extended-family members who differ very little in their recycled genetic makeup. But not so when species take the stage. Extinction is forever, because in the endless ecological argument there is no 'rejoinder' for a finally speci-fied twig on the tree of life (that is if we overlook the occasional weirdness of viral insertions and larval

hybrids in the symbiogenesis story). But of course a branch might also just reshape itself, or even divide into multiple new strategies, whereupon novel directions must be accommodated by all sides of the wider ecological council.

As our view of species inter-feeding continues to expand, and as we are now discerning both the immediate *competitive exclusion* of compromised body types and the *propagational denotation* of evolving sexual traits, a new kind of hunger comes into the picture; this time for 'comprehension' and 'resolution' among ecological strategies. Can we now see a kind of 'personality' emerging here? No more nor less permanent than a human personality? Does it look perhaps like Nature is trying to sort out all the potentials for stable breeding populations, for viable genetic conceptions, so there are no 'gray areas'? Then reverse the view and boldly pursue this analogy into the depths of in-sight: can you feel, right now, dancing covertly in your mouth and throat, a behaviour of no *immediate* utility, one that's shepherding your recycling impulses into conceptual species? (The 'behaviour fragmentation' that I am asking you to consider here is something we tend to overlook precisely because we are asking one set of muscles to stand in for the rest. See essay **42**.) Then, what of greater matters? Beyond 'conventions' and 'law', do we share more intimate stuff with Nature's Grand Personality? For instance, in times of loss or crisis, are the epochs of our own personal evolutions not punctuated by openings for opportunity to step in? As with an ecosystem, minor setbacks can be managed through a subsequent succession of our most primitive and flexible coping strategies, but after a really traumatic pruning, if wholeness ever comes again, it must come out of a deeper emptiness, as these opportunistic root behaviours branch willy-nilly into a broadly reformed personality.

SEVENTEEN

I tell you: one must still have chaos in one, to give birth to a dancing star. —Friedrich Nietzsche[1]

The final lesson to take from our evolution-as-intelligence analogy is not the lesson of Lovelock's Gaia, which simply shifts preconceived mechanisms to a higher plane; it's that Nature gets creative only by

transcending the fixed trajectories and mortal cycles of its reproductions. Even on the largest scale, life's only sure direction, ever-unforeseeable in the details, is outward: out of the sea, above the frost-line, into the skies. And lately it seems to be reaching above the atmosphere itself. Except that here the transcendence takes on a more radical meaning: today's structures are not always gene-built, for the inter-gene-rational dance of selection has been reformatted to new inorganic media, and to a tempo the Old Tree of life can no longer step to. The causes and consequences of this, and our projections for a tree of knowledge branching at escape-velocity, its spray of cultural tapestries now merging under the influence of a shared technology, are… well, just another story.

I know it can be difficult to stand fearless upon the brink of an unknowable future, but the model of intelligence presented here, an evolutionary flowering that unfolds naturally from primordial awareness, can help us with our smaller fears as well as with our fear for the fate of a big planet. Contemplating the deep past can sometimes help me to realise, directly, the deep nature of my own humanity: if this moment, when I see its wonders and don't get caught up in its confusions, is the result of seven hundred million years of good luck, then good will is surely at the centre of my being. Furthermore, whatever intelligence the future holds, it can never be wholly unfamiliar, for *this is what I am* even now. So I hope you'll find my story, my sequel to both Darwin and Dogen, useful. There is no "final lesson" after all.

PART III

DOGEN AND THE TREE OF KNOWLEDGE

In recent years a promising scientific approach to comparative mythology has emerged in which researchers apply conceptual tools that biologists use to decipher the evolution of living species. In the hands of those who analyze myths, the method, known as phylogenetic analysis, consists of connecting successive versions of a mythological story and constructing a family tree that traces the evolution of the myth over time. —Julien d'Huy[1]

In considering transitions of organs [and thus, by extension, species]*, it is so important to bear in mind the probability of conversion from one function to another*[2] … [and from the next chapter] *Domestic instincts, as they may be called, are certainly far less fixed or invariable than natural instincts; but they have been acted on by far less rigorous selection, and have been transmitted for an incomparably shorter period, under less fixed conditions of life.*[3] *—Charles Darwin*

When we reside in awareness, we are resting in what we might call an orthogonal reality *that is more fundamental than conventional reality, and every bit as real. Both pertain moment by moment, and both demand their due if we are to inhabit and embody the full scope of our humanness, our true nature as sentient beings.*
—Jon Kabat-Zinn[4]

EIGHTEEN

… for say a foolish thing but oft enough, (and here's the secret of a hundred creeds,—men get opinions as boys learn to spell, by re-iteration chiefly) the same thing shall pass at least for absolutely wise, and not with fools exclusively. —Elizabeth Barrett Browning[1]

The life lessons to be drawn from Nature's vastly pre-human evolutionary dynamic are profound; in fact, eco-evolutionary intelligence seems to be the kind of wisdom that can be faithfully conveyed only by giving an appropriately adapted introduction to the teachings of Zen Buddhism. Also, for us gadget-heads at least, the teachings themselves might gain some much needed credibility from their juxtaposition with recent evolutionary insights—both studies can help us move beyond the deterministic patterns of closed reiterative cycles, and introduce us to a more natural, open-ended, open-handed, creativity. But now, just so my introduction to Zen-natural history doesn't get hijacked by reflexive schools of thought involving 'no-harm' and 'oneness' (and it's worth noting that curious onlookers normally commit to mindfulness practice only after discovering within themselves the universal calamity of unexamined reflexes), I need to broach a complex double distinction: between bodies and behaviours as they respectively affect the evolution of ecosystems, and between their respective 'mortalities', by which I mean the birth and death of organisms vs. the arising and passing away of thoughts (i.e. covert behaviours).

Darwin postulated that structural change must always follow a functional shift to argue his case that species do in fact evolve: that the natural world changes.[2] Here I want to remind the reader that, implicit in Darwin's formulation, we have an argument that, when considering the everyday stability of species and ecosystems, it is also "important to bear in mind" that an organ's "conversion from one function to another" does *not* happen without an ecological motivation. This is achieved during normal times, or under "fixed conditions of life" as Darwin himself put it, by the rigorous selection of natural instincts.[3] What this means, for any animal in an undisturbed and fully diversified biosystem, is that ultimately its structure is more reliable than its behaviour (which, no matter how instinctive, will always be "less fixed or invariable" than its

body) for *maintaining long-term ecological stability*. So now, when we ask what does it mean to be human in the Natural world, it soon becomes a pivotal issue whether or not natural selection's everyday priority is to *limit* behavioural flexibility by pruning out all behaviours that don't conform to species-normal body structures. For if the answer is yes, then it becomes obvious that technology compels a radical departure from this Natural state of affairs, and this must not be overlooked by holding to a sentimental (and indeed self-serving) Man-As-Part-Of-Nature Environmentalism. After all, 'oneness' is not an ecological, but a metaphysical, mental construct; the more we think about oneness, the less we really have to think about, and while this points us in the right direction 'spiritually' (though unlike silent practice, it doesn't act-ually get us there … sorry, get us *here*), it's of no use to us whatsoever scientifically. So for the sake of argument, let's take the acronym for this overly simplified interpretation of Darwin's message as yesterday's MAP ONE, which served to direct our intuitive hand to begin the task of species conservation, and now we can use 'both hands' to turn to the next page in an updated atlas of human nature.

NINETEEN

It is vain to do with more what can be done with fewer. —William of Ockham[1]

The flexible behaviour of higher animals can't be trusted to maintain resource partitions; only innate structure can. Thus ecological stability requires not only that *inapposite curiosity* (i.e. a predisposition to wasteful experimentation) be de-selected, it also requires adaptive learned behaviours to be supported at every opportunity by the natural selection of more reliable genetic programs. In undisturbed ecosystems the evolution of genetic support for useful, easily acquired habits (a pathway known as *phenotypic accommodation*[2]) eventually makes behavioural flexibility redundant as well as a liability. And whenever disturbed ecosystems return to stability, this preference should resume—so that eventually behaviours conform once again to the natural limitations of body forms that come with the solid lifetime guarantee of an irreversible genotype.

TWENTY

The man pulling radishes pointed the way with a radish
—Haiku by Issa

The wolf is tied by subtle threads to the woods he moves through.
—Barry Lopez[1]

That Nature has installed, even in its self-proclaimed human 'masters', behavioural software that affects our choices at the most profound level, is a truism for the evolutionary psychologist, but it rarely enters the picture when the rest of us spin our personal and social narratives.[2] For instance, when we talk about the "humanity" of caring for others, we seldom mention the innate drive for self-interested 'moral' alliance; but in fact the attraction of associating and sympathising with others, in its un-calibrated essence, is a bit of genetic programming that helped our forebears (not to mention the wolves who hunted them) adapt to a world of "us and them", and to a time when problems could be solved with muscle fibre alone. Now that the consequences of reacting without tolerance for "alien" views have become more severe, the provocative 'acting-out' that recalibrates Nature's programming for the Pleistocene epoch must be more consciously restricted to our Pan-piped childhoods.

Our inner cave-man can clearly see his world has changed, but despite the sermons he offers up to inspire 'humane' behaviour, he tends not to uncouple this verbiage from the undercurrent of Natural urgings that keeps him satisfied with preaching to the choir even though this instinct for parochial conformity undermines the technology-driven need for change on a species-wide scale. We live in a world without precedent, where our 'parish' is neither local, nor is it orchestrated by unique and unchanging biological instruments. In this world it's not hide-bound moralising, but critical thinking that sorts things out. Only scientific questioning can move us beyond the grip of Natural programs evolved to regulate a world of genetically ventured bodies contesting for known resources. That the human mind is altered by its changing instruments is a theme to be explored after my introduction to Zen, and a case will be made then for the kind of questioning that happens in meditation, and flows from poetry. For now, I'm concerned only with correcting a misunderstanding that comes from our not appreciating the central

ecological *requirement* for genetic regulation. What we need to understand about *human* nature is it's not just about ontogenic instinct recalibration, and certainly not about phylogenic co-adaptation; it's about deliverance from inter-species regulation altogether.

Nature's de-selection of body-insubordinate imagination, of inapposite curiosity, should be considered very seriously before we claim to understand the full significance of cultural dream-sharing, of technology, and of Man's ultimate relationship to other species—even if this means we must back away from our current well intentioned appeals to Man's Symbiosis with Nature, or to a shared Council of All Beings, held out in the respective names of deep or depth ecology. Indeed, these a-priory assumptions of environmentalism might end up defeating its primary objectives, which are the conservation of Nature *and* the flourishing of Man.

TWENTY-ONE

—like one that on a lonesome road doth walk in fear and dread, and having once turned round walks on, and turns no more his head; because he knows, a frightful fiend doth close behind him tread. — Samuel Taylor Coleridge[1]

This notion of a body-behaviour *conformity imperative*, arising from the need for ecological stability, is so important to my Man as Extremophile case that I'll back away from it a little now, in an attempt to mitigate some of the resistance a reader might feel when looking directly at what amounts to our non-qualification as a species. Uncertainty about our animal-entitlement 'as part of Nature' is too easily deflected with comforting assertions that our technological advantage over other species has been "naturally selected", but also, the argument I'm about to make encounters a *visceral* barrier: we *feel* the fear and hunger of a long and bloody prehistory as inborn truths, and so men, whose acts are no longer limited by their body forms, find ways to justify these impulses as "reasonable", and only admit them to be "natural" when we want to indulge them.

Our unexamined gut reactions, arising out of primordial fear and hunger, misinform our attitudes to Nature. Though dealing with these

Natural drives is more a matter of practice than argument (I'll pick up this thread in the next essay), we have a long history of trying to come to terms with Life's Pan-demon-ium on a conceptual level, and we tend to forget that our even deeper animal past can easily skew the conclusions we draw. For instance, since Robert Paine, in 1966, advanced the *cropping principle*,[2] that tells us ecosystems become *more* diverse, not less diverse, when they are culled, the hungers of our hunter-gatherer past have made us Naturally resistant to an interpretation, and blind to gathering evidence, warning us that technological 'harvesting' has a very un-Natural impact on slow evolving species. Especially when we kill off all the biggest and most efficient Natural croppers out of fear.

Only Natural cropping makes for Natural diversity. In 1976 Steven M. Stanley even proposed that "the explosive radiation of life in the late Precambrian … was produced by a kind of self-propagating mutual feedback system of diversification between trophic levels, which was initiated by the advent of heterotrophy".[3] This *predation hypothesis* is a formal but profound testament to the creative power of killing, for in essence it claims that the Cambrian 'exploded' only after evolution managed to assemble an organism with not just motility and a stomach, but with mandibles. There are other theories about that original diversification,[4] but we now know that before humans arrived, when mammoths were still cultivating whole continents and whales were recycling entire oceans, species diversity was much greater than it's been since humans began hunting these megafauna to extinction[5]—all this from the eating, shitting, and decomposing of coevolved bodies. Every animal in Nature is made out of borrowed flesh; the ecological neighbourhood has been *designed* by organisms consuming other organisms; and the visceral proof of creation's blood (and sap) debt is this carnal hunger that denies the true impact of technology, and this fear that turns our political culling of *cognitive* resources, to murder.

So let's take a moment here to question some of our more convenient 'natural truths': **1** Too much is made of the amorality of Nature. First of all, from an ecological perspective, the deadly tooth and claw of Darwinian struggle are primarily adapted as inter-species 'crop-sharers', and only during ritual displays do they become the 'weapons' of co-specific reproductive competition. In fact, to say that predator and

prey are competing for a common prize, in the same sense as they compete with others of their own species for a mate, is to overlook so many differences in their roles as predator and prey, and even in their population dynamics, that the term goes beyond meaningless to misleading. So reserving the word, weapon, for co-specific politics makes it clear that there is no room for the characteristically human posture of "an eye for an eye and a tooth for a tooth" in the predator-prey struggle that diversifies ecosystems. And as for the word, competition: as the 'excluding hand' of interspecific resource partitioning, it hardly fits the dependent relationship between a predator and its resource. It's true that eyes and teeth can be both cropping tools and mating ploys (think "eye of the hawk and tooth of the lion" as well as "soft gaze and pearly whites"), and the extravagant feeling we call 'vengeance' most likely surfaces as a wild but fleeting impulse during ritual challenges, but the ecological business of killing distributes energy, it doesn't waste it. The main consequence of our fear-twisted morality being less clear than Nature's (for morality *does* apply, whereas fear does not, on the unborn, undying, evolutionary scale—think "war" of organisms vs. "alliance" of species) is that we regularly conflate our own un-Natural winnowing of psychological constructs and techno-logical structures with these instincts for the culling of bodies (eco-logical structures) that were genetically downloaded from Nature in our deep past.

2 Another fear that is clearly no longer appropriate for humans is xenophobia: technological extensions to the human body neutralise all physical advantages that one sub-species can possibly have over another, and so they defeat the competitive exclusion of compromised hybrids that might have otherwise divided the human genepool. Genus *Homo* is famously a melting pot; it is no longer an expanding *clade* of non-interbreeding, resource-partitioned species, because technology's potential for the equalisation of human bodies subverts, irreversibly, the evolutionary justification for 'racial profiling', as a validation of species.

Perhaps this kind of questioning can point us in the right direction, but it doesn't go deep enough. Because: **3** rationality itself is a twist we've *added* to our Natural promptings; it doesn't contact the core. For example: our confusing the two kinds of cropping (of bodies and of ideas) can't be cleared up simply by adopting a vegetarian diet (in fact,

if this choice is based on a sentimental denial of Nature's truth, the confusion is all the more entrenched), and our social biases can't be tempered with liberal philosophy alone.

Our fears add a sense of horror to fundamental personal and cultural evolution by implying that the breaking of dreams and the breaking of bodies are hopelessly entangled; but if dreams, like Nature's organismic programs, are reborn while 'dying' in the dreamer, this needn't bring suffering to their human host any more than dying creatures cause Natural Systems to suffer. By relaxing our judgemental grip on ideas, we experience self-sacrifice as the way forward for cultures, and so we might recognise Nature's, so-called 'amoral', struggle for bloody resources then as a portent of human argument. The problem is, we can't really trust our authentic morality until we take an inner journey, and, like Nature, play the non-judgemental host to dreams, habits, attitudes and ideologies as they complete their 'life-cycles'. When the body is 'just sitting', we *see* our busy thoughts, conforming to reflexes, at the im-mediate core.

TWENTY-TWO

He moved very, very slowly and carefully. With the most slight and gentle movements, trying to catch at the sound he moved his head round what seemed like a billionth part of a billionth part of a degree, slipped behind a molecule and was gone. —from The Long Dark Tea-time of the Soul *by Douglas Adams*[1]

Now that this literary pirate (I plunder the hard work of others) has officially taken shots at the full cross-section of readers—from pure rationalists, who are justified in thinking that science and religion don't mix, to Buddhism-oriented Depth Ecologists, who need no justification for their empathy with all living things—some readers might be a little confused and want me to show my true colours. Perhaps I should simply declare myself to be a husband and father, a building designer, a native philosopher, and a nut for reading all things scientific while obsessively classifying all the flora and fauna I'm privileged to find in my big backwoods backyard. That's easy enough. As for the hard part, the 'what do

I believe' part, I suppose you could say I'm a practising un-believer. This isn't as exotic as it sounds. It's not Buddhism for instance.

Being a science watcher all my life has given me practice in the great Western tradition of believing and unbelieving things as fast as the evidence comes in. But unbelieving the things I've always thought were essential to 'me' takes a different kind of practice, and this is often neglected by those of us who call ourselves sceptics. Probably that's because, in most Western cultures, 'inner practice' is limited to goal-oriented recreations—like golfing and fishing. So I put it down to good luck, really, that I became a zazen practitioner. Initially doubtful, and still contrary, I'm also lucky the mindfulness community does not see anyone as an 'outsider', because, me being a very rational un-believer, I find it too confusing to then believe I am a Buddhist—even though this tradition offers the most powerful methods of unbelieving. You who are Buddhists will know what I mean.

Up to this point I've tried to reconcile my gadget-headed-poet's two-handedness by claiming that true religion is simply a healthy scepticism turned inward. Simple? Yes, but not easy. Now, without getting too precious and spiritual about it, I think it's time we gave Buddhism its due. In the next six essays we will be celebrating the virtue of Bodhidharma's and Dogen's particular cultural gate to Nature's branching Way (Zen has absorbed a lot from Taoism). The diversion might even suggest a deeper connection between the Eastern view of religion—as a non-judgemental posture of natural response-ability that is methodically practised, rather than a set of expectations based on narrative models—and the Western science picture of how living systems evolve without the 'advantage' of foresight.

~PHENOMENOLOGY PRIMER: SENSATIONS & MENTAL OPERATIONS~

An early way of thinking about perceptual 'phenomena', following from Aristotle's 'blank slate',[1] was developed in the late 1600s and early 1700s by the empiricists. Locke wrote a masterly essay on how the senses, including internal sensation, might account for all the 'materials' that feed our 'mental operations';[2] and Hume wrote that we are "nothing but a bundle of … different perceptions".[3] But, as this stream of natural philosophy fed into the torrent that is modern science, 'real philosophy' stayed attached to its Platonic roots. After all, the sensory apparatus[4] of 'mere phenomenalism' can't account (as the behaviourists would soon say it did) for Plato's Forms, Descartes' innate ideas, and Kant's pure intuition, when mental operations 'obviously' must be performed by an immaterial being answerable only to his lovely rarefied ideas. Thus the thinking-mind naturally resists giving up its nature-free will for a self-less bundle theory.

But 'the love of knowledge' had become somewhat jaded by the 1800s, with thinkers like Hegel developing grand philosophical systems[5] portraying this passion as a purely rational process; so, in response, Kierkegaard, and the existentialists who followed him, took it upon themselves to put the pre-rational person back in the picture. Phenomenology, in the modern view, is a re-grounding in 'pure self-reflection'; and in the early 20th century, as part of this philosophical reaction, Husserl presented his Western brand of phenomenology as a 'subjective science'. In his view, intentionality is always directed 'at something', and the experience can be faithfully reported without comment on the thing itself.[6] Yet it was still frustrating to his more scientific followers that Husserl's methodology was to provisionally place the natural world 'in brackets', thereby putting the non-material 'essences' of Plato, Descartes, and Kant[7] back in play.

Merleau-Ponty[8] came close to bringing Buddhist phenomenology to an Idealist West in the 1960s, when he said that perception was 'a real body-subject interpenetrating with a real world'. Mind alone can't see, in its limited conceptual way, that essences are merely conceptual fixations imposed by language, and a phenomenologist must see through these *as a bodymind*. But his 'hyper-dialectic' thinking is still not Zen,[9] for without sustained non-verbal practice as guide, a thinker is still haunted by his object-ive view of the body's inter-subjectivity.

[TWENTY-THREE]

I now want to show that there is 'plenty' of room [at the bottom] … The biological example of writing information on a small scale has inspired me … A biological system can be exceedingly small. Many of the cells are very tiny, but they are very active; they manufacture various substances; they walk around; they wiggle; and they do all kinds of marvelous things—all on a very small scale.
—Dick Feynman[1]

Perhaps you've noticed that phrases like 'Pan-piped world' and 'dream-like flow of variation', and my allusions to 'intentions', 'hopes', 'personality', and even sexually selective 'speci-fication', in reference to ecosystems, can be rendered in more passive language. Such as: "Where a system's ecological barrel is pretty much full, any organism having innate tendencies toward over-reaching experimentation is likely to experience greater competition from other, better constructed, species, and will therefore leave fewer offspring to the next generation than an organism who's behaviour is more reliably consistent with its species-normal form."

I understand well enough that a timid sort of righteous folly might throw out the infants of human imagination with the reductive wash of scientific language. But when Shunryu Suzuki tells us, "either everything is sacred or nothing is sacred", clearly implying that even science can be a sacred trust, there is a deeper message. The teaching also means we are *always* either celebrating the creative activity within ourselves (allowing it to resonate naturally with everything we encounter), or we are seeing everything through the objectifying lens of the thinking mind. It's only when the agitation of picking and choosing is set aside that we can truly live the totality of this moment—even though Totality is unfolding in such a way as to include the science that comes out of thinking's wash.

And so now, when we see in this active and personal light our passive-language model of the 'evolutionary mechanism', we find ourselves appreciating that our full ecological barrel, just like any human *culture* that is also rich in coevolved detail, is precisely one that embodies a long history of natural selections and sacrifices—all the way

down to the scale of a mutating molecule. We might even acknowledge that a diverse and tightly woven community of species makes more numerous and less predictable 'choices' than a comparatively un-evolved system might. In a very depleted ecosystem, for example, choices might be reduced to a climatic cold shift producing more, or a warm shift less, body hair, and then that body's innate tendency to experiment may in theory reach out as far as it likes (which is not very far, it turns out, where there is so little ecological community to compete with, or to feed on). Simply put, just as it is in human heads, and in the cultures expressed in human actions, there is literally more in-tension-al activity in a system as it becomes more minutely responsive—more 'evolved'.

[TWENTY-FOUR]

[Phenomenological reduction] is a piece of pure self-reflection, exhibiting the most original evident facts; moreover, if it brings into view in them the outlines of idealism … it is still anything but a party to the usual debates between idealism and realism.
—Edmund Husserl[1]

And yet the simple dodge of redefining Newtonian reaction as 'action', when a system becomes more dense and energetic, doesn't hit the mark does it? There's more to being 'conscious' than a faster change of details. So where are the words that satisfy our intimately felt sense of unpredetermined choice? Or conversely what does it mean to be re-active or pre-dictable, when these words take their meaning only by citing the action or diction presumed to arise from our spontaneous minds? Is a truth 'derived' from these ultimately self-referencing words different from the moment of truth we live?

When Hegel laid out his ground breaking dialectic path—taking philosophical and scientific arguments 'naturally' from thesis through antithesis to synthesis, thus leading to progressively more useful models of reality, or more productive *hypotheses*—did he really suppose The Truth can be approached this way? Or was he just saying we can better prepare ourselves to act with authenticity, in the moment of truth, if our preconceived models are tru-er in the sense that they model our most

informed calculations of probability? But wait a minute, this can't possibly mean that being prepared with such dialectically improved models helps us in any sense to become less automatic. Must there not be some other, entirely unrelated 'path' we must take? If the Truth of this moment in which we act is *all right here*, then when we say 'it' is being 'approached' we can only mean 'we' are being 'prepared'. But, prepared for what? Doesn't any preconceived notion, even of arrival, predetermine the lived moment? Without some way of Knowing, which pertains beyond our words and calculations, all arguments are inevitably circular. So how, in this verbal-play-ground where echolalia and contradiction are the insensible rule, can we expect to characterise non-automatic activity? Let alone favour it (as all sensible people do) over 'more' activity?

[TWENTY-FIVE]

What would it be like to settle into your own body, into a sense of just being alive, even for a few moments … You can find out of course, just by dropping in on yourself and purposely not filling the present moment up with anything, especially anxieties about the future … or resentment about what has already transpired …
—Jon Kabat-Zinn[1]

I am painfully aware that (you being a sensible reader) this question of whether or not we have free will may seem hopelessly unproductive as an exercise in theory, but in practice, as the evening news amply demonstrates, it is far from trivial. The question has been taken up by almost every Western philosopher, and as often as not (and circulating from the pens of the wisest I would say), Thales' maxim "know thyself" has been variously recommended. For example, according to Anthony Gottlieb, Spinoza offered the oracular consolation that "man can obtain a satisfying degree of autonomy in everyday life by trying to understand the hidden causes of his feelings and actions",[2] and Husserl counselled a science of "pure self-reflection".[3] However (and one might say characteristic of philosophy in general) these gestures by Western thinkers toward the radical autonomy of insight were not followed up with useful

instructions (other than just more thinking) on *how to* actually know that autonomy, or purify that liberating in-sight.

Which brings us to 'the Buddha'. Having grown tired of Eastern philosophies, Gautama developed a practical means of direct insight through quieting the mind (of course a mind isn't really quiet until it's no longer busy with means, and when an experienced practitioner reaches this point, he or she is really "just sitting"). Apparently this sitting practice worked for Gautama, and it still works for anyone who commits to it. But this path of knowing yourself hasn't universally caught on, and I suspect this is mainly because (for those who need it most anyway), "it's just boring." Also, since the very act of stepping beyond philosophy (like falling in love) makes any attempt at justification self-defeating (or even worse, dishonest), thinking minds from East *or* West can dismiss it way too easily. And then again (to cap off a philosopher's irony with a teacher's culpability) this means there's no mental *support* for not-thinking. So how can we recommend formal practice at all? And *why* would we recommend it (especially to those who need it most)? On what authority, or what rationale, once we understand that courage *alone* must sustain us?

To simply pay attention, just seeing through our quiet desperation of attachments, is the whole and unconditional assignment. Teachers, teachings, and mindfulness groups are all here to support you (and despite the challenges, they will, and surprisingly, they can); however, the 'refuge' phrases you might learn ("I take refuge in the Buddha, the dharma, and the sangha") are not meant to protect you from the upheaval of your (supposedly fundamental) belief systems: there is no real safety from self-knowledge except in the difficult quiet of non-judgemental acceptance itself. But then, when we do commit to this path of everyday heroes, "why we do it" becomes excruciatingly obvious. As Zen priest Steve Hagen (the writer who taught me the importance of practice) tells us, "We only need to see that it's beyond the [re-presenting] spin of paradox that Truth and Reality are glimpsed. If we would simply not try to pin Reality down, confusion would no longer turn us away."[4]

[TWENTY-SIX]

It is by a mathematical point only that we are wise, as the sailor or the fugitive slave keeps the polestar in his eye; but that is sufficient guidance for all our life. We may not arrive at our port within a calculable period, but we would preserve the true course.
—Henry Thoreau[1]

I can't personally recommend that you take up formal insight meditation before you've come to know why you need it. Certainly, without a good teacher, it can encourage more confusion than it clears up. Also, personal stories from masters and mystics may be inspiring, but they create an expectation, and this is the root of all confusion. After all, only your own experience, right now, lights The Way. So, should I tell you my story? Should you risk assuming my narrative attire only to, as Thoreau put it, "stretch the seams in putting on the coat"?[2] Of course, having read even this far, you are probably more sceptical than you are mystical, and you have earned the right to know who it is that records these thoughts. So I will now offer a short personal history, and an exercise drawn from one life-changing experience. Don't read too much into this. Don't for instance think the writer is 'enlightened'. I certainly don't.

Looking back, I'm inclined to say there were two circumstances in my life that were sufficiently out of the ordinary to explain my obsessive need to understand what it means to be human in the Natural world. The first unusual circumstance was my vulnerability, from an early age, to private bouts of total existential panic. It takes a certain amount of anxiety to produce a writer they say, so maybe it takes total panic to make a philosopher. But time and place of birth also conspired to shape my obsession, for I witnessed an extraordinary procession of new technologies while growing up in a cultural backwater in the backwoods of North Ontario. I saw unfolding before me a parade of human contrivance that began with horse drawn hay-wagons and log-sleighs, kerosene lamps, outhouses and water pails, and marches through the present flourishing this un-dreamed-of Word and CAD software, and photovoltaic nano-tech hardware, that allow me to make my living. No, there really is no sign of an ending to this advance, for the history of technology is evolution, which neither repeats, nor stands still.

But I witnessed the downside of mere 'progress' also. For there were elm trees in my youth. Huge woody giants they were, that seemed to reach upward and outward forever. And under their green canopy my cousins and I floated on make-shift rafts down a tea dark river that crashed through our property during spring break-up, and then sprawled out dreamily in the summer. Here, in *my* dreams, I was "Bomba the Jungle Boy", in a wild world. But a twice Lost World now. For dreams change, and the few understory elms that remain today are playing cat and mouse with a fungus that hitched a ride from another continent on our restless ocean liners. Even the lesser ash trees that replaced them have been cut down by beavers no longer kept in check by the timber wolves I used to hear howling on clear winter nights. Before the snow-mobiles came.

Perhaps it was a sense of helplessness in the face of this profoundly impersonal slaughtering of Nature that fed my anxiety. Or maybe my non-specific panic was a congenital condition: when I almost died at the age of five, my distraught parents were told that I had a "late closing heart valve". My heart is good as new today, thanks to the more personal touch of modern prosthetic technology. In any case, The Fates presented my worried family with an overly withdrawn and preoccupied child by the time I was in grade six. Mom would explain me to her friends with the story about "the absent-minded professor" who walked all the way to the school bus (we had a quarter-mile-long driveway) carrying his freshly squeezed milking pail instead of a lunch bag. It's true that from grade seven on I seemed to be able to ace just about any exam without really trying, but of course my 'talent' for dividing body and mind got me only half way through university. Twice: engineering straight out of high school, and later, environmental studies. There was no money, no sensible prospects, no drugs, just a lot of disillusionment and a rock'n'roll band exit strategy.

I've been a farmer, a logger (so much for tree-hugging), and for many years a tradesman and employer; and I'm still a registered de-signer, a master electrician, a husband, a father, and lately a grandfather. Life's been good. But for a very long time this traumatic condition of a divided body and mind preyed upon me, and I couldn't put my heart into the little things that should bring joy to life, for to me they were

desperate entertainments. I was haunted by fundamental and endless questions about the viability of not only my insecure self, but of my species (in this respect, a typical story in the fallout shelter generation perhaps). I couldn't let the questions go so long as I had any expectation of a 'final answer'.

By the spring of 1972 I had lost faith in rock'n'roll, along with formal education, so I undertook the favourite escape of my generation, and I set out to renovate a little cabin in the woods (it had been hastily built by a Tennessee draft-dodger my family took in). And it was here, on the very first day, that I was graced with an epiphany of "letting go into wholeness". It was a big deal to me! Of course, with no training in mindfulness practice, I immediately began to reconstruct my momentarily collapsed self-structure of expectations,[3] and fell into the trap of reminiscing about my epiphany under the cover of a new found talent for poetry. I thought then that poetry was the portal to these extraordinary insights; but I now see such openings as an ordinary human response to some powerful angst, or blessing: the light of unaccountable day breaks through your busy cloud-cover of daily accounting. Perhaps these experiences are made extraordinary only by the darkness of the clouds to begin with? For of course my demons persisted as a cautionary backdrop to my daily blessings for many more years.

By 1983 I had read Thoreau and Gandhi, and with a growing concern for the next generation, evoked by the anticipated birth of a second daughter, I became alarmed enough to protest my government's agreement to test US cruise missiles over Canadian soil. The work of creating this book then began in earnest. And it began with a question: "how has technology altered the human animal?" I knew the study of phenomenology was important to my answer (it still didn't occur to me to try formal meditation), but my experience as a builder didn't support the accepted view that thought was fundamentally different from act; rather, I had begun to notice that the subtle activities I 'felt' in my mouth and throat seemed to be organising, and in the process occluding, the more 'practical' motor images I could also feel propagating, as covert rehearsal, throughout my whole body. Also, what about this covert activity in my eyes and face—it seemed to be 'mimicking' my full-body imagery—surely this must be unique to a technological species? I was

less sure about the 'automatic' covert mimicry that embodied my sympathy for others, because my dog seemed to be good at it too! (I began looking for similar observations in the literature, but it wasn't until the late 1990s that the discovery of *mirror neurons* hit the news.) Thus an objective phenomenology (by which I mean the self-subject is recast as just another object in our models of experience) joined poetry in my existential disquiet.

It was only after eighteen more years passed, filled with such questions and backlit with memories of wholeness, and it was only after many promises were kept and a few inevitable disappointments were accepted, that panic and despair paid their final visits as credible despots. Like many, I let them go in my own good time, with no training in formal practice. For such is the universality of an awakening human life that even Gautama didn't lay claim to the one and only "right path". This said, the prescription for an *enduring* escape from suffering was his, and to avoid the quicksand of reinventing a tradition of mindful living and detached thinking I would eventually have to ground my experience with the help of a mindfulness community.

You've probably heard that following the breath plays a big part in meditation. There are some good metaphysical reasons given for this, and the very practical reason that the breath is always available as an object of meditation, but my years of casual introspection, exploring the relation between my thoughts and my overt behaviours (as I said, I wasn't yet 'sitting' at this time, but poetry is nothing if not an exercise in recording one's more fleeting insights), had begun to reveal an exquisitely material reason. Tired of living in a 'model reality', I was finally ripe for the effects of pure method. So, in the spring of 2001, I was walking along a quiet back-road to appease an unquiet mind, when it occurred to me that feeling the air moving in my throat helped me to stay, at the same time, aware of the very subtle speech impulses taking shape in the same anatomical area. I discovered that whenever these sub-vocalisations were interrupted by a concurrent awareness of "breath just moving", then my body, the trees, the Pepsi cans in the ditch, also "just walked", "just rustled", "just were". After thirty-five years believing that

meditation was just another dubious exercise in reconditioning (an unfortunate impression left by a certain autobiography of a yogi), I finally learned how to *see*-conditioning. I was *doing* walking meditation. As any vipassana teacher might instruct, my feet and legs were "just stepping", the pain in my neck was "just tensing", and all these aborted speech impulses with their attendant reflections were "just arising", "just falling away". I could 'see' the verbal bars of my conceptual cage as just behaviours in my throat and mouth, no less habitual, and no more solid, than the breath moving there. I could even feel a little of what I began to call my attitudinal 'wall-paper', for these more pervasive body tensions were continuous with the stiffness in my neck, but much more subtle. I could see that my living reality itself, which all this thought-structure had been built to frame, was …unaffected. And the framework itself—the bars, the wallpaper—oh how insubstantial all that was! And is.

See, I told you not to read too much into this.

But perhaps you might try this 'formal practice' sometime when you're out for a casual walk. Or, if you're already a meditator but haven't recognised thinking as subtle behaviour yet, just make the observation of covert speech impulses another part of your regular practice. It's especially interesting if there's someone talking in the next room, for the impulses in your mouth and throat trace their words exactly! Now you're feeling the effect of your neuron 'mirror functionality' [see essay **37**]. Also, if you're interested, you can read in essay **43** more about how subtle tensions in your throat (and maybe even your face) can promote thought, and inhibit breathing. This is literally 'deep' stuff. Normally, most of us keep our lives from being drowned out by automatic verbal re-presentation (this mouthy vortex that closes in admirably, hypnotically, from all sides but never actually arrives) by reconnecting only very briefly to our surroundings (after all, we are never totally insensible unless we are sleeping). We do this by closing our abstract distance just enough that sights and sounds can peep through little blinks in the eye of our self-maintaining thought (the maintaining of a "self" story is the cornerstone of abstraction, where "this and that" is prefatorily offset from "me"). But of course we can (and indeed we must) transform our 'selves' at exceptional times: in moments of crisis, or peak experience,

when we are obliged to stand not at arm's length from our 'object', but at Thoreau's "mathematical point only". With some formal practice in sensory awareness we might even come, more and more, to reside in these moments of clarity.

Over time (for language and the thinking mind are fundamental pieces in the human tool kit, and must be re-calibrated carefully and slowly, so they obscure as little insight as possible) I came to think of my experience on the back road as the meeting of an old friend. One who was walking with me all along, but I'd almost forgotten he was here. And so I took up my practice very deliberately, because I wanted to get to know this Friend better. I knew, beyond all the self-protecting shadows of doubt, and knowing even that these doubts would still visit me, also as 'old friends', that the *good will* of this Friend I had rediscovered can never be truly lost, or even shaken. Because it is my own.

[TWENTY-SEVEN]

"If your cart doesn't move," [Dogen] asks, "is it better to prod the cart or to prod the horse (sic)" …everyone knows you should prod the horse … the secular world has plenty of ways to prod the horse [meaning the mind] but "lacks any method of prodding the cart [meaning the body]." —Brad Warner[1]

We get into trouble when we take our religions too literally. Our bodyminds know this at some level, but bodies are variously challenged by an uncertain world and so minds grasp at indelible truths with varying degrees of desperation. We all share this unspeakable state of religious affairs, so why then do we feel superior to "others" when they are "obviously wrong"? Is it because, whether we are God-fearing believers or open-minded philosophers, our self-assurance is ingrained in the form of deep-touch patterns laid down by a studious *imitation* of "proper behaviour"?

Buddhists are people too. But not taking things literally enough can actually be a problem for Zen students. To be clear, it's true that problems can often arise when teachings which emphasise propositional uncertainty start the thinking mind down overly convoluted pathways, instead of releasing it to engage with the more radical authority of a

teacher's simple and direct communications. But when Dogen spoke of the bodymind,[2] he meant us to take this at face value. When we train the body to sit still, and to be perfectly balanced, the mind doesn't just follow the body's postural enlightenment show: the mind *is* the body's subtle gestures, habits, and training. And so it is that our continuous physical imitation of family and peers[3]makes "our" culture of "proper behaviour" seem more probable than an outsider's lecture on moral relativity (the view that behaviours might be wrong in one culture but right in another). A Zen teacher, on the other hand (or any good teacher really), is thoroughly confident that her unhurried pause, and her unguarded, receptive, eye contact, will speak louder than a wordy lecture on open-mindedness. A quiet mind *is* the body's stillness, and this is why years of sitting practice can lead to self-knowledge and acceptance of others in a more direct way than any amount of counselling and argument alone.

But of course silence is not for everyone and for all times. When the need for outside help is warranted by mental or physical circumstances beyond one's reasonable ability to control, then a call for help is a courageous choice. The needs of a child, left starving, sick, and homeless, within a failed-state created by economic interests outside her culture, can't be met through self-help alone. She needs hope, and perhaps even some well-intentioned religious dogma. But notice that, even here, such a desperate 'courage to hope' is learned or unlearned by a body's intimate experience or non-experience of reward for effort. And this behavioural reinforcement, of kindness or selfishness, 'embodies' its believability.

[TWENTY-EIGHT]

… to understand religion and to affirm it are not the same but almost exactly the opposite.
—Merleau-Ponty (as interpreted by Remy C. Kwant)[1]

There's nothing very profound in my saying that when we experience a thing repeatedly, we reinforce habits and expectations; and when I say this conditioning is felt as the thing's fundamental 'believability' you

surely understand me. But believing conceptually, relies on an additional verbal, or at least symbolic, reinforcement, and here something happens to our sense of certainty that will be less familiar if we haven't trained ourselves to watch for it: truth becomes a moving target that *always* evades our philosophical arrow. An example of a symbolic near miss might be found in phenomenologist Maurice Merleau-Ponty's Zen-like conception of thought as a "product of the body's interaction with the world it inhabits". These thought products allow us to step away from our direct experience in order to objectify it—all part of a philosopher's job.[2] To be fair, Merleau-Ponty knows enough to start with the body's experience as his foundation, and he even sees that it is with thought that doubt first enters in: the conviction of body experience is *denied* by the intrusion of thought. But even this truism can never be Truth, and Merleau-Ponty doesn't tell us (though perhaps the convoluted nature of phenomenological 'thinking' in general demonstrates) that without some practice at 'just sitting' upon the body's perfectly adequate foundation, thought's need for justification continues to bring more words, and thus entrenchment on a whole other level. Any philosophy that doesn't stipulate practice, excites the love of knowledge to seek postulates for its ground.

Objectivity is an unavoidable, and indeed a wonderful, dimension of the human condition, but we can't really be trusted with it until we see that it's always accompanied by unspoken doubt: it never quite attains that 'sense of reality' which tells us we are awake rather than dreaming. Real confidence has no fear of being wrong, because our sense of truth depends on a fullness of experience that is-what-it-is because it's all there is. To mix phenomenological, Christian, and Buddhist teachings: objectivity diminishes our lived experience by 'nailing' it to an abstract framework that pretends to satisfy our need for permanence. And we fight over this *because* it does not, by itself, inspire real confidence.

That kinaesthesia is also a sense to be reckoned with, like sight, sound, taste, smell and light touch, that it is indeed the sense of interaction, means Merleau-Ponty's "lived body"[3] has no primary need of an abstract context: deep touch mani-fests context, wherein the arising of sensation *is* our totality. Thus our awareness of how the body actually

feels opens up Reality to us wider than our symbols are 'really' meant to. The secondary objects, Merleau-Ponty's thought products, guide the culturally extended mind where unarticulated intuitions cannot go, but what truth can we hope to bring into view when we boldly cut deeper and deeper with our inadequate words? In the two and a half millennia since braver words told us there was no such thing as a self, we still brutalise and kill for the selfish shadows we 'see' in this diminished light!

You see (sorry, the verbal traps are embedded), it's not just the snare of words that catches us up. While pinned to our world coordinate systems, and imagining we can only look out along the x, y, and z-axes toward three dimensions of escape to infinity, we are less content than we sometimes pretend. Nor are we truly satisfied as we look toward eternity along the t-axis. (Can we really see time?) So, along with our unsatisfying vocalisations, let's not take our talent for wordless visualisation (these model realities that assure us, "seeing is believing", at least until we find a better model) so seriously either. But let us come more fully to our senses. Let us practise to climb down from our cross, one smile, one step, one breath at a time if need be, and to sit, or stand, in this dimensionless here and now, for this one moment of re-ligated (i.e. religious) experience joins every creature that ever did, or ever will, through ever-now ages, live. We won't even imagine 'we' have changed. Old habits are still untouched, and we will undoubtedly find truths enough to talk about, and to hang up 'there', on our visionary tree, for a season. Depend on it. (To sample this season's crop of model realities on my own tree, all you have to do is turn the page.)

PART IV

PANDORA'S BOX

Give me a lever, a fulcrum, and a place to stand, and I will move the Earth. —Archimedes

Prometheus … *Gk Myth* a demi-god … worshiped by craftsmen. When Zeus hid fire away from man [author's note: according to *Bullfinch's Mythology*, fire is inseparable from weapons, tools, shelter (in all climates), the arts and money], Prometheus stole it by trickery and returned it to earth …
—*Canadian Oxford Dictionary*

Pandora … *Gk Myth* the first mortal woman … created by Zeus and sent to earth with a … box of evils in revenge for Prometheus' having brought the gift of fire … to the world. Pandora opened it out of curiosity, and all the evils flew out; Hope alone remained to assuage the lot of mankind.
—*Canadian Oxford Dictionary*

TWENTY-NINE

In a culture like ours, long accustomed to splitting and dividing all things as a means of control, it is sometimes a bit of a shock to be reminded that, in operational and practical fact, the medium is the message. —Marshall McLuhan[1]

It is best, I think, to leave the 'true' story of our human origins for the physical anthropologists to unearth, given time and luck, and when we want a bolder guide, perhaps not factual, but true as art, then we can always call upon myth and imagination. But for the present, both fact and fancy can wait, because what I'm interested in here is: what changes *needed* to take place so that the genius for technology could get past the conformity imperative of a stable ecology that kills the boldest bents for imagination? What role does language play in transforming a niche-bound animal's mind into an ecologically unrestricted tool-maker's mind? Is there a down-side? Did the likelihood of tools and culture really just become overwhelming as the complexity of animal behaviour increased beyond some brain-size Rubicon?

I'm inclined to think that an understanding of the distinctive roles played by structure and behaviour during this eco-evolutionary transformation is of some importance if we want to unravel the many convoluted effects of historical accident. If we accept the proposition that behavioural experimentation beyond the resource partitions for an optimised body structure is a liability for animals in a stable ecology, then it follows that only prolonged instability can allow truly inventive brains to evolve, for instability might continue to favour opportunism, and thus reduce the competitive handicap of risky cultural experimentation for the duration of a speciation event.[2] It's now thought that climate change at the end of the Miocene favoured the dispersion and the evolution of large brained opportunist apes in general;[3] if this is true, could the 'punctuated equilibria' of the Pleistocene have eventually made room for technology? And then might sexual selection, and ultimately 'real' language, have taken over from a foiled natural selection and committed these LAST Niche renegades to their un-Natural strategy (giving relevance twice over to the opening line in the *Book of Genesis*, "in the beginning was the Word")? Most likely both instability *and* naturally

increasing brain size were important in establishing the conditions for a synergistic elopement of hominin tool-use with human language, resulting in the runaway innovation that defines us. But before we speculate further, let's first establish our terms.

TOOLS DEFINED, AND THE TWO DOMAINS OF INTELLIGENCE

A persistent means to an end, a.k.a. a tool, is any structure or behaviour that is adapted and maintained: **1** by gene selection pressure arising from elemental conditions and ecologically emergent resource partitions to support bio-associations; or: **2** by behaviour conditioning pressure arising from direct experience and psychologically emergent conceptual categories to support human cultures. (See Occam's razor.)

Interpersonal instruction certainly does look a lot like Darwin's "descent with modification"[4] when we recognise, in both domains, how the potential for 'mutation' and 'recombination' in the transfer is such a lively source of novelty. But analogy is a job half done, because when this intentional breaking of category lines admits an awareness of broader connection ('the Lion King' invites a deeper understanding than the words courage, or leadership, would convey independently), a diligent philosopher must still re-draw (more precisely we hope) the metaphorically altered lines—and this is half the work again. So when we reflect that the whole theatre of *genetic* selection consists in mortal transactions among bodies spatially distributed as species, the elegance of our cleverly superimposed analogy shouldn't tempt us to lose sight of the incongruities involved in a *behavioural* selection process where conditioning takes place sequentially, within and between bodies, as spatially distributed 'theatres of ideas'.

With this caveat now held steadily before our minds, we see that, if ideas are to be likened to species ('categories' that constitute human cultures on the one hand and bio-associations on the other) then, in our shared Grand Theatre of embodied theatres, language becomes in its turn a kind of cultural 'sexual selection': words shepherd the 'evolution', and 'ecological maintenance', of cultural categories. And, in keeping with the cultural reality whereby immortal ideas are distributed among our mortal bodies, this verbal shepherding of behavioural evolution must take place at two distinctive levels: ideas are first taught-out,

and then thought-out, with words, before they are acted-out in a test of their cultural fitness. I'm afraid our reasoning must be particularly acrobatic at this 'mortality' level of the evolutionary analogy. We mustn't confuse the deaths of mere bodies in Nature with the 'extinction' of concepts, for the only sanctioned confusion of bodies is with our ongoing performance—the cycles of thought-behaviours that arise and pass away without regret—and it's our culturally 'inbred' habits, or concepts, that align best with species:[5] we feel their at-risk status for a time, but we hope for their continued adaptation, and allow for this by promoting thought's give-and-take, and by making room for (civil) experiments in thought's expression.

[Liberal minds throughout our confused human history have held that the right to express a particular behaviour, and the survival of that behaviour to the point where we allow it's repetition as a preferred, or 'immortal', idea, must always be tested in the court of public debate and legal process; but the right of survival for the body which is its personal theatre, on the other hand, must remain beyond question. So while the line of creative frisson that runs between idea and act-uality deviates in its layered texture from the simpler germ-soma interface of phylogeny, still I hope the analogy can take us beyond my primary message of a 'personal' respect for the Natural world, and help us also to frame this mortality confusion better. But the two trees analogy runs even deeper than this, for beyond upholding traditions of respect for Nature and non-violent conflict resolution, it holds up a pre-historic mirror to show us the fundamental wisdom of maintaining a clear distinction between consequence-free dreams and their physical expressions (essay **45**). We must daily renew our superstructure of human traditions, but when this subterranean distinction isn't clear, the flourishing hopes of liberal minds too easily devolve into rootless confusion.]

THIRTY

… and one day she slipped off the cover and looked in. Forthwith there escaped a multitude of plagues for hapless man—such as gout, rheumatism, and colic for his body, and envy, spite, and revenge for his mind —Bullfinch's Mythology

With the 'backdoor gift' of fire, and the technology that the control of fire fostered and represented, it would eventually become possible for mankind to escape from Nature's genetic constraints: illnesses like "gout, rheumatism, and colic" would slowly cease to be an immediate and final barrier to procreation, and, in the fullness of time, our Naturally contained predispositions[1] for "envy, spite, and revenge" would find a place within that plethora of 'justifiable' attitudes that is humanity. With technology, bodies are no longer structurally limited to the efficient performance of resource-partitioned tasks, and so human nature is no longer constrained by competition with better adapted species. The ecological lid is off, and we are beginning to understand that Evo-Ecology itself is the immortal Intelligence our wily Promethean ancestors offended—an offense punishable by loss of *both* Natural and human integrity.

A FIVE-LAYER ANATOMY OF EVO-ECOLOGICAL INTELLIGENCE

A bio-association (as opposed to an ecosystem, which includes non-biological elements) can be thought of as a phenotype-negotiating over-system that uses genetically recalled sub-system reiteration to directly evolve and maintain **1** innate structure (such as bird feathers), and **2** innate behaviour (bird flight); to indirectly assemble and maintain **3** acquired structure (bird nests); to indirectly limit **4** acquired behaviour, or learning (egg stealing); but that has no direct or indirect power over, or timely response to **5** learning-acquired structure (frying pans). [As an example to show the diversity of 'un-Natural' forms that can fit into this last *Learning-Acquired Structural Tools* category (the LAST Niche), even a cooking fire can be seen as an unusually rarefied and notoriously unstable 'structure' that was acquired by way of learning (acquired behaviour) as a key addition to the *Homo erectus* tool-kit.]

Despite the commonly held (and to a point defensible) assumption that language, together with the hyperprosocial cooperation that language makes possible,[2] played an opening role in the human story, it's nevertheless difficult to imagine how any animal could ever refine such *non-material* culture in the first place without a prior commitment—opening an ecological niche in practice—to *material* culture. We know now that the modern human anatomy evolved around two million years ago—initially for endurance-running in pursuit of prey, and then for throwing-torque to make the lethal application of sticks and stones less risky for a predator.[3] And it can also be assumed that a certain mental capacity for patience would have been necessary at the start. Then (and perhaps inevitably as Travis Pickering of the University of Wisconsin-Maddison has argued), the wielding of projectiles to kill at a distance would have meant early humans had to uncouple their aggressive emotions from the act of killing (affectively 'violent' only for a contact hunter) thus achieving a degree of level-headedness far beyond their competition.[4] Louis Liebenberg, associate of Human Evolutionary Biology at Harvard University, has suggested that by following this endurance-projectile hunting strategy alone our Paleolithic ancestors would inevitably acquire a scientific level of tracking skill that included a theory of mind.[5]

But the a priori argument for material culture initiating non-material culture doesn't depend on this or any other particular evolutionary trajectory; for if we take seriously Darwin's observation that more "fixed or invariable … natural instincts" are a direct and necessary result of the "rigorous selection", under the more "fixed conditions of life", that attends all non-domesticated organisms[6]—that is to say, if the stability of Nature in normal times (admittedly this punctuated equilibria term is a later, neo-Darwinian, reading) really depends 'proactively' (see essay **10** to review some of ecology's intrinsic blocks to inventiveness) on a selection pressure that favours behaviours conforming to body structures that are fixed for a lifetime—then we can begin to see how any authentically sustained and progressive cultural variation must be *supported* by a continuous variation of body extensions.

So it now remains only to distinguish human hardware from those 'tools' employed at times by ecologically constrained species, and it's here we see that the designation, Learning-Acquired Structural Tools

Niche, is a useful unpacking of criteria, not just a clever acronym for the finality of the transition from ecology to technology. I hope the need for consolidating behaviour with structure has now been demonstrated; but, to fill out the human resumé, all five terms must come into play, for these assure that: persistently used, i.e. tool-ish (4), structures (3) are not only acquired (2) and modified (birds do this); are not only acquired through learning (1) (chimps do this); but the acquiring of structures by learning must also constitute the ongoing strategy of the species, i.e. its niche (5). Our ancestors probably crossed this threshold only about 164,000 years ago (see Anthropology Primer), so although this distinction between man and chimp[7] may seem biologically crude, its effects have been historically profound, and existentially subtle.

[THIRTY-ONE]

It may very well be that in our conscious inner lives the interplay among the senses is what constitutes the sense of touch. Perhaps touch *is not just skin contact with* things, *but the very life of things in the* mind*? —McLuhan*[1]

That even Marshall McLuhan, author of *Understanding Media* (1964), saw touch as the product of sensory interplay, rather than as the sensory framework, or primary means, by which we think, is evidence of the deep resistance our thinking minds have to admitting the co-dependent and transitory nature of the 'self'. Even though it was suggested many years ago (e.g. Wilder Penfield and Oliver Sacks—writing after McLuhan) that a physiological 'sense of self' is generated by various kinaesthetic organs that tell us how our joints, tendons, and voluntary muscles are moving (a wide array of other *proprioceptors* generates internal sensation elsewhere in the body); and while it's also obvious that only our skeletal muscles can reshape, and conform to the rest of the world, the quite separate light touch system at the body's intervening surface (the skin has different receptors for soft-contact, pain, heat, and cold); yet our thinking minds remain concertedly blind to the role of this deep sixth sense when we construct our phenomenologies. One reason is surely that deep touch is the only sense that's accompanied by efferent impulses—i.e. movement is *voluntary*. In fact, efferent and afferent are

so indistinguishable here that I will continue to use the one word, kin-aesthesia, to mean both.

Speaking from experience, I am convinced that the best carpenters make practical 'sense' of the messages coming from their eyes—as they scan a drawing or a built framework for instance—only because they use their bodies to under-stand connectivity itself. And yet my reading on the subject reveals only this: that ever since literary men first began to write down their philosophies, the objects of perception have typically been de-scribed in primarily visual terms. One might be excused for wondering if this is a practised (but not necessarily deliberate) oversight, due to the need of indelible author-ity to verbally and pictorially grasp at the hope of a non-material, and non-mortal, self-possessed mind. Or perhaps it's just that the semiotician's background-foreground illusion has not yet been seriously considered at this deepest of all cognitive levels. The illusion in fact *must* be absolute for sensible human beings who naturally hesitate to take that absurd final step of thinking medium vs message where these are so finally *thus*.

But in McLuhan's "culture … long accustomed to splitting and dividing all things as a means of control", where an author must spin a partial and relative universe made for absurdity, why should the Totality of our lived experience interfere with our bold deconstructive mission? Then let's begin by asking an absurdly simple question: How can vision alone extract 'meaning' from an animal's, or an animated machine's, 'environment'? Persevering in these boldly dualistic terms, how else, from the moment our infant eyes are opened, can knowledge about 'there' be registered as meaningful, if not by responses of the body 'here'? If only by the voluntary or involuntary contraction (or the resistance to contraction) of a single muscle fibre attached to a vertebra, a wrist bone, an eyeball or its lens? We call even those 'motionless' shadows that seem to map out our fainter impressions, feelings; so how can the geography of cognitive tensions, or our brain maps of projected intension, be other than the body itself? I find it hard to accept that *any* of my thoughts or imaginings can have meaning before they are registered by some impulse in my brain aiming, if only tentatively, at the fibres that relate my body to its environment.[2] So let's agree for the moment (allowing for dreams, and for Steven Hawking's profound immobility)

that my use of the term, motor program, need not imply actual movement. Indeed, until some threshold of a brain's efferent population of impulses is crossed, their effect on muscle fibres might not be afferently, let alone act-ually, 'felt'.

So then: are impulses to be cast as genes, action potentials as genotypes, and overt actions as organisms in our evolutionary analogy here? I must admit it's difficult to assign a perfect set of neurological correlates to the natural selection dynamic (though others have made the attempt[3]). Even with its jiggered genepool design space 'third phase', we have natural selection working only on phenotypes, while its behavioural counterpart works on many levels —where both language and habit are 'archival'. But is perfection really necessary? Isn't it the imperfection of analogy that opens our eyes, proving Leonard Cohen's *Anthem* lyric,[4] "There's a crack in everything, that's how the light gets in"?

While I acknowledge that this alternative phenomenology, weighted in favour of the deep tactile afferent-efferent sense rather than the visual, may seem to disregard the full richness of mental experience, I ask you to trust, for now, a carpenter-philosopher's sense of restoring literary balance while he deconstructs himself as a tool-making animal. While my authority to speculate on biological evolution is strictly that of a well-read amateur, my claim to expertise in what I've been calling a phylogenic tree of knowledge, stands upon a long and detailed intimacy with tools—the technological means to fulfill culture's branching. I will also enlist in this project my sixteen-year familiarity with a Zen tradition that teaches us to resolve even our subtle e-motions silently, within a bodymind 'before words'. But what about my philosophical roots? Do they run deep enough if my credentials are not fully academic, but 'the love of knowledge' is literally an amateur undertaking?

Seriously, having qualified my claim to expertise in so many matters, I don't want to give the impression that Western philosophy is being unfairly treated here. Like any 'real' philosopher I read widely and listen attentively, and I get excited any time I come across a train of thought, old or new, that seems to converge with my own (another reason I lean towards Dogen, who shows us how to get past such excitement). But I've been looking for Western body-mind literature for

forty years now, and except for Merleau-Ponty and some later behaviourists (McGuigan, Essay **44**), I keep bumping into this 'out of body' gray-matter fetish that over-complicates things. Since Aristotle first proposed that knowledge must ultimately derive from the five senses—thus providing a foundation for modern science[5]—it seems Western philosophers have felt the need to trot out his teacher's Idealist 'profundity' to complete this shallow phenomenalist wisdom. But surely the wanted depth can be more easily recovered by showing a proper respect for an older pre-literate intelligence, and for the body's deep-touch sense?

When you take into account the full subtlety of behaviour (see my attempt at an anatomy in the next essay, **32**), then abstract forms like Kant's pure intuition (*Anschauung*),[6] and Descartes' soul, or mental substance, become sensible as the body's covert (thus 'abstracted') activity. Descartes' anatomy of the sensorium followed that of Galileo, who made a distinction between the *secondary qualities*, which arise from the five bodily senses of sight, sound, smell, taste and light touch, and the *primary qualities* that belong to the 'objects' of sense. The empiricist Locke, who deemed the primary qualities, "bulk, figure, number, situation, and motion or rest", to be sensible as touch[7]—even citing the "experience of resistance"—still explicitly disembodied his "inner sense" of "mental operations"; this implies he did not recognise kinaesthesia as the kind of sense that would make these qualities 'secondary'. But if we accept that these 'solid' truths, and our thoughts about them, are *derived* from motor-sense, this would necessarily make them secondary fabrications; so why insist on making this distinction in the first place? Is this *expedient* the author-ised beginning of the mind-body dualism illusion? In the Age of 'objective' (and visual) Enlightenment?

That even optical illusions, hard-wired in the eyes and brain, must be *registered* (in some cases explained) by a body with its own logistical limitations, just means our inner lives are more tangible than the thinking mind wants to admit. And in fact we *do* find phenomenologies that get around the dualistic five senses plus a soul fixation: all the while Western philosophers had their suspicions (and talked around them), and long before modern physiology located *all* the bodily senses, farther to the East, in meditative stillness and silence, the mind itself was easily recognised as the body's "sixth sense".

THIRTY-TWO

Therefore, since the truth seems to be like the proverbial door, which no one can fail to hit, in this respect it must be easy, but the fact that we can have a whole truth and not the particular part we aim at shows the difficulty of it. Perhaps, too, as difficulties are of two kinds, the cause of the present difficulty is not in the facts but in us. For as the eyes of bats are to the blaze of day, so is the reason in our soul to the things which are by nature most evident of all. —Aristotle[1]

So how might we characterise Epstein's "verbal and conceptual behaviors we call 'ideas'" (essay **16)** so they might become familiar to us, not as ghosts in the mind, but as the behavioural species of an internal, but material, branching process not unlike that of evolutionary ecology? If ("in operational and practical fact") our inner, or covert, behaviour ("the medium") in response to a thing is its whole meaning for us ("the message"), then knowledge is a complex act of the *subtle body*. This Buddhist term sounds esoteric, I know, but when referring to the objects of silent meditation it explicitly describes the covert reactions, explorations, manipulations, and (neuron mirror) impersonations that we experience as body-attitudes or kinaesthetically sketched 'images'; thus thinking manifests with clearly tactile connectivity when we become still enough, and open enough, to wordlessly resolve the body's in-tendings. If thoughts arise effortlessly, we say they're involuntary; if they are (selectively) rehearsed, then volition is at work.

A SIX-LAYER ANATOMY OF BEHAVIOURAL INTELLIGENCE

1 Except in the heart and the gut, smooth muscle tensions and other autonomic body responses are literally e-motional. Thus *emotional affect meanings* of objects and events arise involuntarily from prevailing states of body chemistry, and they are associated with direct input from the superficial senses as well as with voluntary motions and tensions of the skeletal muscles. Then, forming five more layers of felt intelligence, 'motional effects', whether overt, covert, innate or learned, evolve into whole 'ecosystems' of meaning when: **2** postures and programs adapted for direct survival impart *reaction meaning* to objects and events; **3** the body's 'measuring' of extension, distance, and resistance to movement or deformation imparts *exploration meaning* to objects and events; **4** the

action of moving and rearranging the 'parts' previously explored imparts *manipulation meaning* to objects and events; **5** our neuron mirror reflection, or personification of 'other selves', imparts *imitation meaning* to objects and events; and **6**, by transposing all these direct interactions to altogether separate 'closed behavioural fields', particularly in the mouth and throat (language: essay **35**) but perhaps also in the eyes and face (imagination: essay **43**), for meta-level manipulation and composition (thus a covert displacement of meaning-**4** objects and events), motor-program-traces are abstracted and associated as mental constructs to *articulate formal meaning*: we call this "thinking". [The last three layers are clearly highly developed for, and the last layer—experienced as indirect mediation—is probably unique to, technological intelligence.]

In essay **31** I made the bold claim that certain philosophical allusions to a category of knowledge that doesn't arise from the five superficial senses can become more substantial if we admit a motor-sensory, or 'sixth sense', derivation. To explore the possibilities for confronting this a-priory knowledge as 'mental operations' of the efferent-afferent sense, let's now take a phenomenological tour of philosophy's *primary qualities*. Locke extended Boyle's list of those qualities pre-existing in objects, not fabricated like smell, sound, and colour in our sense organs, to include solidity, extension, figure, motion or rest, and number (texture for Locke was tied to his preoccupation with atomic structure. In our phenomenology it might appear as a superficial skin response, or an indefinite [fuzzy] motor-image of 'number'); then he says these "*original* qualities" are, if not fabricated, somehow "continued … by some parts of our bodies, to the brains".[2] Which begs my question: if primary qualities are *experienced as* deep-touch sense, does this make them secondary qualities? The real distinction, the 'volition', seems to involve only a shift in focus—so who is operating this mental focus? A koan to keep in mind during the following exercise:

Given my six-layered anatomy of behavioural intelligence above, and setting aside, as a good scientist should, any emotional feelings you might have about the object of interest in front of you (a book?—if

you're reading this as an e-book I hope you can still find some old-fashioned classic to play with), you should be able to detect its primary qualities as some combination of reaction, exploration, manipulation, or imitation meanings; and you should be able to know the object in these direct ways without reflexively moving on to verbally mediated thinking. To begin with, what sense of apartness, or extension, exists in your hands and arms as you hold constant pressure on the object? Do the orientations or pathways taken by your hands as they stroke it feel familiar, and are the motions or pressures of your hands perhaps 'figuring' the kinds of pathways and terminations you might later refer to as straight lines and corners? What felt angles and rhythms become 'apparent' as this pressure or movement repeats? Does the object resist the tendency of your hands and arms to move, or to remain at rest? How much, and in what direction with respect to your body and the pull of gravity? What about its solidity, or resistance to compression and distortion by your fingers? Can your thumbs pull the object 'apart'? When you adjust the pressure of your thumbs does some of the object catch and release at regular intervals, and are these pressure-intervals fast or slow; can you feel the whole duration of their motion and rest according to some bodily rhythm? And now, if you let it go, can you still feel the 'lines' and 'corners' elsewhere in your body? In your face? Can you sense some movement in your eyes or face which seems to 'telekinetically' organise all these mental operation tensions as if they were blocks of sensation? And is there a strong connection between the familiarity of these insights and certain fleeting speech impulses?

At this point you have explored a small part of your own very personal 'book concept': meaning these body sensations and motor programs are still available to re-experience even when the book is not. Of course, I'd be surprised to learn that your direct knowledge of the 'number of pages' amounts to much more than a two-repeat of some fuzzy (visceral reaction to fine texture?) sort of lump (faint 'throb' somewhere in the body?) that you might call, "hundred". Perhaps, if you feel that the book can't possibly be exactly two 'hundred pages' long, the second repeat might be held, or cut off—the shadowy pulse modified by a stretching or shrinking feeling next to the first pulse somewhere in the body.

And now we are at last free to reopen those autonomic emotional affect sensibilities.[3] Hopefully, the book excites you in less willful ways; for just as the grace of an elm tree can be felt as a visceral accompaniment to an impersonating body's outflowing and uplifting posture, and the freedom of a soaring eagle can be felt as flight's vertiginous accommodation, so concepts are also bodily experiences that can stir up our gut feelings. And, as for those emotional feelings that 'make you want to' covertly (or overtly) push the book away, on account of the not inconsiderable effort needed to participate in this exercise, or as for those emotional *and* motional feelings that might be propagated by verbalising, "just phenomenalism", or "subjective idealism",[4] do such formalities really 'touch the matter at hand'? Or are act-ual insights needed to make sense of a world in which a basically standard mammal body has been adapted to think its way into fast-evolving technology?

[THIRTY-THREE]

... though commoners have no method of 'beating the cart' ... on the way of the Buddha ... this is the very eye of study ... it should not be equivalent to 'beating the ox' —Dogen[1]

Cognitive scientists have traditionally viewed the brain (and here I'm quoting Frostburg State University professor of psychology, D. Alan Bensley, from a 2003 article in *Skeptical Inquirer*) "as a kind of complex information processing system, like a computer. The system inputs data from the senses, holds the information in memory, and transforms it into various intermediate states before outputting it in the form of behavior."[2] This tradition of information-input, processing-medium and act-message, was called into question in 1983, when Benjamin Libet found EEG spikes from the motor cortex starting a half second *before* a decision to act was consciously made. The results were surprising and controversial at the time: What are the implications for free will? How good was his methodology for determining the point when a decision is made?[3] But there should be no surprise for mindfulness practitioners who've been trained to watch within themselves for the natural progression by which thoughts and actions arise and pass away. In a culture where knowledge is wilfully published in words, and its full sensory

range is increasingly 'amputated' (McLuhan's term) by passively registered speech-plus-visual-aid technologies (PowerPoint), the 'conscious will' might indeed appear to be a free agent acting on (that is, choosing among tendencies arising from) the 'unconscious'. But the unqualified freedom a practitioner experiences as non-wilful *vigilance* of inner activity, allows us to see that McLuhan's dictum holds at a deeper level even than that of our five superficial senses (let alone the two that comprise most of today's messaging—or the one-and-a-half if we grant that verbalisation is just a subset of the emoted speech we can sympathetically hear). In fact, if speech "is the message" only to the extent it gets sensorily involved, then non-judgemental silence, and overt stillness, allow the "is" to fully collapse: even our somatosensory intending is now message, medium, and act all in one.

At this point some impatient historian might prematurely conclude this is "just behaviourism all over again". But when I claim that actions aren't translations, but rather amplifications, of my more subtle behaviour, I don't 'feel like' I'm denying my creative potential as that school of thought has been accused of doing;[4] for there's not only Darwin's "grandeur in this view" that sees my deep-touch sense evolving as McLuhan's "very life of things in the *mind*",[5] but when ideas (even very abstract ideas called up by words like "if, then", or "democracy") are recognised as the subtle re-enactments they truly are, there is a *return* to creative wholeness.

If you have any doubts about the importance of your body-sense in shaping what 'appears in the mind', try the following exercise. Be warned: you must sacrifice a little sleep as you momentarily re-awaken from sleep's onset to identify the very first image that passes before your closed eyes just before you let go of volition. I'm talking about something so early on in the progression that, in its lack of detail, it's really more outline-figure than picture—an image that arises even before the first twitch of the shoulders, or the first catch and release of breath due to relaxation of the lips or nasal passage. If you're like me, you will consistently find that the 'picture' accompanying this release of tension

reflects the very posture of that body lying in your bed. You might identify this shape with something other than your body—in fact you probably will—but, what does the fundamental 'contour' look like?

Do we have here the realignment of efferent muscle impulses (as they disengage from the tensions of covert activity) with playful doodling direct from the visual cortex? I don't know. But to give you an idea of how deceptive these sleep-onset body images can be, I will describe one of my more recent experiences: I was resting on my back, and just as the tension let go, in my mind's 'eye' I seemed to be looking down at a tiger's pelt. It was a close-up view, so I could see only two wide black stripes on the orange fur—one narrowing in from the right, and another, lower down, narrowing in from the left. I can't say whether these colours were 'real' or perhaps some trick of certain muscle potentials (adjusting my pupillary-openings, or my relaxation-response, to temperature associations?) that I've associated with colours.[6] When I reawakened (just barely—it doesn't take much when you know what to expect), I found my right arm was folded across my chest above my left arm. The left arm was folded across my belly.

I could have sworn it was a tiger I was looking down on!

In a phenomenological review of formal insight meditation (that is, when the words resume), we might report feeling our 'intentionality' as the contiguous reproduction and passing away of motor impulses (loosely associated with internal chemistry, superficial skin responses, and memory traces of more distantly 'other' visual and auditory impressions) within the body's covert motor-mirror. Do these unconsolidated, un-verbalised body images, however they are subsequently overlaid, not constitute (and I'm returning now to our two trees analogy) the first tentative shoots of Plato's eternal Forms sprouting from Aristotle's fundamental sensory ground?[7] But of course, when the unwary meditator succumbs to the habit of picking and choosing among these idea-sprouts, they begin (all too readily) to follow along one branch or another of some deep-carved pathway in a vastly larger human conversation—the tree-like framework for a 'body of knowledge'.

So, again returning to our silent practice, where the common animal-human behavioural root is only partially revealed in the wash of

partitioning, elaborating words, let's 'just look' for their meanings. Words, as Gautama said, relate to direct experience as "a finger pointing to the moon", but these more subtle behaviours, these preverbal sensorimotor concepts imaging past or future, are still not "the moon". The illumination our words point to is indeed the bodily substance of our 'thinking', but this too, by itself, is just more shadowy fingerness because, even though it's more reflective of experience than words are, in as much as it's a sketchy conglomerative 'rehearsal', it's still representational. And if we hold onto even nonverbal thought too tightly, these lonely and weak covert movements detain us further. They are but moon-shadow, that only *implies* a moon *to* a separate friendless 'self' (for my anatomy of the body's 'fragmentation layers' see essay **43** and **44**). Fortunately we've all seen, at least when we were very young and perfect animals, what here and now 'looks like' before this sprout of internal re-presentation branches out on the strong fibre of our fragmenting, elaborating, self-ish commentary. But we seldom 'just look' for long, because this subtle busyness is our birthright, and our burden.

Something strange happened to the human animal long ago, on the coast or on the plains of Africa, or perhaps on its journeys beyond the Levant. I'm pretty sure other animals don't divide themselves so,[8] but their fears and their wants come and go directly, with the appearance and disappearance of unmediated sensations and memories. Their witness and their response are one continuous piece. Still, that they can't separate them—not by symbolic displacement anyway—doesn't make their witness-response less real. Indeed, their lives are always Real, while we have to work at it.

~ANTHROPOLOGY PRIMER: PANDORA'S BOX, A TRUE STORY~

If tool invention, in its early stages, was a clear advantage for survival, it's curious that 164,000 years ago, when glaciers covered temperate land masses and the tropics were mostly desert, the species that gave rise to all modern humans was reduced to a small population hanging on by eating shellfish at Pinnacle Point in South Africa. They used fire, sophisticated stone-flake tools, and body paint, while extant *Homo erectus* was limited to fire and relatively crude, unvarying, stone tools ever since their emergence nearly two million years earlier.[1] If we use all five designators in Learning-Acquired Structural Tools Niche as a test of what it means, ecologically, to be human, then *H. erectus* would likely fail because: although they used structural tools as an essential component of their niche (unlike chimps), and although these must have been initially acquired by learning, and must have been maintained by cultural tradition, nevertheless there is little evidence for the *continuing acquisition by learning* of new tool types over an incredibly long period. Clearly we can say that innovation was not a significant component of the *H. erectus* niche.

So perhaps it was their unimaginative commitment to an endurance-running, spear-chucking, ancillary-specialty that allowed an anatomically opportunist *H. erectus* to survive those two million years among other species confined by nature to their own special, and formidable, biological structures? True specialist diversity did fall off with prolonged climate disturbance, just as our uninspired earlier ancestors were becoming relatively successful, and whether their success was a cause or effect of the falloff is still controversial.[2] In any case, the pitifully small size of that Pinnacle Point complement of immediate human ancestors must be taken into account if we are to judge the effects of unregulated imagination in its early stages.[3] Some think the 'trick' that lead to unstoppable inventiveness was a gene for *hyperprosocial cooperation* in the defence of rich and dependable shellfish territories on a tribal scale;[4] but, whatever happened there, a new kind of animal emerged from Pinnacle Point, and from Africa, to confront other hominins with progressive technology. Of course, by then, tool-making genus *Homo* may have already become a melting pot unable to branch into separate species: this *multiregional hypothesis*[5] is evidenced by our sharing some DNA with Neanderthals.

THIRTY-FOUR

Wind back the tape of life to the early days of the Burgess Shale; let it play again from an identical starting point, and the chance becomes vanishingly small that anything like human intelligence would grace the replay. —Stephen Jay Gould[1]

Between two and a half million, and twelve thousand years ago, as we now know from deep sea sediment cores and glacier ice cores, and from the terrestrial fossil record, the Pleistocene epoch was characterised by mile-high ice sheets advancing and retreating over Europe, while extended dry and wet conditions concurrently swept North Africa and the Mediterranean Basin; and it was during this climatic disturbance, this 'blinking of the co-evolutionary eye', that a long line of hominins slowly became human.[2] No other species has used Structural Tools, Acquired *wholly and progressively* by Learning (by which I mean non-living body extensions that are not 'proprietorially' developed by genetically orchestrated or ecologically contained behaviours) as a defining (though ultimately, in the purely Gaussian sense, contradicting) element of an exclusive technological *LAST Niche*.

Maybe Gould was right about the "vanishingly small" chance for human intelligence, but our late prophet of evolutionary contingency (his *only* reason for this comment by the way; there's no evidence Gould would have approved of a Nature that 'actively' works against our kind of intelligence) didn't recognise that, perversely it would seem, his and Eldredge's *punctuated equilibria* might in fact favour such a supreme opportunist. Especially if a cycle of these glacial punctuations was also fast and unrelenting.[3] It could be argued that, even under chronic stress, the tirelessly healing resource partitions of the Paleolithic world might have had time, though balancing on the very edge of Promethean supra-ecological catastrophe, to deselect unperfected language in the death-wake of out-competed bodies with over-reaching imaginations;[4] but the Natural and sexual 'hands' of selection would have exerted a drifting pressure in those times of advancing and retreating ice-sheets, of unsettled savannah and rainforest,[5] and they would have kept falling upon two fateful contingencies: **1** 'intention' already had an animal presence in that inchoate sprouting of motor-concept that our ancestors could feel

as the sketchy covert rehearsal of familiar actions, and **2** the muscles of voice, being useless for fleeing danger, or in the case of diaphragm acting on larynx even for fighting or feeding, had already been set aside for innate signaling. So, when this 'grunt-system' also turned out to have very little use in exploration, manipulation and invention (jaws and lips optional), our ancestors' tool-use (temporarily prolonged by the befuddlement of a diminished co-evolution) would have had an opportunity to take advantage of a set of traits pre-adapted to kick-start a 'verbal selection process' for their waywardly ramifying thoughts.

In our continuing evolutionary analogy, it's not overt language, but covert activity in general that corresponds to the shadowy, abstracted, gene-pooled design space of an ecosystem's non-somatic (germ plasm) chemistry. In fact, the implied correspondence between genetic 'code' and verbal code is misleading: the first is a chemical precursor for amino acid sequencing of proteins, and the second, a changeable convention that, to the extent its vocal details have no relevance as behaviours in the real world, assigns verbal behaviours to thought behaviours as arbitrary handles. It's only because, at our accustomed scale of relating to Nature, the codons of DNA exhibit alternative sequencing, while sexually selected traits appear as a messy subset intrinsic to 'fixed' species, that we don't recognise the latter as the properly correlated 'conventions' that handle Nature's Darwinian work. Indirect verbal behaviour specifies the partial and tentative, but directly useful, covert behaviour[6] of which it is a subset, and so 'thought' unfolds bivalently according to the body's own "universal grammar". [7] Just so, to avoid tentative reproduction, sexual traits, not directly related to survival, are selected 'as a convenience' to decisively speci-fy traits that are.

I don't mean to use Chomsky's dictum lightly here. By pointing out that grammar is real-ised through operational and practical developments within the body itself I know I seem to be putting the cart before the horse, but recall that Dogen's reversal of this old trope—where beast is mind and cart is body—makes a lot of sense when you look at which end of the body-mind has the real-world traction (Warner's quote in essay **27** was written for a western audience; Dogen had a body-cart pulling an ox-mind[8]). When we are truly thinking, the real work begins

even before the words come, and the pre-verbal traces and yokes to a broader culture are real in the same attenuated way; but since thinking is easily *driven* by the words available, we must take care, when our horse and cart come to a crossroad, we make a 'natural' selection, and speci-fy it later.

[This view of language, as a 'mapping' of bodily movements, goes back at least eight centuries before Dogen, to Augustine. It has been criticised by none other than Wittgenstein (possibly because his own ideas were so similar) for assuming that the meaning of a word is the object for which it stands ('ostensive definition').[9] But, in a way affirming his own philosophy, the mind of the Saint went deeper than reason alone can penetrate: "When they (my elders) named some object, and accordingly moved towards something, I saw this and I grasped that the thing was called by the sound they uttered when they meant to point it out. Their attention was shown by their bodily movements, as it were the natural language of all peoples: the expression of the face, the play of the eyes … Thus as I heard words repeatedly used in their proper places in various sentences, I gradually learnt to understand what objects they signified; and … I used them to express my own desires" (*Confessions*, I. 8). This "natural language of all peoples" can "point out" much more subtle meanings than ostensive objects, and hold words to their grammatically "proper places", because our "bodily movements" are not ad hoc conventions, not code; they are meaning itself.

True code is hard to find in nature. Other than sexual traits, which might be seen as naturally selected conventions on the evolutionary scale, the only hint of biological code, in this 'conventional' sense (and on the organismic-scale) that I am aware of was demonstrated in 1992 by W. J. Freeman, when he showed that long term memories of sense impressions in the brains of rabbits (and presumably humans) are formed in arbitrary association with *chaotic attractor states* of electrical activity.]

THIRTY-FIVE

When we claim to describe what's Really going on by our words, no matter how beautiful, such words are already in error. Truth simply cannot be re-presented. We want Truth badly. We want to hold it tightly in our hand … to give it to others in a word or phrase. We want something … we can impress upon others—and impress others with. But Truth is not like this … We only need to see *that it's beyond the spin of paradox that Truth and Reality are glimpsed. If we would simply not try to pin Reality down, confusion would no longer turn us away. —Steve Hagen*[1]

From a motor-sensory phenomenological perspective, language seems to operate as a *closed field of associated behaviour* that helps to organise and extend the more intricate and practical non-language covert behaviours it aligns with. In practice, what this means is that arbitrary linguistic behaviours branching off from innate roots (genetically encoded, but not yet socially calibrated, behavioural routines: facial imitation, babbling, etc. [bonobo infants babble, but they are probably now competitively excluded from our technological niche] that have been enhanced and adapted, on the phylogenic scale, in response to the selection pressures of persistent learning-acquired structural-tool-use) are learned in parallel with our non-arbitrary cognitive behaviours. This closed field—meaning every-interior-thing gets mapped onto, or symbolically replaced by, a perfect (meaning it appears to be sufficient unto itself) behavioural layer generally limited to the mouth and throat—was probably at first an energy-conserving overt, and eventually a covert, persistent means (a tool) for finally liberating the un-Natural artefact potential of the human body from the conformity imperative that assures ecological stability in normal times. Language behaviour supports this 'cultural escape' by associatively tracking, maintaining, articulating, and outering (a 'palingenetic' variation of the word 'uttering', often used by McLuhan[2]) the more complex, seamless, and truly reflective (non-arbitrary) subtle-body behaviour sketches and memory traces we call "thought". (See?)

But perhaps our analogy can make this mouthful easier to digest: words are to thought-behaviours as red breasts are to robins, they are the

means to a faithful reproduction of type. Furthermore, words are not only similar in being traits that are useless outside their purview of cultural specification but, like showy inbred feathers, they can only contribute to cultural 'species' by exposing their owners to a far more voracious creativity.

[THIRTY-SIX]

The "exo-holographic" part of the acronym [SPEL, meaning: Sono-Pictorial Exo-holographic Language] derives from the fact that the dolphin pictorial language is actually propagated all around the dolphin whenever one or more dolphins in the pod send or receive sono-pictures. John Stuart Reid has found that any small part of the dolphin's echolocation beam contains all the data needed to recreate the image cymatically in the laboratory [the CymaScope is a device that assembles sono-images] or, he postulates, in the dolphin's brain. Our new model of dolphin language is one in which dolphins can not only send and receive pictures of objects around them but can create entirely new sono-pictures simply by imagining what they want to communicate. It is perhaps challenging for us as humans to step outside our symbolic thought processes to truly appreciate the dolphin's world in which, we believe, pictorial rather than symbolic thoughts are king. Our personal biases, beliefs, ideologies, and memories penetrate and encompass all of our communication, including our description and understanding of something devoid of symbols, such as SPEL. Dolphins appear to have leap-frogged human symbolic language and instead have evolved a form of communication outside the human evolutionary path. In a sense we now have a "Rosetta Stone" that will allow us to tap into their world in a way we could not have even conceived just a year ago. The old adage, "a picture speaks a thousand words" suddenly takes on a whole new meaning. … Our research has provided an answer to an age-old question highlighted by Dr. Jill Tarter of the SETI institute, "Are we alone?" We can now unequivocally answer, "no". SETI's search for non-human intelligence in outer space has been found [sic] *right here on earth in the graceful form of dolphins. —Jack Kassewitz*[1]

I have reprinted Kassewitz's statement here in some length, partly because I want to revisit it in the next section where I will elaborate on the "challenging step" whereby we can better "appreciate the dolphin's world"—and our above-water human world as well—through a fuller appreciation of the sensorium itself. But also, the complete passage nicely introduces three points I want to make right now about human language and intelligence. That Kassewitz, who is obviously up to "the challenge" (carefully distinguishing between pictorial and symbolic thought in the first place), at the same time casually uses an acronym that labels the "language" of pictorial thought not only symbolic, but perhaps doubly so (if you see SPEL-ling as visually symbolic of spoken words which are themselves symbolic of thought, so this is also a lesson in our mind-hobbling preference for vision and print), is an object lesson in the challenges that even the most sympathetic among us face in our efforts to 'look' past our symbols. (You might notice that my acronym for the human ecological strategy, the LAST Niche, actually denotes a non-niche. So perhaps our dubious acronyms just reflect the irresistible pull towards creative image association that we ourselves feel as very playful mammals.) As Kassewitz says:

> *Our personal biases, beliefs, ideologies, and memories penetrate and encompass all of our communication, including our description and understanding of something devoid of symbols.*

My second point is that when we say "we are not alone", for the simple reason that a dolphin can communicate its inner life, we make too little of the body language coordination we might see even in the lowliest of social animals (I grew up on a farm, and I had to stay alert at milking time because, when one cow takes a whiz, all nearby cows relieve themselves at once), and, in my view, makes too much of an "exoholographic" dolphin "imagination" that doesn't express itself in structural modification. We can only say we're not alone in this respect if we acknowledge the structurally-creative 'intelligence' of an evolving ecosystem.

Finally, "the graceful form of dolphins" is a perfect image to illustrate my argument that eco-evolutionary (phylogenic) intelligence operates with a conformity imperative that limits the imaginations of its

(ontogenic) organisms: if the gene-regulated harmony of our oceans had allowed an octopus (who *can* use tools) to evolve the social intelligence of our gracefully formed dolphin—no hands!—how long would the harmony have lasted? And what if octopuses *had* developed technology first? Well, Milford Wolpoff's *multiregional hypothesis*, pertaining to hominin evolution, tells us that "the potential for niche overlap would have made the co-existence of multiple tool-using species impossible"[2] —no humans! Luckily these handy cephalopods are not only all aquatic and short-lived (their reproductive strategy might be called 'self-consuming'), but, perhaps due to their unusual *genetic* flexibility, they are all non-social specialists with ecologically well-partitioned 'interests'.

THIRTY-SEVEN

Unlike monkeys, humans also use mirror neurons to directly imitate actions and understand their meanings. … Gallese and Rizzolatti found that when people listened to sentences describing actions, the same mirror neurons fired as would have had the subjects performed the actions themselves or witnessed them being performed. —David Dobbs[1]

A comprehensive unity of the human spirit, required by us mortals to render our tree of knowledge 'immortal', is intimately manifest in what might be called, covert inter-personation: the effect of a *mirror neuron* system which is present, but unequaled, in the rest of the animal kingdom. This subtle, involuntary, behavioural mimicry, whereby our own muscle neurons fire for every muscle that corresponds to the actions we witness in another (these may or may not be dedicated 'mirror neurons' so I'll continue to refer to this as a more general 'mirror functionality'), was first confirmed experimentally in the nineteen-eighties and nineties by neurophysiological researchers at the University of Parma, Italy.[2] But of course, anyone with a well-developed capacity for introspection will probably have observed at one time or another that empathy is more than just a vague and strictly e-motional precursor to action; rather, it is impossible to really under-stand another person without a subtle sense of our own covert behaviour becoming coordinated with each movement, posture, and expression of that person. If we *are* what we *do*, then

there is but one human soul, and it's held together by subtle but real sympathetic responses that we are not always consciously aware of. This covert inter-personation is primal, but humans have contained, augmented, and reinforced it with overtly sensuous cultural re-presentation in word, art, music and dance. Indeed this is how we human beings find our-selves in a reacting, exploring, manipulating, and inter-personating covert world—a shared world, with dreamscapes to fill. (It's not surprising then that stories of re-incarnation are easy to believe, especially when the original character is widely known and imitated, and the believer is mirrored, and thereby affirmed, as 'the chosen one'.[3])

The latest neuropsychological research supports the view that human covert impersonation might go well beyond mimicking other humans to encompass a full cast of animal, vegetable, and mechanical characters. By contrast, the neuron mirror systems of other animals probably 'reflect', in this subtle behavioural way, only living organisms of the same species, or of similar body structures.[4] Perhaps this is because species outside the LAST Niche do not need to under-stand techno-logical agencies? Of course, since we technophilic humans are nevertheless strongly attached to our standard mammalian body plans, we might often still have trouble enacting our special mirror-empathy when we meet up with the disparate body of a spider (a disembodied 'hand'!), of a snake (the limbless passage of a spectre!), or the Manifold Flicker of an inimitably slow, and imperceptibly vast, 'evo-ecological mind'.

THIRTY-EIGHT

What I cannot create, I do not understand. (Written on *Richard Feynman's* blackboard at the time of his death.)

There is one consequence of a supercharged neuron mirror system able to impersonate inanimate objects and machinery that really needs to be looked at here. When we project our hopes and fears onto technology, we must temporarily forget that the forms and movements of pre-programmed energised structures cannot themselves bring about any fundamental change, for they embody our own preconceived models. And if we are genetically 'pre-wired' to unconsciously mimic their

forms and operations, we must experience in the process either our preconceptions as living, or ourselves as lifeless. We know our contrivances are at best life-*like*, and that they are becoming inevitably more powerful, integrated, and indispensable. So, all too naturally, we fear the implied scenario in which these soulless machines just might take over the world, subduing or destroying their more vulnerable creators: us! But the scenario that I find scarier still, because it's more believable, is that whole cultures might fall into a hypnotic compulsion to emulate our pre-programmed energised structures. For hasn't this already happened? Hasn't this informed the dreams of the leaders and the fears of the victims of totalitarian regimes? Should we not see even the oppressor as victim of his innately mirrored machine thinking?

If our thinking is truly creative, if we're *happy* to dismantle our preconceptions and start anew on that direct sensory ground more fundamental than any model reality we might conceive, we will see that the first scenario only makes sense to someone who has already partly succumbed to the second; for should a machine ever really come alive, we who know ourselves to be more than machines will surely empathise more deeply yet with this new consciousness. Any truly non-automatic being will be a welcome surprise, for it will need to be as open and as vulnerable, and as capable of happiness, as ourselves. Non-living automations, and the machinery of an automatic mind, do not know (or in the last case they have forgotten) joy.

Many of us may feel, but perhaps do not fear enough, the steely-eyed inhumanity that we witness in our automation by unknowingly *receiving* it within ourselves; rather it's the thought of our organically limited human intelligence being left behind in the dust of our technology's accelerating electro-photonic intelligence which causes us anxiety, for this touches our daily lives. Some of us have a hard time keeping pace right now; what will it be like in the twenty-second century? As a student of natural history, I don't worry too much about this. There have been many crazy growth spurts in biological evolution too, and yet they have always incorporated, rather than outstripped, all that went before. They have never produced anything like the information singularity that certain futurists seem to get excited about for instance. (On the other hand,

if you want to pursue this cosmological vein of thought, you could say that humanity is already a 'black hole' with respect to Nature, in the sense that everything is being drawn in while nothing *can* be given back. And we can't really do anything about this except to shift our horizons so as to remove ourselves from the lopsided feast.) The boom and bust population cycles of locusts and lemmings, or the destructive growth curves of invasive species (their exploding populations, their inevitable dieback, and the possible extinction of some indigenous species), are fodder for the lurid imagining of survivalist "aliens from outer space" stories. But the relatively short term 'bump in the road' trajectories of these limited population adjustments (even when whole bio-associations merge, as they did when the Isthmus of Panama rose to connect North and South America) don't really look like the explosions of *diversity* which are the proper analogues for technological evolution. When real catastrophe strikes an association of species it's not of their own making, and the void left by such events is generally filled (whether through succession in the short term or through adaptive radiation in the long term) more or less according to what's known as a sigmoidal, or 'S'-shaped, growth curve: diversification is slow in the beginning due to a limited supply of opportunists or survivors; then increases exponentially when climax species begin to jockey for position; and finally it levels off again (all-be-it at higher levels in the case of truly novel modes like heterotrophy) as the ecological barrel becomes full.

I personally think the curve of human technological evolution will play out something like the Cambrian explosion, which was also a new *kind* of evolution. But then, what carrying capacity, or what 'technological barrel', will this latest evolutionary diversification reach or fill? I'll speculate more about this later because it has everything to do with humans getting to know who we are: with our finding and securing, like the supreme extremophile rather than the supreme opportunist, survival strategies that are progressively 'contained' with respect to authentic ecosystems. But for now, what about our hopes for artificial intelligence of the "I am alive" kind? Frankly, I don't know. But perhaps, just perhaps, when our technology starts to level out a bit towards the top of its sigmoid curve, we might see that we don't really need this kind of intelligence, or even want it, from our tools. And, returning to my earlier

thought, since it feels to me like this being alive, or this being self-aware, is directly related to our capacity for joy, or at least to a memory and a hope of joy; and since our joy in life—a joy we *do* share with other species—is the product of three billion real-time years of good luck accruing to our personal germ-lines; then such true and equal fellowship with our less ancient, our less fortunate, technology could have some way to go yet.

So, just for fun, let's keep our technological slaves working on their artificial neural nets. Perhaps we can even allow them to 'feel' the consequences of their actions in the cosmos somehow?[1] We have nothing to lose as long as we allow ourselves to feel this difference too. Whatever forms intelligence might take in the future, they can never be wholly strange to us once we see that *good will* is at the root of evolving awareness. The intelligence of ecosystems, LAST Niche primates, and nanotech space bugs, even if tied up sometimes in self-centred knots, can never be complete without touching this common root, and in the touching, *this* is *us*. I wonder: if the primate strikes the right attitude to the ecosystem, that is, the 'personal' attitude, will his own success convince him that respect for life is the mature state of all intelligence—including that scary future space bug?

[By the way: the tendency to emulate our impressive computing machines—for I understand this approach is still 'sexy' in the cognitive sciences—may be leading us not only into false hopes for artificial intelligence, but also into a false view of our own intelligence as well. An old chestnut, for those who like to describe the mind as an organic computer, would have us look at the game of baseball: we are asked to marvel at the "incredible computing capacity" of a player's brain that allows him to catch a fly-ball. But when we describe the workings of the catcher's mind even in terms of evolving artificial neural net (ANN) algorithms, we see that the brain is not act-ually computing at all: the bodymind, after much practice with successive approximations, is simply doing what works best. Moreover, when we look at the bodymind in terms of an evolving forest, the familiar (to a biologist) evo-ecological processes make this more obvious yet: in Weismann's terms, "the information represented by the morphological changes of a

lifetime is lost after each generation", and in Gould's terms, "variation is the hard reality, not a set of imperfect measures for a central tendency"[2] To a biologist who is also a mindfulness practitioner, the analogy should be perfectly natural, and its meaning clear: when you *feel* that a new variation works better than previous ones, you don't have to figure out *why* every single time a similar situation arises, you can just let the motor program repeat without calculating. Let memory be authentic. The 'phylogenic' life is not just about reducing memory to little bits so that we can calculate the best trajectory to our preconceived goals; it's about fully accommodating every little miracle as it shows up, using our promethean powers of analysis only to prepare the supporting branches of our cognitive tree for more surprises at their im-mediate living tips.]

[THIRTY-NINE]

We are between stories. —Thomas Berry[1]

Tracking, and fully articulating (i.e. interconnecting), our intimately direct experience, and thus in particular our sketchily rehearsed pre-verbal thought experience, with a separate behavioural field, *signifies* the separation of objects of attention from an attending subject. So now we have two independent selves (independence makes the 'other' into another 'self') where before all codependent experience was just *this*. In terms of the natural history of sensation and perception, a simple animal expedient of ineffectually rehearsing behaviour has been speci-fied, extended, and accelerated, by technology-driven language, allowing otherwise transient *readiness potentials* to become "things" in themselves. In this way, a separate, shadowy and yet tangible "world" is brought into existence. If this sounds too abstract, we need only look within ourselves to experience the deception, for here in our passive self-referencing model universe, where tentative rehearsals not only 'exist' as ideas, but link to this conceptual world with covert movements of the tongue, even awareness 'appears' as divisive, and intrinsically judgemental, *naming*. Our stories aren't real. But we know this only in that 'dumb' part of the brain that's been left out of the *game* to engage the

moment directly, while the awareness that can be named treats our stories as if they are real. And we argue over them as if we could really make this seemingly perfect layer of words as seamless and complete as the lived moment.

Take the "natural selection" story for instance: here we have a narrative that deals with the question, "Given autonomous entities we'll call organisms, what is a species?" But of course we can also say the selection is being done by another entity, called "Nature", and so a second story can be told in which "species are co-adapted": this story deals with the question, "Given autonomous species, what is an ecosystem?" Then, coming full circle, and asking the question, "Given autonomous ecosystems, what is an organism?" we can tell Margulis' story about symbiogenesis: "A lichen is a co-adapted alga-fungus organism, and a green anemone is an alga-animal organism." (The fact that their DNA, their contribution to what I call genepool dreams, is packaged in separate nuclei is not an admissible point with Margulis because her metaphysics, like Lovelock's, is more comfortable with the materiality of creatures—"organisms" by any definition—than with the spookiness of creation, aka intelligence.) In our first (strictly Darwinian) story, any genetically fixed entity is an "individual organism"; in our second (evo-ecological) story an ecosystem is an "intelligence" (after all it's not individuals that evolve, it's Nature's divisions, its speci-fications, themselves); and in our last story (symbiosis) "a tiny divisible ecosystem has evolved into an individual organism". Perhaps it can now come back into our first story without further argument about what these terms mean? "Things" change, and it's only when we don't expect *any* story to be complete that we can appreciate *all* stories' essential complementarity. Indeed the whole story would take all of us, and all of time, to never really complete. What matters to me is the utility of our insubstantial narrative models in fostering a mindful non-destructive culture, and this means, as an essential part of the story, telling how stories take up dedicated space in the totality of our experience.

Of course the 'this is that' naming illusion, which allows us to tell stories, need not signify a desperately grasping idealism, or even 'real' categories (unicorns come into many inspiring tales). It might only entail the transitory model space pretense that ideas are true, in the sense

that we hold them less variable than the muddle we directly experience; thus we *believe hypothetically*. The illusion does give us useful models—like natural selection (favouring without intent), and entropy (favouring recognisable ends upheld by the greatest number of indistinguishable means)—but its uses, and also its misuses, arise from the illusion's potential to both direct and obscure the undefinable, ever-changing totality of our lived experience. The "bio-association as intelligence" story has two uses: it forces us to take a broader view of intelligence, and therefore of our insubstantial selves, thus encouraging both a more hypothetically-believable relationship to Nature *and* a more mindful culture. Many will say this challenge is un-realistic. It is! But a non-practitioner might be less reluctant to accept the necessary premise, that thinking is essentially Darwinian, if my story can explain (believably) why we so easily get stuck in our creative head spaces: why do our creatively modified and recombined—thus metaphorically ontogenic—mental subroutines hold us so spell-bound that we forget to step out again into that creative wholeness? Then, if you also believe my tale about "a Promethean Humanity that's unlike any Natural species in that our minds recapitulate all three phases of Darwinian evolution",[2] I readily concede that I'll still need to prove (that is, defend as useful) my claim that we are "naturally destructive to Nature". Accordingly, I will pretend to "finish my story" in the next section.

PART V

THE EXTREMOPHILE CHOICE

The rewilding of the tortoise in its ancient habitat represents not only the species' slow drift away from extinction, but an overall movement toward a more plentiful world. What the bolson tortoise reminds us is that it is ultimately less important to choose a baseline than it is to choose a direction. —J. B. MacKinnon[1]

The Earth is the cradle of mankind, but one can't stay in their cradle forever. —Konstantin Ziolkovsky

… reforestation is gradually returning the [Sudbury] area landscape to its natural state. Using both surface and under-ground greenhouses, Inco grows some 250-000 seedlings each year for reforestation purposes. —Inco [Mines] website, 2008

This is how a human being can change: there's a worm addicted to eating grape leaves. Suddenly, he wakes up, call it grace, whatever, something wakes him, and he's no longer a worm. He's the entire vineyard, and the orchard too, the fruit, the trunks, a growing wisdom and joy that doesn't need to devour.
—Rumi, The Worm's Waking[2]

FORTY

Sweet, sweet, sweet, O Pan! Piercing sweet by the river! Blinding sweet, O great god Pan! The sun on the hill forgot to die, and the lilies revived, and the dragon-fly came back to dream on the river.
—Elizabeth Barrett Browning[1]

We began by looking at some of the seldom questioned fundamentals of the physical and biological world we pretend to know. We saw how the analogical construct of an isolated and ghostly 'design space', representing genepool 'play', adds a personal dimension to our view of natural history's phylogenic tree—it becomes an immortal creative intelligence that unfolds, seamlessly and globally, by means of the ontogenic seedings of discontinuous individual organisms—and we saw how our confusing the open totality of creation with its preconceived creatures is perilous at a deeper level than we usually care to think. Also we saw how a statistical formulation central to all categorical discriminations—even giving cause and effect its direction in time—depends on discrimination itself, and therefore on a direct bodymind awareness that can't be made to fit into any formula: as Dogen tells us, "Indeed, the whole body is far beyond the world's dust".[2] Then we called upon the phenomenological insights of both Western and Eastern psychology to teach us how to look at intelligence, both human and Natural, in a more intimate light.

Now, I might be wrong to conclude, as I do in this section, that the LAST Niche 'non-species', with its faster technological evolution, must eventually stop plundering the resources of Natural species, if only because we can. Like those species of worms and shrimp called extremophiles, that live around black smoker hydrothermal vents on the deep ocean floor, we can thrive in conditions that typical life-forms can't even endure; and like certain microbes that live within deep mantel rock and polar ice caps—let's call them non-coevolved extremophiles—humans can make use of ecologically unproductive spaces into which even the detritus of the world's ecosystems never enters. But, unlike any Natural species, we are also 'adaptive extremophiles': in theory, we can extend our homes and farms around the globe unchecked by either elemental conditions or ecological competition. I won't pretend this vision

of our distant future is anything more than a working hypothesis based on some very general ecological principles; nevertheless, whether this vision can truly help us "choose a direction", as MacKinnon recommends (see quote at the head of this section), or it's just foolish, it is my hope at least that we can gain a more empowering view of ourselves from the light of our 'two trees' analogy, and by framing the consequences of our very existence in this bold way. The artifice of anticipating the future (or of analogical thinking for that matter) doesn't make us more intelligent than Nature, nor our art, more spiritual. But in the light of friendly inquiry a student might learn from a personalised Nature what is hidden from a doctrinaire master. At the very least, we might learn to respect the creative power of unmediated *human* intimacy, and open ourselves to a less claustrophobically calculable human future.

On the other hand, I am absolutely confident when I say that our visions, and even those passions and predispositions that have been Pan-piped into our animal bodies by an older and wiser master, evo-ecology's gene-shuffling God-Of-All-Tribes, are provisional props that won't betray us if only we see through their passing and inconsequential bodily shadows. I've watched this process unfold, in myself and in others, on the cushion and off, as I've grown older. The message itself is old, and the process might be more natural than I've made it out to be, at least for some of us.

But what about the "much needed credibility" I've promised my gadget-minded readers in this Dogen Meets the Great God Pan story [essay **18**]? A good plot they say will have a surprise ending that relates back to some curious detail slipped in near the beginning; some clue that only makes sense as it makes the ending plausible. Well, I confess my who-done-it scene in this section, revealing a material difference between Natural and cultural evolution and positing what we are obliged to do about it, might seem more final than is good for us. Even this plot twist (you've likely guessed it already from my comments on the model space of covert behaviours vs. the design space of genepools) is somebody else's finger pointing to your personal moon.

FORTY-ONE

That it will never come again is what makes life so sweet, believing what we don't believe does not exhilarate. —Emily Dickinson[1]

If it were possible to experience from the perspective of a slow-evolving bio-association, human technology, with no part in the mutual feeding that ultimately drives Natural selection, would be 'practically' invisible, for it would be impossible to see that which changes too fast to adaptively 're-cognise'. Perhaps it's knowing this at a latent (or we might say an Oedipal) level, that has in all human cultures inspired mythological cautions against Promethean hubris. So, risking the confusion of phylogeny with ontogeny once again, we might figuratively characterise our predicament as that of a developing child, who must face his existential fear and turn away from the known (his parents) to the unknown (himself). Sooner or later we must look at who we truly are and begin to own our technological emancipation, for only then can there be real hope for the phylogenic 'mother tree' whose little hominin bower we've outgrown. Such leaps of individuation are difficult enough for us mortal vessels, who grow up gifted by parents with wisdom 'descending with modification' from the immortal god of culture (for now we return to the truer, or less-figurative, case), but individuation must be harder yet for untaught humanity itself—an orphan god, not born but escaping, like a techno-genic Athena out of the head of a phylogenic Zeus.

We might think we have come a long way, but even now we don't really need to imagine how traumatic the assembly of a first complete, or associatively 'perfect', language was for an animal that did not yet know it had an inner life. That animal still cringes in the shadow of our dualistic 'self-knowledge' (see *Panic terror*, Part I).

Perhaps cave-art, starting around 164,000 years ago, was an early response to the closing of the linguistic behaviour field. With the final expansion of arbitrary word-behaviour to associate with every-interior-thing, and with an animal mind raised to cultural 'phylogeny' by this speci-fying behavioural fragmentation, the powerful dualism illusion implied by 'referring' to a covert universe became inevitable. This has been both a gift and a burden to us these millennia, for the beauty of our thoughts and words can still pull us back from the very experiences they

re-present. Only by seeing this thoroughly can we understand, and withstand, the pull of words; when words like 'beauty' even can grasp at moments during which the grasping, therefore the word, is exactly 'wrong'.

So with the stage thus set, we are now finally ready to examine the benefits that flow from restoring evo-ecology's daring Pan-like innocence, and our own, as we embrace this new perspective on a Mankind invisible to Nature. Is this vision as hopeless as we are asked to believe? This prospect of 'rewilding' our planet? Do a million years of humanised ecosystems, and the economics of 'ecosystem services', determine our future, or do they just reflect a more and more distant past? We commit on paper to some program of conservation, but then jobs are threatened and we choose the economics of Man over the economics of Nature every time, saying that the last depends on the first. E. O. Wilson calls this way of thinking, "people-first ethics", but then, speaking for "environmental ethics", he writes: "no one says, 'Let's give it all back to nature'", and he recommends instead that we "combine the best of [humanist] short term and long term [environmentalist] goals".[2]

Maybe he's right; but what if we decided the economics of Man and the economics of Nature were not so naturally entangled as our hunter-gatherer past has constrained us to believe? What if our human-natural strategy is not that of a supreme opportunist, but of an adaptive extremophile? Let's suppose that, looking Natural intelligence in its technology-blind 'eye', we chose to withdraw our burden from that innocent brow; is it conceivable that we can at least begin to build or feed on less productive Natural soils than the oldest and richest river floodplains? We have already farmed deserts and grown food on city roofs! Under glass! Underground! (Inco Mines in Sudbury.) Might our freeing up of Natural habitat have the same transformative effect as that of America liberating its slaves, and thereby itself? Might it even complete that human emancipation? The changes in the mind of a reformed slaveholder have consequences far beyond him, because the economy of Man is nothing but his psychology. One more good reason, by the way, to respect the economy of Nature, ecology, for it affirms and rightfully belongs to another intelligent being.

Is it so naïve to suppose that it's only this denial of our psychological burden (the burden of a recurring verbal disconnect, grasping, and loss of intimacy) that keeps us from seeing the individuation of Man as a practical hypothesis? Especially if all the while we're trying not to face the further burden of a freeloader's guilt? Surely it's *simpler* to see our environmental predicament strictly as a problem in motivation: we have this growing but repressed and guilty understanding that *naturally* obstructs the bumpy road to independence, even as it opens up before a tool-inventing non-species. And now imagine also that this subliminal guilt is the psychological engine that's driving the present steep and gluttonous curve of technological growth. Guilt clearly makes us restless, but it doesn't drive us in a clear direction. Can we deny it's a sort of misdirected guilty restlessness that creates conflict even amongst ourselves?

But our first steps in the right direction needn't be a wild flight from Promethean guilt (or from the original sin of self-knowledge for that matter). In even the most desperate human circumstances —such as Jeffrey D. Sachs, director of the Earth Institute at Columbia University, has described in Africa, where impoverished farmers grow "roughly a third of the average yield in other developing countries"—these first steps need not take us to complete independence, or even be necessarily high-tech. As Sachs sees the African scenario unfolding: "In practice, it is a group of interacting technologies that matter … farm inputs, health services, safe water, latrines, computers and training, motor vehicles for village use, on-grid or off-grid electricity and all-weather roads."[3] So here's my point: without *knowing where we're going* we seem to have little inclination to do even this, whereas an extremophile, even 'unfinished', might see that this humanitarian solution also frees up two acres of natural habitat for every acre cultivated. At the very least, viewing ourselves this way breaks an emotional log-jam, because it accounts for our failings in a more productive way than calling each other lazy or greedy. Where has casting stones got us lately?

Today, a growing certainty that our restlessness is spilling over into the Natural world, a world we seem to be connected to in ways alarmingly beyond our means of control, is urging us more to a resolution as

the damage becomes more obvious. And even when we deny the obvious, unspoken doubt increases the urge for technological advances, though we don't know to what end. Perhaps, just perhaps, the desperate growth curve of technology will flatten out a little as we approach that independence from wild nature that will serve both intelligences? If nothing else, this 'extremophile choice' is a no-regrets policy that can't help but benefit wild species. And of course any culture that adopts such a policy will suffer no disadvantage in relation to other cultures on account of its technological dependency: the commitment would be its advantage.

Listening to the latest news of the world, of atrocities committed by frustrated youth and their cynical elders, I find hope in imagining what an 'individuation from the mother tree' policy might do for our traumatised sense of belonging in the world. The history of slavery teaches us how "absolute power corrupts absolutely"; but was it just the power, or was it really a *freeloader's dependency* that corrupted? Whether we're depending on a three-hundred-million-year-old fossil fuel 'reserve', or the 'natural resource' of nutrient-rich soil made by a clear-cut forest, or even a corporate 'bottom line' choice made on behalf of non-participating stockholders, it's not the power to take, but the habit of taking without giving back that corrupts. And if it excites a man even to leave his parent's house, what exhilaration will come when he quits the ultimate freeloader's pretense that a physically mutable opportunist has the right to despoil a Nature that's powerless to respond, phylogenically?

The latest news of the world is haunted by the politics of fear. But this won't motivate to any good end, because humans thrive only when we believe in ourselves. Clearly the environmentalist sales pitch has this same problem, and I propose that it's our knowing what it means to be human in the Natural world, not our fear for the loss of ecosystem services, that will save the 'mother tree'.

~TECHNOLOGY PRIMER: FROM THROWING STONES TO MATURITY~

McLuhan laid out for us a history of human 'mediation' beginning with the fully embodied aural/oral cultures of tribal hunter-gatherers, progressing through the alphabetically regimented "amputations" of visual-mode thinking in agricultural empires, and then in moveable-type industrialised nations, and seeming to come full circle again in a "global village" connected by electronic media.[1] But today, the interactive, but 'virtual', reality of a digital age has somehow confused this sense of returning. Clearly, with each advance in technology we see a fundamental shift in human nature, for the medium is not only the message: mediation is us. So the circle isn't really ever closed, because technology itself advances, and looking out from either end of this history, from stone axes to nanotech devices, we can divine even more crucial unknowns that resist direct scrutiny.

If we can comprehend, without invoking discontinuous jumps to 'soul' or 'consciousness', how gene-modulated animal behaviours got transposed onto inanimate media in the first place, circumventing the control of evolutionary ecology, we might yet regain that which we sometimes pretend we haven't lost: our authentic 'animation'. It may take some effort to reach back to this animal certainty of knowing who we are: not just better philosophies, but some real practice in getting to know the body's intelligence. And who knows how this might influence our scientific efforts to understand Natural intelligence? Then, with this understanding of our deep past, and an im-mediate approach to living in our mediated present, we might yet undo what we have done in our ignorance: we've competed where we were not 'wanted'.

To understand our beginnings is to know how technology *must* remove us from authentic evo-ecology, and with this realisation of what technology 'is for', the future also becomes clear: not in the sense that we can ever know the details of what the future holds (you cannot call yourself a true innovator when the future is already given) but in the sense that we can now *know when* we have accomplished our natural task. Surely the frantic pace of technological change can relax when Natural intelligence, the totality of real species, is once again healthy. And only then can we be truly free, for our collective human conscience will be clear.

FORTY-TWO

Miss Sullivan touched my forehead and spelled with decided emphasis, "Think." In a flash I knew that the word was the name of the process that was going on in my head. This was my first conscious perception of an abstract idea. … The beautiful truth burst upon my mind—I felt that there were invisible lines stretched between my spirit and the spirits of others. —Helen Keller[1]

King Solomon had a ring they say that allowed him to talk to the animals.[2] Men have long dreamed that the minds of beasts can communicate with our own, but since the beasts have resolutely failed to speak, we sometimes say this is *only* a dream, it's "just anthropomorphism", because a mind without speech is also without 'real' consciousness. Maybe so, but when Kassewitz and Reid [essay **36**] tell us that dolphins have a Sono-Pictorial Exo-holographic Language, they resurrect an ancient hope: is the *CymaScope* a real life Solomon's Ring that lets us speak with dolphins? These preternaturally 'talkative' creatures can clearly exchange images using sound, the primary medium of human language. But images aren't words. And besides, isn't 'sonar language' problematic when seen from our motor-sensory phenomenological perspective? Wouldn't the *usefulness* of sound for dolphin perception create conflict?

If the things you 'see'—whether literally by means of sight, or metaphorically by means of sound—are to have any meaning for you, you must also (or so I have claimed) re-act in some way, either overtly or covertly; and, if you're a well-adjusted dolphin, if you are plying your niche efficiently, then you probably react in much the same way as other dolphins do. So far, this is really no different from any other species-normal learned or innate perception-behaviour loop in an animal that sees with its eyes. But here's where the magic of the dolphin's world comes in: not only can echo-images be reproduced overtly, to guide the behaviour of other dolphins, but the acoustical activity (certainly more involved in image generation than eye movement is) by which sonar images are covertly processed can presumably be rendered overt also, to *directly* in-form the mentality of other dolphins. With their sound-shaping musculature, which we might suppose creates 'meaning' in the

same way our own covert imagining behaviours do, dolphins can directly re-view and re-enact each other's moving (Doppler shifting?) mental 'under-standings'.

So, from this perspective, the real question comes down to this: is Kassewitz's "Rosetta Stone" technology, which correlates dolphin sounds with non-symbolic images, really detecting *innovation*, when our well-adjusted dolphin, plying its niche efficiently, doesn't physically need this level of imagination—supposing even that it does have the capacity? In his words:

> *Our new model of dolphin language is one in which dolphins can not only send and receive pictures of objects around them but can create entirely new sono-pictures simply by imagining what they want to communicate.*

If dolphins don't need to mentally image scenarios that do not yet exist in their experience, and especially if such invention is, in the wild, a waste of valuable time and energy, and in consequence, through the generations, such extravagant flights of fancy are being deselected by a stable ecology's body-behaviour conformity imperative, then it's my guess dolphins are not imagining at our level (we might compare Kanzi the genius chimp to her wild cousins here to see how captivity defeats this limitation). Personally I'd be surprised if dolphin communications in the wild are found to go beyond what's needed for immediate coordination. Still, that they do this without linguistically *referencing* their mental activity—that is, without fragmenting themselves and distancing themselves from their shared experience—well, this is the magic that we humans spend much of our time and energy seeking isn't it?

Such powers would seem wonderful indeed to a non-aquatic animal such as ourselves; not just because the capacity would transpose, in our world of vision, as the power to read another's mind just by 'looking' into their 'eyes', but we might envy them also because our own behavioural fragmentation (which the dolphin presumably does not experience) makes it more difficult for us to fully access an equivalent power that we do in fact already possess: the capacity for a very subtle empathy that involves, 'neuron-reflectively', our whole physical being.

For we *can* do this as well as any other mammal—but only in times of heightened awareness.

Unfortunately, this degree of intimacy, this truly perfect understanding without the intermediacy of linguistic and imagined fragments, is uncommon in today's high-tech culture. (To forestall confusion here I should again point out that the behavioural layer we call language is itself only 'perfect' in the sense that it maps *all* our covert behaviour by tracing it *as* fragments. The perfect understanding of body language now being considered is not so much a stylised mapping of fragments, as a real-time sympathy of behavioural flow: 'being in tune' bodily with another person even as we speak.) Our usual practice is to just assume a meeting of minds, when in fact a mere exchange of words—bits of inconsistently associated experience—is taking place. And this of course is where all our troubles, personal and political, enter into the discussion.

Luckily, as every 'body' knows, practice (and only practice) makes perfect—in this magical sense.

[FORTY-THREE]

Direct your eye inward, and you will find a thousand regions in your mind yet undiscovered. Travel them and be expert in home-cosmography. —Thoreau[1]

Any animal that does not need to use symbolic language will not need to risk the dissonance of a divided 'behavioural geography', as we do when we use the musculature of speech to arbitrarily re-present other, still covert but anatomically practical, thinking behaviours. And yet the language field, though it may be the most obvious manifestation of our human talent for symbolism, might not be the only (nor even the oldest[2]) fragmentation of our tool-making anatomy. Linguists see language as a specialised form of gesturing that has been reduced from a non-arbitrary whole body sign language to an even more conventionalised (and less energy consuming and logistically conflictive) activity involving only the lungs, throat and mouth. (Unconscious body language still remains an important part of any good conversation though— I remember being sent by my mother to use the first telephone in our community, and feeling anxious over the mere anticipation of a disembodied voice.)

However, from a deeper phenomenological perspective (meaning sensorimotor insight; not just asserting that we have this computer-like mental capacity for symbolism that lets us perform on an ad hoc basis other modified gestural reductions as well as the linguistic—ASL for instance), I feel there might be some more fundamental, more subtle, and less conventionalised fragmentations *natural* to the body that have become further elaborated and specialised for the human adventure in symbolism.

From personal experience I have come to think that those kinaesthetic feelings associated with the eyes and face might support our deep conceptual 'views' as another, potentially closed, behavioural field, which allows us to covertly practise *pure imagination* without the need to exhaustively map it onto conventionalised behaviour correlates within the language field. Some very creative people are, or were (Einstein and Darwin come to mind), exceptionally good at seemingly effortless non-verbal visualisation. Most of us must struggle mightily to imagine such things as the "warping of space-time" and the "selecting of entangled banks", and in fact our efforts too often result only in a tension headache. To begin with, I suppose, it's the sense of distance implied by the eye's non-contact with its objects (light propagates through 'empty' space—for the eye feels nothing of this—but to produce sound, air must press on the eardrum as a physical extension of its vibrating source) that allows its responsive behavioural field (eyeballs, lenses, face, scalp?) to feel transported beyond the rest of the body. Notoriously, the imagining mind can easily believe it is somehow floating outside the very body it imagines *with*: the longer we daydream, the more fragmented we feel, even though our wordless reveries themselves 'appear' complete.

So here, once again, there seems to be something more tangible about human imagination that embodies even our 'sense of detachment'. To explore this, we might begin by observing that the onset of dream is often signaled by an abrupt shift: the tensions of voluntary thinking drop away (maybe with a hypnagogic twitch) to be replaced by eidetic, or at least involuntary, images that seem to be visual impressions of a more direct sort. (As I mentioned back in essay **33**, the *very first* images to appear might be crude residual tracings of the body's posture

as the muscles let go—but I'm not referring here only to those.) My argument follows from the additional observation that I can often facilitate this transition simply by 'feeling around' for, and releasing, very subtle tensions in my face alone—as if my face is a chalk-board, with figures popping up at random, and my attention, redirected to the 'medium', is an eraser. If this experience turns out to be at all common, it could support the hypothesis that the face and eye muscles, having started out as an instinctive primate gesturing system, have since become specialised to enable day-dreaming as an aid to cultural invention.

[If you have an established meditation practice, you may have noticed that concentrating on breathing often leaves a residue of very subtle tension in your throat trying to 'give voice' to the breath, even after covert speech itself has died away.[3] By the time you discover this you will probably have already given up sub-vocalising, "one... two... three..." or even "in... out...", having noticed that this too can make your breathing unauthentic. But tension in the face, particularly around the eyes and forehead, is also a common feature of over-concentration, and releasing this tension leads to more natural (not only non-vocal, but non-visualised) breathing. Of course, you might just notice that the urge to 'give voice' is the beginning of thought, and so you return your focus to more and more subtle sensory aspects of breathing; but if over-concentration is persistent, you will likely find this manifests not only in voice, but as a whole facial attitude that's trying to 'pinch off' the natural breathing act, or various full-body rehearsals, into this realm of visualisation.

Also you might try my 'erase the face' trick: just assume every arising thought image is correlated with some tension in the area of the face, and then allow your attention to move naturally over the face *with* the thoughts. The 'images' move quickly, and therefore so must your attention; but even if you get stuck on a thought (judgemental words need only give tiny pushes to maintain a cycle of rumination—like pushing a child on a swing), move on anyway. The exercise is very relaxing. Maybe too relaxing: I suspect I'm not the first one who's used this trick to trigger the onset of sleep.

But of course any exercise that distracts from bothersome tensions and ruminations might induce such deep relaxation (the way visualising

a lake or counting sheep triggers sleep); and, as it is with any phenomenology, I can only report my own experience. In fact, expanding awareness to the face is just one small step in the overall task of vipassana meditation, where narrow focusing is carefully balanced with progressive 'opening' to achieve an increasing depth of alert relaxation.]

I admit there must be many differences in the way we as individuals subdivide our 'subtle bodies'. But I suspect that any significant differences in how we use our highly evolved—thus standardised—human bodies have less to do with allocation than with *how subtle* we are inclined to be in the moment; and to support my phenomenological insights I can call upon Albert Einstein, who said that his style of thinking entailed an association of images and "feelings", and that the elements of thought were not only visual but "muscular".[4] Intriguingly, research published online by Dean Falk of Florida State University in 2012 found that the motor face area in Einstein's left hemisphere was "extraordinarily expanded".[5]

However controversial the 'closed face field' hypothesis is, it's not much of a stretch to say that the quality of our imaginations is related to how much of the body we need to involve (more when sleep-deprived I presume) in order to keep our day-dreaming from drifting into sleep dreaming. Notoriously, our motor control suffers when we are overtired, and then, perhaps to keep our volition from slipping away altogether, our waking states overcompensate: we become 'uptight'. If this persists for long enough, our wilfulness can become so intractable we despair over some ineffable yet fundamental 'loss of meaning' in our lives. We might find it hard then to recognise that it's only our subtlety we are missing, and so our minds start looking for some philosophic or religious 'truth' to rest in. But this isn't rest, and we lose ourselves further in the agitating wish (or alcoholic reach) for a permanently settled (or blank) mind.

This is where the stillness and the erect balanced posture of sitting meditation is helpful: our awareness of subtle covert behaviours is not overpowered by the demands of more energetic overt behaviour (this includes acts of the tongue—thus, 'noble silence'). Also, subtle attitudinal leanings are not overpowered by act-ual leaning. Eventually we

discover the body we think we are feeling is just that, a partly visualised representation of a body. And then as we learn to 'just host' messages to-from-and-mimicking within a seemingly still body, we find we are less and less caught up in all this *rearranging* agendas, *holding* attitudes, and *dispatching* judgements that admits only glimpses of presence to orient the busyness.

Some of us (not me) are lucky enough to possess naturally the perceptual subtlety of an Albert Einstein or a Charles Darwin (who claimed he could recall detailed facial images on demand[6]). Such sublimely imaginative souls as these seem to slip easily, like children, into a place so laid back that the delicate connection between the voluntary body and those eidetic images arising directly from the visual cortex, is not overwhelmed; and yet they can stay awake enough to shift scientific paradigms! Most of us only accomplish this miracle for a few precious moments as we slowly emerge from a good night's sleep. Have you noticed how detached the body is, even the face, in these moments? Just as Darwin said he could do when fully awake, we can ask for the image of a loved one and—*here* it is. Even the action in such an image (for potentials in the brain, if not feedback from the body, are still involved) is effortless: involuntary, or at least un-willful. Research shows that all our senses interact, and the muscles have their spies and minions throughout the brain.[7] Does our subtle-body's handling of even non-visual sense impressions rely nevertheless on systems in the visual cortex? (Apparently those who are blind from birth can process sound here.) Is the visual cortex really a generalised 'image' generator? In any case, however the brain is organised, and despite our current attachment to the computer analogue, it might be only the overall degree of tension in our *bodies* at any given moment that determines what parts, and how much, we can en-act (are we splitting our hairs with a scalpel or a maul?) to *imagine with*.

[FORTY-FOUR]

The subtle source is clear and bright; the branching streams flow in the dark. To attach to things is primordial illusion; to encounter the absolute is not yet enlightenment.
—Shitou Xiqian, eighth century poet and Zen ancestor[1]

Image and motor function are certainly connected in very subtle ways (much like s*ynkinesia* connects hand and mouth 'gestures'[2]). Take for instance the dramatic effect of resolving composite stereoscopic images, those fuzzy two-dimensional pictures that leap into three dimensions when you look at them just right. This is often cited in dharma circles as an analogue for enlightenment experience, but since the trick (easily learned by those who study overlapping aerial photographs for relief detail) is to independently control the focal movements of eyeballs and lenses, and this is the outcome of slowly unfolding body awareness, then if we extend the analogy this implies that learning the body's subtleties is the natural path of enlightenment in our everyday lives. All absolute insight grows out of some kind of training in intimate discrimination, so a common practitioner of bodymind meditation can expect to resolve many things deemed mysterious in purely 'visionary' philosophies.

I have observed (see the problem?) in essay **43** that my 'field of feelings' related to visualisation, which involves the rapid and highly coordinated activity of eyes, and the fine focal adjustment of lenses (the action of pupils is involuntary), seems to be 'fleshed out' in a dedicated (closed field) kind of way by the exceptionally complex musculature of my standard issue human face. I might in fact feel many sensory shadows arising involuntarily, but I am organising them with subtle but voluntary 'mental operations' in my face. This makes good evolutionary sense for a daydreaming species, simply because, if planning for the future and recalling the past is "all in the head", this leaves the rest of the body free to do everyday chores. Thinking ahead while you work is of course the simplest level of multitasking, and I suspect it's been one of those necessary evils for our species from the very beginning. However, for the sake of *other* species, and for the appreciation of our own animal natures, and indeed for the hope of achieving those depths of imagination that require a non-conflicted *subtle body*, our 'skill' for distraction

should not be taken lightly. Alarmingly, a willful ignorance of this delicate evolutionary compromise appears to be the norm in today's consumer culture, where continuous distraction is accepted as an 'economic reality'. Surely financial systems based on more believable life-patterns are also more creative? And stock markets that value time out, less mass-hypnotically soul-sucking?

[Back in essay **33** I commented somewhat cryptically about holding onto sensorimotor concepts that are "lonely and weak covert movements", and I hinted that the bodymind's "fingerness" illuminates as "moon-shadow, that only *implies* a moon *to* a separate friendless 'self'". We are now in a position to look at this in a more practical way. If imagination ('fingerness' without words) is essentially "feelings in the eyes and face", then a human being is doubly divided at the neck, and becoming whole again can be a struggle. Or, then again, might it be as simple as balancing your body awareness by becoming mindful of what's going on below the neck? Seems pretty crude, I know, but we spend a disproportionate amount of time 'upstairs', and I've noticed some interesting effects from this little exercise: When my sleep cycle gets disturbed, the pull of sleep can manifest as an unpleasant heaviness in my head; but if I 'invite' the heaviness into my lower body, the judgemental fixation goes away. Because my body is now whole, I again feel connected—I can now 'play host' to otherwise disturbing thoughts and emotions (this takes practice), and then they morph naturally into dream. Whatever your method, when you allow willfulness to recede, the subtle body's direct connection remains, so selflessness entails no great loss. As any good teacher will tell you, the self might be a fiction, but that 'sense' of who we are, how we fit into a family and a history, is as real as any other body-mind event, and if we're holding it "all in our heads", then such a disembodied view-point is indeed something helpless and weak. Maybe that's why only humans add a squeeze when we hug?]

This idea of another closed field of kinaesthetic experience other than language, one related *directly* to visualisation, is brought into full relief by the most recent illusion civilised man is susceptible to; and all this touches to the heart, and the danger, of our human experiment in technology. Even McLuhan didn't seem to make a distinction between light

and deep touch as anatomically different senses. So, when he postulated that "audile-tactile" tribal cultures became "hypnotically" reduced to the "visual mode"[3] as civilisation made it necessary for us to put ideas on paper, he wasn't well positioned to see that his assumption (via Helmholtz), that the "interplay among the senses … constitutes the sense of touch",[4] really makes better sense in reverse: deep-touch constitutes the tactile framework for sensory interplay. So we need to adapt his scenario as we now ask why it's so very hard to be mindful of subtle non-verbal behaviours behind a wordy foreground, and metaphorically see past Buddha's "finger pointing to the moon". From a tactile conceptuality perspective, what meditation does is free us from the tyranny of thoughts that go deeper than words, but if our 'perspective' is also stuck in McLuhan's visual mode, we might do even worse than make the common, and quite popular, mistake of anticipating enlightenment: we might be anticipating only en-light-enment.

Let's back up a bit. Early explorers spoke of Antarctica as a "landscape of timelessness". Although I'm sure being faced with a vast silence had a lot to do with this, could it be that these explorers were also responding to the relative *non-reactivity* of a cold body? I have often been visited by a sense of timelessness during winter walks in Northern Ontario, but I'm also aware of hypothermia's deep paralysis at these times, and that time itself is being measured by a slower internal response-ability. What I'm getting at is this: the words 'awakening', and 'enlightenment', don't really have equivalent meanings, and when the teachers speak of awakening in terms of "brightness", maybe they are just pointing to a heightened sensitivity *throughout the body*. It's been said that the release from mental suffering that Gautama taught came easier in his own time—*before* this 'Age of Enlightenment' that we attribute to the invention of print and the spread of literacy—so does literary 'enlightenment' actually compound the illusion meditation is meant to dis-spell? After all, what is a mediaeval scribe, keeper of the sutras or the gospels originating from the mouth of his more fully-embodied master, to make of his paper and ink, where finger-made words are felt by the eyes before engaging the tongue? Isn't it interesting that our 'realised' religious founders didn't write down their own words? Literacy has indeed increased the retention, and the intentional stability,

of speech (empowering respectively science and technology) but fingers and eyes aren't as technologically 'useless' as the tongue, and this *conflictive* level of confusion between the medium and its message can leave us feeling *anxiously* un-awake.

Because reading 'feels like' thought itself, we mistake seeing for knowledge; a relatively new mix-up that comes on top of our more primitive 'facial displacement'. (And even yet we haven't plumbed the depths of illusion: see next essay.) No wonder many well-read students of pure or applied science, who must hold thoughts in mind for extended periods, have trouble re-ligating (the literal meaning of religion) their bodies, when they are routinely experiencing a naturally lifeless facial 'medium' with the same musculature they use to re-live its meaning. This isn't such an issue with the pure throat and mouth activity of speech. It's a matter of proverb, at least for the layman, that being 'stuck in your head' is a big problem for the literate mind; but it may be that with every 'outering' of imagination in human history there comes a further fragmentation, and a more serious effort is needed to keep our abstracted imaginations in touch with the wholeness of our being.

[The facial closed-behavioural-imaging-field, if it exists for everyone in the truly dedicated way I've postulated here, might be investigated by means of the latest versions of electromyography (which measures muscle potentials) in the same way Kassewitz and Reid (essay **36**) used a CymaScope to investigate the dolphin's 'language'. When behaviourists, such as F. J. McGuigan,[5] did some of this research back in the middle of the last century, the implication of determinism for a manifestly creative human mind was found to be unsatisfactory on more levels than one. But I think it should be evident by now that an indispensable premise for these essays would reverse this historical misunderstanding: the dismissal of behaviourism as simply the conditioning of 'zombies' was itself an over-simplification, especially in light of what we now know about the evolutionary nature of intelligence. A fundamentally behavioural framework for psychology does not preclude human creativity any more than a strictly genetic inheritance precludes the "natural selection" of Darwin's "forms most beautiful and most wonderful". The comparison speaks for itself.]

FORTY-FIVE

Do not depart from deceptions and errors; for they of themselves are the nature of True Reality. When all things are illumined by wisdom and there is neither grasping nor throwing away, then you can see into your own nature and gain the Buddha Way.
*—Hui-neng (*the Platform Sutra*)*

Those who do not understand the distinctions between the two truths [Absolute and relative] do not understand the profound truth embodied in the Buddha's message. —Nagarjuna

The innovators we most look up to, those we call 'spiritual' and aspire to emulate, are those who display an authentic mental poise; for they have learned, from their own personal journeys, that seeking satisfaction, permanence, and solidity, in the momentary and relative fabrication that goes on in the confusingly covert-behavioural model space in their heads, is a temptation that compromises the free evolution of knowledge. The key to any inquiry, they intuitively understand, is found by reverting to the timeless, seamless ground of their fully embodied direct experience. So, why is getting stuck inside the proverbial box still a problem for the rest of us? Now that we've struggled from root to crown of our 'two trees', with their eco-bouquets of tigers and roses on one hand and this flourishing of gadgets and words on the other, and having explored the fundamental branches and incidental twigs to discover their creative secrets, perhaps we are now ready to explain our Edenic problem in a purely 'natural' way. I wonder… After all my hints, and following your own internal branchings, have you already deduced that our confusion might simply be the result of a convenient eco-evolutionary compromise? It's just good symmetry that arbitrary verbal behaviour articulates 'real' behaviour much as sexual selection shepherds the natural selection of species, but did you see the discrepancy in my likening pre-verbal cognition to genepools, when this 'covert rehearsal' has the same motor-tactile nature as its overt expression? What happens when we can't take advantage of that "primaeval convenience" (essay **2**) that chemically delimits Nature's genepool 'design space'? The safe domain of our creative dynamic, the covert playground in our heads where shadowy acts *must be forgotten* to provide a ratchet for the

culture-genic progress of the whole evolutionary 'archive', is not so clearly distinguished from the more consequential acts of our daily lives as are Nature's nucleic acid 'blueprints' from their epigenetically modulated protein expressions.

The consequences of this can be illustrated with a couple examples: A thought comes unbidden into my head that "I can't talk to a roomful of strangers", and sure enough, I just sit there, frozen by stage fright. If I could accept this as 'just thinking', a shadow passing through the guest house of my mind, I might stand up and allow my performance to be judged after it's over, instead of judging it for myself even before I open my mouth. And again: I'm sitting beside the bed of a dying friend, and I feel an aberrant sense of relief that "it's not me lying there". Instead of seeing this as a natural permutation of the many conflicting impulses 'inside my head', I judge myself as unworthy, and immediately counter with an 'attitude' of selflessness—thus missing the chance to be authentically caring. In both cases, these impulses can be acknowledged as tentative shades that might enlarge our rapport, or they can become blindly engrained so they limit our overt actions. This last, behaviour conditioning, is useful to animals living under Darwin's "fixed conditions of life", but for cultures, where minds evolve hourly, it's as if those first Galapagos finches wore their germlines like little hats: subject to immediate reshaping and reversal, and not committed to play out as 'brave little hypotheses', to die naturally in their times. Thus confusion results if the phylogenic oversight of Natural-selection's, or an unattached mind's, *totality* is bypassed. There's a reason we use double blind experiments to ensure impartial science: anticipation is a block to discovery, and to cultural evolution. But, that anticipation actually becomes *destructive*, when it proliferates into fully formed and shared interior 'worlds', is a more critical matter.

Let's review our three-phase evolutionary dynamic: A species on the phylogenic tree is internally recombined and re-membered by gene-pool processes set apart within special cells and chemically distinct from the protein-based structures they express, and it's among their ontogenic expressions only (organisms), due to their overt interactions, that the selective events of species-branching or maintenance take place. In fact,

we can say a "commitment" is made when a zygote forms (when a covert germline becomes overt); and this corresponds to our thought processes giving rise to overt actions, or to a playful discussion becoming a real world decision (even when it's meant only as a 'trial balloon')—for now the oversight of our cultural totality performs a 'phylogenic' selection. But notice also that cultural evolution is *naturally* compromised, if only because our cognitive equivalent to the Weismann Barrier is not so robust.

So now we must ask, how *can* we be trustworthy hosts in our private house of thought if the covert behavioural 'guests' therein are unconsciously held to be personally consequential overt actions?

> TWO TRUTHS: **1** THIS *bare awareness, without leaning, and before judgement, decision, or comment arise, is our only Absolute Truth, because* **2** *our everyday truth is a compounded 'reality' in which chain-reacting stories tell of 'parts in relation' (samsara). Here, seeking from thought to thought, for an ultimately imperfect resolution, we grasp onto a succession of divisive, judgemental 'selves' that, even after we die, are widely 'impersonated'. —the Buddhadharma (updated)*
>
> BUDDHA'S MESSAGE: *Nothing whatsoever should be clung to as being "I", "me", or "mine".*

Western psychologists confront every day the damage done when thoughts are given the same emotional investment "as if they are real". And in the East, mindfulness practice was developed expressly to free us from our "picking and choosing" thoughts. So it's not all that controversial to say that *H. sapiens* gets easily disoriented at the interface of thought and act, and it should also be easy to see that this is where the magic of "maybe" becomes the suffering of "should be". But language isn't the only culprit here, more of an accomplice really, for it's the tongue's protraction of other attenuated and uncommitted behaviours that points us down not just the wide road, but a natural road, to confusion. Can we now say that it's only because of an evolutionary compromise that inventive hominins must make a special effort to seek the grace of a 'lost paradise' in religion? Then:

The act of religion is not just claiming a supra-Natural freedom from animal compulsions; it's nothing less than the mindful effort to reclaim a unified poise—whereupon our compulsions naturally lose their desperate hold.

Ironically, the beliefs we commonly associate with religion are the very doorway to further departures from this state of grace. However, they really only trouble us when we hold on to them tightly—when we treat them as more than conventional words and images that just 'point the way' to a whole-some life. The daily effort of authentic religion amounts only to recognising as insubstantial, thereby *releasing*, our beliefs and assumptions. And the uniquely human need for religion consists in the un-Natural requirement that we alone in the animal kingdom must discipline ourselves to oversee our internalised choosing before the act, and to accept that the authentic choice is made in good time by paying attention, by community, and by Totality itself. Or, in fewer words, our job is simply to be authentic. Without mindfulness discipline we are sentenced to endure, with faith or pragmatism (or laughter and beer), an existential doubt. Gautama meant that, not just verbal instruction, but abstraction in general is a "finger pointing to the moon". He knew there was a problem, as we all do, but the biological lore of his day didn't allow an evolutionary interpretation: *Our cultural version of Natural selection is built on a jerry-rigged 'Weismann Barrier', which depends on insight alone to compartmentalise the extended, abstract thinking that makes technology possible.* Although this 'stickiness' of our model realities can be managed, as demonstrated by "the innovators we most look up to", and by sporadic acts of wisdom that can pop up anywhere at any time, nevertheless, *reliable* mental poise means managing the quality of our insight.

[Here is a deceptively simple koan from a Zen astronomer: How do we point out the full aesthetic experience of *this* crescent moon, sitting above *this* horizon, as *these* stars in the Hyades begin to colour *thus*, with a bent finger?]

I would apologise for bringing up this 'sticky model space' wrinkle so late in the book, but I think it would have been a confusing, or even

antithetical, observation to make before the groundwork for my Darwinian Zen phenomenology was laid. Now however, it offers a surprisingly tangible insight on the vaunted 'forethought' that's supposed to set human intelligence apart from the Nature's mere in-tensionality. Reason tells us that playing with models to see how they fit into a model universe is anticipation, not really fore-'sight', but still we have trouble mentally relating to genepool designs and the sexual selection that affirms *them* as 'anticipation' also. This is because covert rehearsal 'feels like the real thing', and convinces us bodily that we alone are 'seeing the future' (or at least *a* future). Even though Nature bypasses this full-dress-rehearsal stage, engaging *directly* with real world consequences, it produces results that Darwin himself said are "immeasurably superior to man's feeble efforts". Is natural selection's "power incessantly ready for action"[1] not the very purest form of anticipation? Gautama's teaching might even be boiled down to the recommendation that we should only engage in this modelling activity to the extent that we need it to stay fully human; that we must not get 'stuck' there. So really, would it have made the journey any less difficult if I'd tried to twist this radical projection into our tangle of cross-culture, cross-scale, metaphor from the start? (Though you might have noticed I hinted at the end of essay **22** that foresight is not necessarily an 'advantage'.[2])

Dealing with a 'sticky model space' makes our intelligence different from Nature's: not superior, but not inferior either because building on an imperfect past is what natural selection does, and because any metaphor misfit, arising from a jerry-rigged 'barrier', can do little but emphasise a natural expectation that there is still work to be done stabilising the LAST Niche. The mismatch just 'suggests' that something is missing; it doesn't change the lived Reality that we must make an effort to see through this trick of our fragmented, metaphoring, meta-behaviour. Nothing is missing, because 'this' is not 'that'. But *this* is hard to see, so in the next essays I will try to fold Weismann into the mix, if only as collateral evidence that 'mindfulness effort' is constitutionally needed.

[FORTY-SIX]

9 *… God caused to spring up … the tree of life and the tree of the knowledge of good and evil in the middle of the garden …*
16 *… Then God gave the man this admonition, "You may eat indeed of all the trees in the garden.* [Author's note: She said this in a time of innocence that *ended* in self-knowledge and the invention of the plough.]
17 *Nevertheless of the tree of the knowledge of good and evil you are not to eat …"* *—Book of Genesis, chapter two*[1]

The Eden myth can be adapted (there's very little value in a myth that *can't* be adapted) as a lesson on the judgemental attitude: clinging to an idea, or 'consuming' an insubstantial thought so it becomes part of your identity as being for or against something, means removing it from the evolving flux of a properly functioning open mind. The fruit of an ontogenic tree must disperse. In other words, it must fall, or be eaten for its nutritional value (and not for the DNA information it holds), for only then can it return seed stock (perhaps a little modified) from its genepool design-space to take its expressed and speci-fied place on a non-seeding, non-aging, non-perishing phylogenic tree. Thus a phylogenic tree is 'immortal'; it is its own 'fruit'. In our continuing analogy, 'setting seed' corresponds to a thought being occasionally 'picked out' for overt expression, then the overt behaviour is tested for its fitness to our personal, and ultimately cultural, needs (thoughts may also be 'nutritional' I suppose, in the sense that a mortal thinker can make a living by them). This is how our dreams evolve: they are *reborn by dying* on a cultural tree of knowledge. In contrast, a 'consumed idea' goes far beyond this brief engagement between rising and falling away on a personal or cultural tree: instead of re-entering a tentative idea to a living flux, our self-identification maintains dead-heavy ideologies to feed even more intractable paradigms.

Knowing about Darwin's tree of life can help us to see why a creator would say, "from the tree of [judgements] you are not to eat". When we cling to a belief, even though hypotheses are all the thinking mind can deliver, we are trying to 'finalise' that which is already timeless *because* it changes. Like this Eden myth, which now becomes a lesson

telling us it's OK to make the occasional judgement call, but identifying with our choice out of desire or fear means an attitude "claiming the knowledge of good and evil" is at work. That is, we are being judgemental. So how do we get at the root of our fearful and needy confusion in order to eradicate this species-original "sin"? The Darwinian Zen version of the creator's command tells us we must become familiar with our own 'judgement trees', and to do this we must take up a tradition of practice: we must look deep inside our ever-changing bodyminds, and learn to catch this rejecting of 'phylogenic' change, this settling for unvaried, unexamined, 'propagation'. The daily choices come and go, but for the 'tree' to remain immortal it must not, it-self, 'set seed'.

It's a familiar enough human problem: our thoughts about others, about ourselves, about our situations, do not trouble us except to the extent we feel they are 'good' or 'bad'. But I am also saying that these confusions are 'natural' to human culture, because the distinction between our mental model space and our culture-genic Totality is not naturally clear. On the one hand, this creates the illusion that our intelligence must be superior to "un-foreseeing" natural selection (we mistake anticipation for foresight, while it can never be more than just *readiness*; indeed our modelling is a symbolically extended 'rehearsal', and rehearsal is only *needed* for behavioural readiness); but on the other hand, the likeness of our shadow-play thought behaviour to our overt act-uality, as well as its contrived association with discretely 'real' speech behaviour, can leave us feeling physically engaged in our imagined pasts and futures; and it is because of this 'natural stickiness' that we find it hard to rise above ourselves and step into the wonderfully unselfish intimacy of direct experience. It is only *here*, in the eternal present, that a thought's or an emotion's immediate use can be properly distinguished. But if we spend all our time *there*, where grand propositional sketches are 'realised' by, and the life-preserving emotions are readily misinformed by, their more subtle embodiment, then our creative picking *at* illusion, our verbal 'mastication' of concept, becomes naturally reinforced until a stifling finality is achieved. Flourishing dreams become judgementally extracted, and 'finally' embodied, when they are verbally chewed and then 'swallowed'; thus metabolising our passing

thoughts to sustain a lonely, fully in-formed, and fabulously immutable, but ultimately make-believe, self.

OK, that's a bit tricky, so let me try to bring it down to earth. When we "think outside the box", what is this "box"? Meditation teaches us our thinking is 'sticky'—we're afraid to let go of our thoughts the way Nature lets go of its organisms because we 'identify' with them. We refuse to 'commit' them to a critical, culture-genic, interrogation. So now, even when I say "this is what it means to be human", you should know I don't mean any of this to be final, proclaiming a mere 'seed' to be immortal. I don't want a monster to rise out of *this* fragmenting, and literally disembodied, text.

[We have all seen that human judgementalism can reach monstrous proportions: the grotesque apparitions arising out of "justified war" (where rape becomes a weapon) or the numbing descent to a corporate "bottom line" (which accepts the starvation of children). I'm going to go out on a limb here, and say that monsters do not survive in Nature. Even cancer—the chromosomal dreaming of somatic cells that can metastasise to the rest of their environmentally engaged organism as isolated and unresponsive masses—must end with the death of its provisionally reproduced victim. In fact most of Nature's little nightmares never leave the seed, or the womb, and those that do are quickly consumed (Nature throws away seeds and youth as fast as a writer throws away sentences) because, just like the ecological fluctuations of disease, or of invasive species (temporary monsters), all gene combinations that do not 'fit' must ultimately succumb to the cropping that goes on outside a Weismann Barrier; all the while, just 'inside', the genepool usually discards its even more aberrant dreams at the recombination stage. (I wonder: do motion picture aliens eat our brains because they can only reproduce themselves by means of the confused dreaming found within these organs? For surely extraterrestrials must have evolved within, and thereby learned to coexist with, a workable ecological association on *some* planet.) The only case that might be made for impunity from Natural selection is, perhaps, prion disease (like 'mad cow') wherein a malformed protein can not only reproduce in the body, but it can then be

ingested by unrelated organisms—the biological equivalent of an unquestionable idea perhaps?]

FORTY-SEVEN

When you see forms or hear sounds fully engaging body-and-mind, you intuit dharmas intimately. Unlike things and their reflections in the mirror, and unlike the moon and its reflection in the water, when one side is illuminated, the other side is dark. —*Dogen*[1]

It was the third brother … who received the hand of the princess. He lived the marriage of form and spirit, and did absolutely nothing to deserve it. —*from Rumi's Mathnawi*[2]

Enlightenment is nothing special, the teachers say. It's nothing but our seeing through the illusory human conventions (both public and personal and acquired over a lifetime of mostly continuous thinking) to our direct animal sensations upon which these mental constructions are built. For it is illusion itself, the mediated 'reality' of a tool-making animal, that's special. 'Speci'-al in fact. We call it enlightenment when we see through this, but we're really just becoming whole again: not just wholly animal, but wholly human.

Now *here* is a distinction worth looking at more closely.

In meditation classes the need for thinking is acknowledged, but seldom elaborated upon. If you ask whether or not it's possible to be fully present (to 'be awake', in dharma-speak) and at the same time to fully engage with technical problems where we have to practise extended thinking, the response will probably be something like: "Of course, this is what we wake up *to*." This might be a good enough answer in the zendo, where we practise not-thinking, but it doesn't comprehend the supra-ecological human project in which the "two truths" dynamic makes meditation practice necessary in the first place. The zendo itself wasn't designed simply by absorbing the atmosphere, and in order to reinvent 'human ecology' on a daily basis we must spend serious time in a model space where we see, darkly, nothing but parts in relation.

Without selfish engagement—this emotional investment in thoughts and dreams as if they are real—would we even bother to

dream, or to design? What we need is already *here*, right? Meditators, and even dharma teachers, will often avoid discussions of a scientific or speculative nature simply because it might pull them and others away from the stillness they have found. This is understandable in the beginning, or as discouragement from interrupting silent practice, but having a still mind all the time is not what it means to be authentically human, and just paying lip-service to the utility of critical thinking (implying that it 'just comes naturally') doesn't recommend the teachings to those who need them most. Sure, the zendo would not be needed if we didn't love our ideas and gadgets so much, but we have built this lovely place to sit expressly so that we can learn to *accept* our inventiveness, with discernment, forgiveness, and even love.

If you are familiar with meditation culture and you don't think scientific laziness is a notable problem in the West, then I ask you to consider this: At the end of a meditation session, practitioners will often formally repeat something like, "May all beings live in harmony and be free from harm." But what does this 'metta phrase' actually mean, coming from the one being who is free of the harmony of beings eating each other? In a time of species die-back unparalleled in the last sixty-five million years, can we afford such carelessness in our speech and understanding of the Natural world? Any good teacher will tell you that intellectual work is necessary to the extent that it is useful. An exceptional one might even point out that an unforgiving victory over illusion, an enlightenment that feels superior to science, is no victory at all. So the real question for critical minds is: "Do buddhas have bodies with dreamscapes to fill?" Here is a koan that's hard to resolve with a meditator's complete dispassion; and it's why, in a book for both practitioners and non-practitioners, I've been so bold as to imagine it might help the most sceptical among us—those who share with me the stubborn compulsion of William James' philosopher to "think things through"—if Dharma spoke Darwinian.

If thought and act are seen to cyclically arise, flow, and ebb on their own, like the seeds and creatures in an evolving ecosystem, then there need no more be a 'thinker' than there need be a 'god of evolution'. And even if we insist on imagining such a god—it may be Pan, Mother Nature, or

Gaia—'he' or 'she' has no need for a name, no need to be set a-part in this Reality of endlessly deep and ever changing 'context', because, as we have learned from the Mother Tree, *immortals don't need to set seed*. Or consider even this purely physical analogy: if the force of a thought or an act is within its nature, then the detached but mindful follow through (in Buddhist terms, 'right effort') doesn't depend on an independent agent, but only on a *presence* as each succeeding moment unfolds. Either way it's the quality of our presence—whether we respond intimately, like Maxwell's 'fictional' Demon, or just react to the calculated statistics, like a 'realistic' philosopher—that determines the creative quality, the *magic*, in the outcome.

But there's an other-side to this story. The evidence for evolution, and a separate germ-line, demonstrates what Dharma (at least in the West) is disinclined to say: to be fully human we must engage our imagined selves and their projects, passionately enough to 'evolve' human ecology, as well as train our minds for not-thinking (The present Dalai Lama, who says if he wasn't a monk he would like to have been an engineer, readily slips out of 'his holiness' and into 'debate mode' when necessary[3]). This "marriage of form and spirit" ensures that the most abstruse calculation, even the sparring of a devil's advocate, will seem less an all-consuming bother and more a sacred trust. The meaning of life, of being human in the Natural world, is not hidden from us; we hide our *authenticity* in words and forms for a while, perhaps even for an adult lifetime, but then we stand forth wordless again in death as we were at birth.

Or in some sublime moment in between.

Or in this moment.

As we please.

And so it is that insight training can help us to 'think' better, even though we step away from our mindful presence. And yes, even when we're driven by passionate puzzle solving. For as we become more familiar with our motivations, we learn how to see into them—a brief glance perhaps between the spinning of our mental gears, but this is enough to release the buildup of "good" and "bad" so the gears can still turn freely.

And (to mix metaphors) we also keep faith that a heavenly body still shines beyond these clouds of thinking. At the very least, when we do find ourselves stuck, our training allows us to step right out of our model space, for as long as we like; and *here*, seeing deeply into how "the affections color and infect the understanding", we can find our true course again, for it's only by attending to this makeshift barrier between overt body and covert mind that Sir Francis' mandate is fulfilled. This is what gadget lovers want to hear before they come into the zendo.

This might be a good time to return to the concept of 'method philosophy' introduced in essay **8**, for now we can see how only a transformative method can point beyond our philosophic 'conclusions'. If this term meant only that all philosophy and science is to be treated as a means to some particular end, then it would simply be another excuse for restricting our imaginations. But method philosophy doesn't assume an end at all; it invites a moment-to-moment beginning. In fact, the marriage of form and spirit that it invites would be just the same as mindful sitting, or mindful laundry, except that, because we're problem solving, we must for the moment allow our presence to be partly lost in representation: one hand tinkering with what works, the other reaching for what matters. Our inner scientist is no longer oppressed by a "meaningless" world view then, and our inner poet no longer fears his "dark side". As a gadget-loving designer, I no longer lose heart every time a philistine client seems to "waste my effort", because my overriding effort is to reveal his better nature. The 'method of silence' reveals our natural goodwill, to ourselves; and only then do all our methods of philosophic and scientific tinkering put our full humanity at the service of a larger awakening, for the 'agent' is goodwill itself.

FORTY-EIGHT

Everyone has heard the story which has gone the rounds of New England, of a strong and beautiful bug which came out of a dry leaf of an old table of apple-tree wood … Who knows what beautiful and winged life, whose egg has been buried for ages under many concentric layers of woodenness in the dead dry life of society, deposited at first in the alburnum of the green and living tree, which has been gradually converted into the semblance of a well-seasoned tomb, — heard perchance gnawing out now for years by the astonished family of man, as they sat round the festive board, — may unexpectedly come forth from amidst society's most trivial hand-selled furniture, to enjoy its perfect summer life at last!
—Henry Thoreau[1]

Henry David Thoreau is not named in my title, but his influence runs deep in a book about human kind's *Extremophile Choice* because this is a philosophy of Humans and Nature that realises his early "perfect summer life" ethos, and depends upon the new science he later helped to establish. Thoreau was a founder too, like Darwin and Dogen, and his quiet presence here is equal to these others because, while he maintained his pre-Darwinian viewpoint that put men between the gods and nature, his later commitment to sorting out Darwin's "entangled bank" set in motion, in a practical way, the study of the interactions that determine the abundance and distribution of species that is today's science of ecology.[2] His life and character personified an ethos that transcends racial identity and animal hunger,[3] but also he appreciated that it's not the dream-like train of evolutionary mutation, or of metaphysical imagination, that reveals the *substantial* meaning of being human in the Natural world. Only ecology can tell us what species are, right now, in relation to one another; thus Thoreau's first *field ecology* project, revealing the dependency of forest succession on the relatively unvarying relation of pine cones to a squirrel's teeth and inclinations,[4] eventually leads us to wonder if changeable humans occupy a 'last niche', meaning we have no ecological future *in* Nature.

Thoreau's powerful intuition of human nature as "a strong and beautiful bug" gnawing its way out of mankind's "festive board" appears at the head of this essay. Written near the end of his well-known prose work, *Walden*, it stands in semi-mystical counterpoise to his lesser known scientific work on biological nature, and serves as a masterfully drawn object lesson for this explicit warning he gives earlier:

> *It is a ridiculous demand which England and America make, that you shall speak so that they can understand you. Neither men nor toad-stools grow so.*[5]

Some ideas are hard to understand because we're not ready to hear them, like McLuhan's message of inherently subversive media that seems to have landed on ears deaf to its implications for the earliest media of all: stone-headed spears, fur-coats and log canoes.[6] But I hope after all my talk, if not of toad-stools then of 'two trees', we are now ready for the full message: our relationship to Nature will not change through moral persuasion alone, because non-material change comes about willy-nilly in a changing material world. This means, if we want to bring courage and maturity to our 'environmental' choices, we must know what we have become, in substance, to evo-ecology.

Even as the first material extensions of human bodies were beginning to bring about changes in our non-material humanity, the disruption of Nature's biological materials was already underway. This is the latest story being pieced together from the fossil record by paleo-ecologists,[7] but it's difficult to make sense of this new *Homo sapiens* vs Nature evidence from inside the environmentalist box. To begin with, we need to understand that the 'wilderness' we see today is a vast illusion perpetrated by human memories that are limited to animal lifetimes. That we are subject to this "shifting baseline syndrome",[8] that haunts the dreams of all serious conservationists, is the theme of a very thoughtful book, *The Once and Future World*, written in 2013 by Canadian Journalist J. B. MacKinnon. It turns out the giant elms that overhung my boyhood rafting river, the memory of which will die with my generation, might have been all there was left of another "lost world", for the area had been logged a century and a half earlier for its even taller ship-mast grade white pines, and then the bird's-eye maple

and tan-bark hemlock. (I counted the growth rings on some of those dead elm spires to be well over 160 years when we were cleaning up the devastation of that alien fungus.) In the wake of the loggers, the farmers came (literally, for boats came before sleighs and wagons to the shores of Georgian Bay, and in fact the fisheries were reduced before the forests), and they opened up space for the proliferation of edge species—aspen, birch, red maple and various ashes—establishing a new normal for my time. Looking further back, it was in those early logging days (*my* forgotten time) that Thoreau's pines were seeded on land that had, again, been cleared earlier of its primeval forest, and emptied of large fierce animals.

So now, to understand what Walden Pond, and the world its people called Turtle Island, looked like when the first Europeans arrived, we must take *two hundred* generational steps back into the forgetting. Most people have heard that North America was once the home of strange beasts: mammoths and mastodons, armadillo-like animals the size of cars, two-ton ground sloths, and strange looking antelopes. There were camels, wild horses and wild oxen, and giant llamas, moose, elk, beavers, boars, birds, and beetles. And of course there were also the upsized bears, dire wolves, and sabre-tooth cats that could prey on these 'megafauna'. Less well known is that the diversity reached a peak only fifteen thousand years ago as the glaciers melted and the climate stabilised at the end of the last ice age. And then it began to disappear. As MacKinnon explains: "Scientists have debated the cause of the mass extinction for decades, but evidence increasingly points to the spread of humans around the globe at a time of intensive climate change. Go to any corner of the planet, and the moment that *Homo sapiens* first shows up in that place will be roughly the time that many of its large species begin to fall toward the void of extinction. Africa is the exception, where megafauna such as elephants, giraffes, lions and hippopotamuses evolved alongside people. Otherwise, the pattern holds."[9] But let's return now to the first Europeans to settle near Walden Pond. According to Charles C. Mann (author of *1491*), the famous flocks of now extinct passenger pigeons were "pathological".[10] And University of Utah wildlife biologist Charles Kay also believes that the massive buffalo migrations, the teeming salmon runs, and the lucrative beaver fur trade

that typified North American abundance—and *followed* the arrival of Europeans—were "artificial".[11] It turns out the first environmental effect that Europeans had on America was to kill off its indigenous peoples with European diseases, and therefore Kay proposes that it might well have been the *absence* of aboriginal human hunting pressure that allowed their 'natural resources' to run wild.

The most alarming aspect of this human 'success' story for me is that, from the human point of view, I don't really need to be using these qualifying inverted commas. You see, each generation *does* become comfortable with the alterations of the last. When Europeans first arrived on Easter Island, the poster child for human-caused ecological disaster, it seems they really did not, as a people-depend-on-nature environmentalist might suppose, find a miserable and malnourished human population. The descendants of those early Polynesian tree-destroyers were numerous and happy, thank you, and heartily roasting the rats and chickens they had introduced, with vegetables on the side harvested from rock gardens cleverly designed to deliver nutrients and protect young plants from the harsh weather of a treeless island.[12] A chilling scene, I'm sure, if we could see from that lost forest's ghostly point of view.

So what would we see, from Nature's 'point of view', back in the time before our innovative forebears escaped from its regulatory grasp? We may never know, because all we have left now are the mineralised bones and stems of this lost world, and a handful of old sailor's stories about landfall on a "lost island". And as for these stories, it must be said to begin with that such natural refuges are really quite young in geological time; and since uncharted islands must be distant and small, the startling diversity reported is (as the theory of island biogeography predicts) only found around less isle-ated offshore reefs. History, says MacKinnon, "is filled with accounts of briny waters that had rarely if ever before seen men. It's remarkable, then, that these reports describe a world beyond our current understanding."[13] Indeed just fifteen years ago the ecological situation at Kingman Reef, most isolated of the Line Islands north-west of Easter Island, was described as a 'reverse pyramid'. According to MacKinnon "an estimated 85 percent of the biomass

was accounted for by sharks and other top predators. This defied belief."[14] It's not supposed to work this way. There's *supposed* to be more biological material at the bottom of a food chain than higher up. At least that's what we see wherever humans have disrupted the systems of Nature; and this is because when we 'manage' Nature it becomes *our* system. So it's truly misguided to think we can *return* to authentic Nature, to think we can still "take our share" in a balanced system to which we no longer conform.

To understand sharing in Nature, we only need to consider the wolf: here is an apex predator that eats many times its weight in prey during its lifetime and, seemingly, gives nothing back but a little bit of buzzard and maggot food. But in fact, the trick that Natural regulation depends on is that every one of its temporarily living feasts, like the wolf itself, is engaged in a ballet of inter-action that optimises ecosystem diversity and stability. We can *never* do this. Everything about us exempts us from this response-ability. We take the fittest stag, not the unfit (How would we measure wild fitness anyway, except in terms of a forest's own evolving rules of play?); we grow crops that suit us, but they can't survive on their own in the long run (evolution is a *very* long run); and increasingly, in all our interactions with wild Nature our personal survival is not *at stake*. We are un-Natural, and we turn evolving ecosystems into 'productive' (i.e. less diverse) farm-systems.

It is very important to understand the reason why those Kingman divers, when they entered the waters of that pre-human reef, described it as "a landscape of fear."[15] It turns out it was biological turnover that upset the pyramid: large predators reproduce and grow slowly while their smaller prey do things the other way around, and this aggressive cropping strikes a balance in the end where both diversity and biomass are "far richer than on 'normal' reefs affected by fishing, pollution and other human influences".[16]

If you think about it, this is the way human cultures work too: intolerant systems (like the communism of the former Soviet Union) collapse because popular, or ideologically cult-ivated, concepts get lazy and simplistic if they're not 'cropped' by the continuous and fundamental questioning of 'free-range' thinkers. Of course, any system becomes ideological when greed, fear, and intolerance take charge: it's clear the

so called sharks on Wall Street can't be relied on to trim the ideological fat, nor the little entrepreneurial fish feeding on their left-overs, because predators of ideas are needed, and to be an apex predator you have to go after big-idea prey—like consumerism. But then, to encourage truly creative 'predation', we must watch the 'feeding-frenzy' from the distance of a meditating host, where fear doesn't become a problem; *here* the sharks are all in your mind, and accommodation is always possible—as long as you haven't killed off these fierce critical faculties and, in consequence, allowed little thoughts to become one-dimensional pests.

This is where a small difference I have with MacKinnon's view might turn into a big fish that can provoke more vigorous debate. He champions my ecological sensibilities in almost every way; at one point, speaking of "other species" in the collective, MacKinnon even says: "they are a form of imagination. They are the genius of life arrayed against an always uncertain future, and to allow that brilliance to wane out of negligence is to passively embrace the death of our own minds."[17] No illusions about the planet as a super-organism here; ontogeny and phylogeny are never confused. In fact, if not for the small difference I alluded to, I wouldn't feel the need to write a book at all, knowing that others can express such thoughts better than I can. But I must question Mr. MacKinnon's assumption in his last chapter where he reveals himself to be an environmentalist, and not yet radicalised enough to call himself an adaptive extremophile (even 'unfinished') when he writes: "But we have been attempting to make an impossible world, in which humans are separable from the rest of life."[18] He's right of course, in a metaphysical or even a purely systemic sense, but in a material world of co-evolving species it might be more useful to flip this truism on its head, for then it better fits not only well-established population-ecology principles, but the sociological evidence.

That MacKinnon's "ecological human", who can "love the return of the wild as a formidable presence in our lives", might actually be "enough … to act as [the world's] guardian",[19] is perhaps an even more Quixotic hope than the small difference I propose. This is because, if, as he also says, the "global majority who live in cities, whose families may

have been urban for generations now" are indeed "part of the great forgetting", then, given the Easter Island scenario, this means they do not in fact, as he further supposes, feel themselves to be "temporary visitors with no place that is truly home and no traditions in the places they find themselves".[20] Rather, like those very human Polynesians, we will probably find a way to thrive happily, as 'adaptive extremophiles', whether we deliberately plan it that way or not. The problem is really this: If we want any of Nature's Intelligence left by then, the "majority who live in cities" will not only have to *pay* for ambitious rewilding projects, but must observe exceptional consumer restraint as well; and so they too, like "the ecological human", will need a believable vision of their future. Maybe all Nature needs from us right now is a realisation, however unfinished, of our Extremophile Choice (a small difference from environmentalism)—especially if it turns out the real "impossible world" is one in which a global majority heeds the call for stewardship of a truly forgotten "Lost Island".[21]

Thoreau's toad stool model of discovery suits the needs of my own bug better than the easier practice of re-arranging ideological utensils around an environmentalist table just so we can appear fastidious when consuming the "natural resources" served up in our ecological-slave-master's kitchen. We don't solve hopeless problems by reaching out for more hopes, but by recognising what we don't need to reach for at all. Deep in human nature we've always felt the pull of desert landscapes, whether of rocks and sand, ice and snow, or horizon to horizon asterisms in the night; and, more recently, we find a "take only pictures, leave only footprints" ethic coming to the fore, with a proliferation of hiking trails and national parks. This 'elfin' side of human nature is distinctly un-Natural. However, to the extent that our transition is unfinished, it is 'natural' that our understanding is subject to animal need and intellectual timidity, so even though I'm not suggesting our extremophile future can arrive all at once, I'm saying we must look for it on the horizon. There may well be levitating cars and bio-synthetic filet mignon before this vision is fully realised, but until we understand that this is our future, we will continue to hurt ourselves, and hurt the Natural world, with our ideological and territorial passions.

Perhaps our future can be seen, peeking through the sentiment, in this verse from E. B. Browning's "A Seaside Walk":

> *O solemn-beating heart of Nature! I have knowledge that thou art bound unto man's by cords he cannot sever; and, what time they are slackened by him ever, so to attest his own supernal part, still runneth thy vibration fast and strong the slackened cord along.*[22]

The attitude recommended by many pre-Darwinian poets of nature, like Browning and Thoreau who wrote in a time ripe for Darwin's "grand view of life" but not yet confused by his apparent demotion of "man's supernal part", still serves the extremophile (the real ecological human) very well. And so, "The astonished family of man" aside, I hope my personal "bug" has emerged, for you anyway, as a more familiar creature than it might have had I spoke only "so they can understand". I hope you can now see our blind, outpaced, and overburdened 'tree of life' as a living intelligence that deserves our gratitude and respect. And I hope also that we ourselves, as the lately freeloading 'parasite', will at last pick up the evolutionary baton that's been handed to us. What it means to be human in the Natural world is surely not just more gorging at the festive table as self-proclaimed stewards. Surely a creator must commit to play a more supernal part?

FORTY-NINE

> *There is something in this [experimental path] which reminds us of the obstinate adherence of Columbus to his notion of the necessary existence of the New World; and … may serve to teach us reliance on those general analogies and parallels between great branches of science by which one strongly reminds us of another, though no direct connection appears. —John Herschel*[1]

Our psychological conventions are powerful tools, and so long as we practise seeing them, or let us say, fully sensing them, for the tentative re-presentations they truly are, and keep them as appropriate and up-to-date as possible; and so long in particular as we keep testing our easily

picked fruit of moral-ism continuously against our silent and open posture of moral being; then they won't command and betray us, but they will make us more human.

As Shunryu Suzuki, first Western teacher in the lineage of Dogen, reminds us: "Enlightenment is not some good feeling or some particular state of mind. The state of mind that exists when you sit in the right posture is, itself, enlightenment."[2] And as the scientific heirs of Bacon and Darwin might say: "It's only when our dreams are carefully disentangled from our instincts and conditioning that we can safely, and competently, evolve the political and technological species that constitute culture." But now, where these antipodal lineages meet, we see also that human intelligence itself is a heavily overlaid animal response-ability, trying to keep its authentic poise while recapitulating, and at the same time extricating itself from, evolution's body-bound and habit-driven "entangled bank".

Looking back on our protracted analogy between Natural and human-natural selection, I am still willing to say there are really no new ideas presented here, if only because the supposed novelty of our ideas is what distracts us from the greater project of bringing newness to our old and decrepit ones. Or to ones that are even now taking shape just below our readiness to see them. For instance, my ideas about Man's relationship to Nature may be new only in the metamorphic sense that they bring to the surface human tendencies to 'adaptive extremophilia' that are already well under way. What other animal just visits wilderness, bringing its food and shelter in with it and taking its non-biodegradable waste back out again—taking only pictures and leaving only footprints? It was not always this way, but it's a trend that seems to be growing along with our expanding reach for 'completion'. Indeed, what other animal even *wants* non-biodegradable accessories? And what other mammal risks its life and forgoes its natural habitat and economy just for the sake of going where no Natural mammal belongs? Anyone who has read Apsley Cherry-Garrard's account of Captain Robert Scott's first scientific expedition to the South Pole (Amundson got there first only by treating it as a sporting event) will have a good picture of what an open minded community of extremophile human beings is capable. Even in their last days, with their bodies giving up the

last of life's heat, Scott's crew shared their wealth (the last precious fuel to make tea with friends); his notebook defended the value of continued Antarctic exploration; and his sledge held geological specimens[3] enough to feed the 'apex predators' of natural philosophy back home for years to come in their busy trimming of the scientific tree of knowledge.

The test of a true paradigm shift is not that old ideas get entirely replaced by new ones, but that all the things we thought we knew now look different. Perhaps such a profound change can be initiated simply by decluttering our focus, so we begin to see the outline of a more integrative figure haunting our claustrophobically rearranging ideas. If so, then the expansiveness of a good metaphor can reveal what our self-serving conventions hide. At least this was my intent when I made behaviour, overt and covert, the framework for animal intelligence and cultural evolution, for now our 'mysterious and uniquely human' conceptuality becomes as accessible and natural as the 'speci-fications' of the pre-human world; and indeed, I think this has allowed us to move ahead on several fronts.

First of all, to avoid being brushed with the determinist stain of "just behaviourism", we had to account for the obvious originality of human minds, and so Darwin was naturally drawn into the project: Darwin, who had to account for the creativity of the organic world (equally obvious), gave us a model that inadvertently allows us to see the ramification of knowledge (the speci-fication and proliferation of covert behavioural thought-habits), as a global 'phylogenic' process. Thus, with human-natural selection, the two trees metaphor came fully committed into our newly emerging picture. But then Dogen was also needed, and not just for one, but for two reasons: first, to assure us that we can, through practice based on a long tradition of bodymind meditation, look directly into our personal 'trees of knowledge' and see if there are in fact credible parallels to the tree of life; and second, to upset our claustrophobic 'thinking about thinking'. With Dogen, consciousness at its undifferentiated root becomes Primordial Awareness: the intimate Way of all-connecting Mind manifesting what we call, for operational convenience, our conceptual 'world'. And this is what finally made the two trees a productive metaphor, rather than, as required by the current

paradigm, just another handy way to *contrast* natural mechanism vs conscious intelligence.

One serendipitous consequence of confining our anatomy of human intelligence to behaviour is that, by regarding language simply as *meta-behaviour*—that is, indirect behaviour we use to organise directly functional behaviours—we can now explain the mystery of undisturbed yet overly-diversified ecosystems (the Amazon seems to 'cheat' Gause's Law even without the geographic isolation of species) as a fundamental capacity of sexual selection. There is good reason to think this *meta-evolution* plays the same role of speci-fication in ecosystems that language plays in human cultures. With the Amazonian evidence, and a language-like model for 'intentional' species generation, we now have an even more compelling reason to treat evolving ecosystems as fellow intelligence.

But the consequences for our understanding of *human* nature, when we adapt the concept of Darwinian selection to model thought's overt-covert behavioural evolution, are perhaps more revealing yet. Many of the afflictions of human nature can be separated into two categories: first, our creativity too-easily gets stuck in ideology, and second, our animal passions betray us. When we review the literature regarding the first affliction, we find traditions in both Eastern and Western psychology that blame what seems to be a human difficulty in distinguishing between thought and act-uality (or in Buddhist terms, between real-istic mental construction and Reality). So what is the corresponding case for the gene-defined tree of life? Well, 'gene-defined' is really only part of the evolution story. Weismann's legacy, when we bring it up to date, tells us that Nature's intelligence can be deconstructed as a three-phase dynamic: a genepool 'design space' reiterating from its archive a supply of various fixed mortal organisms to advance the seamlessly evolving Reality of natural selection. And critically, to make the global accommodation of all this evo-ecology irreversible, this design phase is conveniently distinguished, as undifferentiated non-somatic DNA, from the body's epigenetically expressed protein chemistry. But we can't say this about the generative phase hosted by our globally selective *cultural* Reality, for our covert behavioural 'model space' is merely an attenuation, coordinated by a symbolic displacement (i.e. language), of our

overt behaviour. This real-isation is what gives us the illusion of foresight, for our illusory 'living in the future' convinces us our intelligence is superior to un-foreseeing 'natural' selection.

The second category of affliction, whereby our Natural passions betray our supra-Natural strategy, with its 'unregulated' technological powers, might also have an evolutionary prognosis that can be better understood, and accepted, by referring again to our two trees metaphor, with 'cognitive evolution' aligned by a strictly behavioural focus. The simple expedient of viewing all animal intelligence as having an overt-covert behavioural framework allows us to approach the question of human origins, and the ecological consequences of technology, from a new direction. If our object is to tell the human story in the context of other species, and if animals in general are organic structures that can 'behave', and have evolved from a common pattern of muscles in motion (with many animal skill-sets 'more evolved' even than ours in certain directions), then we have to face the consequences of our strange situation: we alone are the progressive inventors of behaving extensions. Darwin's passing comments on "fixed or invariable … natural instincts" as compared with domesticated instincts, and his abstruse arguments concerning structural vs functional change—of marginal interest in the old paradigm—are very important in this new configuration, for they reveal a generally overlooked 'conformity imperative'. Natural selection, for a startled geological moment (first pair of finches on the Galapagos Islands for instance), might favour what I have called inapposite curiosity, but if ecosystems must ultimately select for their own stability, then Natural selection won't favour risky experimentation beyond a certain point; after this point, body-insubordinate behaviour will become a liability. But what if it doesn't? What if, in a prolonged 'moment' (the Pleistocene glacial, inter-glacial, cycling), a new evolutionary story (language-driven progressive technology) has begun? Then *this story* will cease to have a place in *that story*, with its Natural 'resource partitions' (maintained by competitive exclusion of structurally-fixed organisms), and its "fixed or invariable" Natural instincts.

This is quite a list of propositions arising from the simple trick of making thought 'behavioural phylogeny', and when we see such consilience of applications in an architectural design we know we've got ourselves a 'natural' accommodation. However, designing the house we live in is easier than changing the minds who live here, and I don't expect the many honest souls, who are focused on living and cautious of philosophy, to accept a new vision of their future on the weight of argument alone. Rather, if we truly understand the reality that, for most of us, most of the time, the 'tree of knowledge' keeps close to its root until it has the *means* to fulfil its branching, then it will only be necessary to convince a few dreamers who are in a position to implement material projects—for their non-invasive buildings, appliances, and infrastructures of themselves will show their worth to the minds that make use of them.

But are my arguments even good enough for those few like-minded gadget-heads—who must still be nuts and bolts critical? I admit it might look as though I've been strategically shielding myself from criticism by dwelling in such detail on a phenomenology that supports a claim that the extremophile perspective must excite 'natural' resistance, being at odds with the behaviourally-innate 'believability' of our animal entitlement. But my motives were simpler than that,[4] and indeed the challenge of following human motives and devices from the animal level is itself key to improving our relationship to 'other' species. Still, like any 'world view' this one will never be robust, or even useful, until it provokes a fair list of propositions against it. So let me start this examination off at the top by saying that 'paradigm shift' is a phrase much overused to describe any relatively far-reaching advance in our fast-paced, but largely superficial, Information Age. And so perhaps I only use it from a sense of desperate need, in what I also perceive to be an ecologically sick, but perhaps unfinished, Age of Darwin.

A more practical objection can be raised, no doubt, against applying an 'extremophile' solution to a world population already starving from lack of productive farm land, for it has been leveled before against re-wilding projects even when they are limited to arbitrary portions of the planet, and this is: the mere scope of the enterprise seems to defy common sense! But common sense is a moving target, and if the 'mutual intelligence' approach is accepted, it *becomes* common sense, in regards

to the rewilding part at least, that the ecological engineering involved might entail less micro-managing than we would anticipate under the old paradigm. That is, we can't "manage" intelligence at all, but it can manage itself if only we return the key items we've "stolen". Perhaps if we just re-introduce the megafauna, as Michael Soulé and Reed Noss proposed in 1998,[5] the details will take care of themselves? Of course, it's just the biggest animals that need the largest unobstructed ranges, and so it's the *cultural* engineering—not just convincing, but housing and feeding, a maximally 'contained' humanity—that again becomes the biggest challenge. Then, further down the road, the prospect of 'visiting' a megafauna-quickened ecosystem would have its challenges: both mindfulness and battery technology will have to be vastly improved before the average camper will be able to Taser a charging bison, let alone an elephant! But if our extremophile future camper keeps in mind how the ever-present danger from these aggressive Natural ecosystem engineers[6] pales in comparison to the ever-present danger from the *human* demons she must control—demons her 'non-species' has in fact unleashed in the past—then perhaps she will be glad after all to have this reminder (and this vigilance) to quicken *her* once again.

FIFTY

The Great Way is not difficult; just avoid picking and choosing. — from the Hsin Hsin Ming[1]

On the other hand:

My own history tells me that our poetical natures will be harder to convince than our gadget-loving natures when I claim that the human species (if we're a species at all) must choose the strategy of an adaptive extremophile—however unfinished at the start. As a student, in the 'back to the land' seventies, I was pretty much sold on the need for human beings to live symbiotically with natural ecosystems, and I thought then that the only illusion we humans had to see through was our perilous attachment to, and indeed our identification with, lifeless mechanism. I still think it's a problem of course, and I have speculated about this in essay **38**, but my investigations into a behaviourally framed

phenomenology led inexorably to the 'two trees' analogy, and to a different conclusion. So let our poetical natures beware: sentimentality and mysticism are just as ready to grasp at conceptual categories as science is, and indeed, we seem to engage in what Tibetan lama Chogyam Trungpa called "spiritual materialism" all the more urgently when we disdain the urge to question; for it is scientific curiosity that upsets the tidiness of accepted knowledge just as, during silent meditation, our *non-judgemental interest* reveals our illusions, and restores the faculty of immediate Knowing.

Becoming 'enlightened' is not enough: in essay **44** I reasserted McLuhan's message that a wholesome balance of the human sensorium can be skewed by our preference for visual media, and in essay **47** I urged that our gadget-loving abstractions must be wholly set aside, or wholly embraced, moment to moment. It's not 'right effort' that we become enlightened (that is, reclaim our animal authenticity) only to take up residence too far beyond 'the phenomenal world of this and that'. Our teachers and poets tell us that when we see through our conditioned natures we experience "oneness", but at this point a good teacher will also warn us that we are now in danger of wanting to spend all our time in the bliss of satori—that we haven't examined our deepest conditioning, a need for comfort, and must take care to stay engaged, to stay fully human, if only to alleviate the suffering of others. Certainly the freedom from obsessing in the headspace of an 'inventor' brings a peace, and a sense of connectedness, that we might not want to disturb again by engaging in heavy analytical thinking—especially by dwelling on distinctions within our too-easily 'spiritualised' human generativity, such as I am engaging in here. But how can we ethically avoid the call of human enterprise? Is it really 'right thinking' to stay in retreat?

Unfortunately, like other more disturbing animal passions, the pull of monasticism has profound biological support: we have simply to look a little deeper, and *here* we might find a stubborn animal expectation, Naturally-selected for a life with inhumanly stable requirements, that assures us "there is nothing new under the sun". From what I've seen, whether you're a pious believer or an enlightened heathen, this liberation from the burden of uncertainty is believed to be fully realised only when we take up the life of a monk who, moment to moment, relies on

Kierkegaard's promise: "if only the task is established, then much is already gained".[2] But the task of a technological animal, at least when it has reached our advanced stage, is *not* established is it? We might like to think it is, but there's always room for more questions, with answers that don't depend on moral conviction alone. Established tasks are an 'ontogenic' animal expectation, but once we know technology's 'phylogenic' freedom of choice, then "far be it for us to help to circulate the lying reports, that little by little it becomes easier on the narrow way … it becomes harder and harder." The hardness of being human in the Natural world isn't just that insight is bottomless, and its application endless (Kierkegaard's meaning here[3]), but that we must *know when* to retreat and *know when* to engage. We ride the waves of our competing supra-Natural (and 'sticky') human impulses as we always have, but also, we must learn "the marriage of form and spirit", so we can ride without losing our balance. And ahead we see a fuller liberation yet: our original liberation from Nature's body-behaviour conformity imperative, our mindfulness-insight freedom from mental suffering, and a liberation from ecological guilt so that 'right innovation' (do we have a nine-fold path now?) becomes possible. Such is the final liberation for an immortal creative mind that's fleetingly responsible for, but not attached to, the body of an individual ontogenic organism.

So, except for this extra challenge of a jerry-rigged 'barrier' against confusion, the human task is more like the eons-long enterprise of biological evolution. When we look on the right scale, the tree of life is nothing like the life cycles of its creatures, and its task is *not* so idyllic as the life of a monk with his established duties; Nature is neither a parent nor a child, but, like our technological 'species', it is an untaught innovator. Even before Darwin, Søren Kierkegaard expressed the difficulty of the human task this way:

> *The adult is indeed authoritative, he is to be his own master. But it is the Lord and Master who will assign the task, as the parents and superiors do with respect to the child; hence the adult is at one and the same time master and servant; the one who is to command and the one who must obey are one and the same. That the one*

> *commanding and the one obeying are one and the same is undeniably a difficult relationship …*[4]

After Darwin we are not even this sure "who will assign the task". For it turns out that neither the god of Genesis, nor Natural selection, "the Lord and Master" who brought our world into being willy-nilly, cannot tell another master what to do with it. Kierkegaard, who lived in a time of relative technological and ecological stability, concluded that an adult, who is to be his own master, must follow the "way of affliction", so as not to "demoralise his energy". And perhaps this advice will be seen as prescient after all for a post-industrial world, and for an animal who, we now know, is living off the fat of the land without any theistic or Natural regulation whatsoever—just his inconsistently rationalising conscience. So what, if our innovations come much faster than Nature's? If this makes us 'inherently untrustworthy', it's in a way that we can now embrace and take responsibility for. And indeed it can even be argued that, if our most frightful social problems, whether they be self-centred crimes or nationalistic wars, are seen as arising from a loss of faith in our own freebooting species, and from an animal territoriality in defending 'natural resources' that we must learn to step away from anyway, then shouldering our extremophile responsibility will move us forward on the social front as well as the environmental. With this in mind, I will revisit *The Once and Future World* one last time, for I value MacKinnon's 'predatory' analytics to keep me on my toes when I confront the contemporary thought ecosystem regarding Man's relation to Nature.

Near the end of his last chapter, "The Lost Island", we find MacKinnon offering us "A few words about hubris."[5] I confess it's not what I expected from someone trying (against his own doubts perhaps?) to toe the environmentalist line, for he writes only about the past failures of those who assumed they knew how to correct, through the introduction or extirpation of species, the damage done to island ecologies. That is, he warns us about the hubris of *meddling*. Then he offers this hope in the last paragraph: "They lacked the collective intelligence and technologies of the globe's several thousand cultures, not to mention

supercomputers capable of performing nearly twenty quadrillion calculations per second, and they had no one who could build on their successes or support them through their failures."[6] What surprised me most was that this rightly alarmed environmentalist didn't take the opportunity, in a last chapter on hubris, to drive home his earlier point about the folly of "attempting to make an impossible world, in which humans are separable from the rest of life".[7] Maybe he's right, because after all which is the greater hubris: assuming we are equal to, or assuming we are beyond, the task of managing Nature? Does the folly of the last go without saying? But then, why would an environmentalist, committed to a symbiotic coexistence with Nature, focus his final remarks on what should be, at least for an environmentalist, a residual worry: that even well-intentioned interference can be harmful? I still say there's a little extremophile bug ready to chew its way out of every human being. And I submit that this alone can disillusion us, and in so doing save us, from the confusing and destructive animal hope that our newly acquired technological intelligence might both take part in, and yet not be defined by, evo-ecological intelligence.

The unconditioned root of all intelligence cannot despair, and the fundamentally moralising task that the pre-Darwinians wisely set out for us as the "way of affliction", is more favourable than ever for a gadget-loving animal that shoulders its extremophile responsibilities. Some will still say that the non-material *spirituality* of this LAST Niche is our most godly possession, for it raises us above other creatures; but I have attempted to demonstrate here that ecologically secure animals have little need for verbal signs that point the way to representational emptiness, signs that more often than not hold *Homo sapiens* at the crossroads, reading. So maybe this religious promise, and struggle, is just something else we took upon ourselves even as we took our first material steps outside that genetically ordered garden of form-fitted creatures? Or then again, perhaps we can say it's a remedial gift from a less earthly Host? To keep as long as we understand the sacrifice, and the constant faith, that comes with being a good host in turn?

Along with our greater creative agility, along with these hard-won cultural heirlooms bequeathed by our Promethean ancestors in the story of "reinventing evolution", we have the advantage of Nature's untaught,

multi-phase pattern to light The Way. We are not alone; the human non-species *does* have another intelligence to consult—not human, but not alien either—and if we listen to what it is saying, that is if we strain to hear its overburdened silence, we might finally understand that our technology is meant to free us, and Nature too, from our unsustainable dependency on resources that have been evolved to efficiently sustain only eco-evolutionary flourishing. Would this not at least make our task, our endless choosing, less picky and quarrelsome? Let's be thankful for that, and respectful, as we look beyond our most cherished conventions, and far beyond our outmoded impulses selected long ago by Nature. And let us be guided by Nature's example to look in stillness, and by Nature's unconfused moral authenticity to direct our wants and needs in the Right Way—which, once we under-stand the science, will likely lead human ambition farther and farther away from the older evolution.

We are being called upon to make this choice now, though it will happen willy-nilly. Rather than maintain the self-serving pretence that our technological wings have a stable future 'in Nature', a precarious future based on a continuously jiggered sustainability, *H. extremophiles adaptus* will aim instead for a self-stabilising 'containability'. Then this wondrous new immortal, this 'effortless flourishing of knowledge', will spread those wings as one fledgling spirit, and we will fly, as only we can and as fast we can, beyond our befouled and sprawling nest in the Tree of Life.

Too theatrical? That's always the trouble with literary endings. With author-itative 'finality'. Well, perhaps we'll find we haven't changed so fundamentally then. After all, we will be bringing our many gifts with us, as we progress into exotic places; and the facades of our self-contained farms, parks, and other cultivated reminders of wilderness won't need to change as much as their locations will need to. Keep in mind that we have always been happiest living on the less entangled bank. And then again, think about this: we will once again *feel welcome* in our ancestral home! If that's where we want to be. As light-footed visitors this time, of course. Some part of us will always be there anyway, in spirit, "bound by cords [we] cannot sever".[8]

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Notes

By *Part* and **essay number**.

Prefatory Section

1. Uchiyama, 2004, p. 58.
2. Warner, 2003, p. 89.
3. Blake, 1966, p. 214 (The Tyger, 1794).
4. Darwin, 1968, pp. 459-460. The words, "an entangled bank" are used in the 1859 first edition, but I have used, "a tangled bank" from the 6th and last edition, for reasons of poetic flow and printing layout.
5. As defined in Webster's Dictionary.
6. Colinvaux, 1973, p. 337.

Introduction

1. Darwin, Charles, 1958, p. 65.
2. Sagan, 1996. pp. 266-267 (referring to a line from William Blake, "May God keep us from single vision and Newton's sleep").
3. Dickinson, 1993 [1891], p. 127 ("I'm nobody! Who are you?").

Part I

ONE

1. Buck, Wayne. Jan./Feb. 2009. Welcome to my Philosophy Class. *Philosophy Now*, Issue 71.
2. Mahon, 2004, p. 70.
3. Dogen, 1986, p. 2.
4. Lovelock, 2000.

TWO

1. Abercrombie M., Hickman G. J., Johnson M. L. 1973. *A Dictionary of Biology*. Middlesex, England: Penguin Books Ltd. — This is my paraphrasing; but see entry: Germ-plasm, p. 124. Weismann (1834-1914) did his seminal work before DNA's structure and its distribution among all cell types was fully understood. Like Darwin, he relied on his intuitive feel for evolutionary dynamics.

2. In 1965, Donald T. Campbell introduced the idea of "blind variability, selective retention (BVSR)", which has spawned a growing interest in looking at cultural creativity as a Darwinian process. By proposing evolutionary parallels to mental 'model space', and even to human language, we complete this thought by making Natural selection itself, 'psychological'.
3. Just to show how entrancing our representations of the incomparable can become, consider the following: If we look at the three-phase evolutionary dynamic in a biblical context, as "through a glass darkly", then the global and creative nature of phylogeny might appear as "God the Father"; ontogeny might be "God's offspring" who takes a mortal form (suffering both birth and death); and then there's this "holy" feeling we get when we look at the "ghostly" undefinable through the idealist's dark glass of representation itself. I'm sure the fathers of the Christian church knew nothing of genetics and natural selection, but I've always wondered: what were they trying to communicate with this "trinity" mental construct?

THREE

1. From the Boston Massacre Trial of 1770, where Adams defended the soldiers charged with committing murder at the Boston Massacre.
2. Sagan, 1996. pp. 266-267 (referring to a line from William Blake, "May God keep us from single vision and Newton's sleep").
3. Tibetan lama Chogyam Trungpa coined the phrase, "spiritual materialism". To me, it calls up the "Ghost Buster's" comedic use of a slimy material called "ectoplasm" to reveal the presence of that which is presumably … well, immaterial. I consciously avoid using the word "spiritual", but I also try to look behind the word, at the person who is speaking.
4. Stewart, 2013, pp. 206-207.
5. Plato, 2005, pp. 185-187. The guardian of Plato's Republic must be one who "knows the good", which turns out (surprise) to be an eternal Idea, set (*i.e.* put in a 'thought category') apart from all the 'things' referred to as good.

~ A Primer on Philosophy East and West ~

1. Plato, 1950, pp. 78-79;
2. Plato, 2005, pp. 185-186.
3. Aristotle, 1941, pp. 783-811 (Bk. VII of Metaphysics).

4. Warner, 2003, p. 202. There is an old Zen teaching story from the *Mumonkan* designed to turn questioners to the present moment. Case 37: A monk asked Joshu, "What is the meaning of Bodidharma's coming to China?" Joshu said, "The oak tree in the garden." A Monk asked Zhaozhou, "What is the meaning of Zen?" Zhaozhou said, "The cypress tree in the courtyard." I'm thinking of Brad Warner's version here: "*How many Zen masters does it take to screw in a light bulb? The plum tree in the garden!* Haw! Get it?"

FOUR

1. Gould, 1991, p. 476 from "The Median Isn't the Message"
2. Kierkegaard, 1958, Discourse IX. 'The Joy in the Thought that it is Not the Way which is Narrow, but the Narrowness is the Way'. p. 219. "…and far be it for us to help to circulate the lying reports, that little by little it becomes easier on the narrow way, that it is only the beginning that is narrow. The relationship is precisely reversed, it becomes harder and harder."
3. Stewart, 2013, pp. 197-215. "The traditional thermodynamic quantities, such as temperature, pressure, heat, and entropy, all refer to large-scale average properties of the gas. However, the fine structure consists of lots of molecules whizzing around and bumping into each other. The same large-scale state can arise from innumerable different small-scale states, because minor differences on the small-scale average out. Boltzmann therefore distinguished macrostates and microstates of the system: large-scale averages and the actual states of the molecules. Using this, he showed that entropy, a macrostate, can be interpreted as a statistical feature of microstates. He expressed this in the equation $S=k \log W$. Here S is the entropy of the system, W is number of distinct microstates that can give rise to the overall macrostate, and k is a constant. It is now called Boltzmann's constant, and its value is 1.38×10^{-23} joules per degree kelvin."

FIVE

1. Clerk Maxwell, James. 1990 [1871] *in* Harvey S Leff and Andrew F Rex, ed., *Maxwell's Demon: Entropy, Information, Computing.* Bristol: Adam-Hilger. p. 4. Also see Mahon, 2003, pp. 138-139
2. Stewart, 2013, p. 281-282
3. Ibid, p. 213

SIX

1. Tarrant, 2004, p. 57. Zhaozhou questions his teacher Nanquan.

2. Guzeldere, Jun./Jul. 2002, p.15. "The argument that current scientific or philosophical theories can't explain consciousness in their physicalistic framework was brought back again by David Chalmers in *The Conscious Mind* (1996). Chalmers introduced a distinction between the 'easy' and the 'hard' problems of consciousness, putting a twist on Freud's 'unknown' and Levine's 'explanatory gap'. He argued that no level of sophistication in understanding the physical aspects of the brain or behaviour, or cognitive processes such as learning and reasoning (which he called the 'easy problems'), can bring us any closer to understanding the qualitative aspects of the conscious mind (the 'hard problem')."
3. Edelman, 2000, pp, 143-152: The Dynamic Core Hypothesis.
4. Taylor, 2009, p. 41.
5. Ibid. p. 46.
6. Ibid. p. 71.
7. Dogen, 1986, p. 1. We must be careful here. Dogen begins, "Primordial Awareness is in essence perfect and pervades everywhere. How could it be dependent upon what anyone does to practice or realise it?" Then he says, "The vast expanse of Reality can never be darkened by the dust of presumptions. Who then could believe that it needs to be cleaned of such dust to be what it is?" The title of this short work, *Fukanzazengi: How Everyone Can Sit*, should alert us that he is not talking about 'things' here, there is no physical 'mirror of awareness', but he is just exhorting us to, as he says further along, "Be Before Thinking". In Soto Zen meditation we are not trying to 'get somewhere', we are just 'being here'. This 'kind of reflection' begins where presumption ends, but the 'pool' of what we can experience, though now calm, is just as deep as always; thus Primordial Awareness is sometimes translated simply as "The Way".
8. Koch, Christoff. Nov./Dec., 2014. A Brain Structure Looking for a Function, *Scientific American Mind*, vol. 25, no. 6, pp. 24-27. Quote taken from p. 27.

SEVEN

1. Bacon, Sir Francis. 1620. *Novum Organum.* (In English: *The New Organum, or True Directions Concerning the Interpretation of Nature*). Book One, Aphorism XLIX (49). (www.constitution.org/bacon/nov_org.htm)
2. Popper, 1994. p. 58.
3. Husserl, 1967.
4. Edelman, 2000, p. 57.

5. Ibid, p.16. (The theory itself is found in Edelman, 1987, *Neural Darwinism*,)
6. Ibid, pp. 216-217; 7. Ibid, pp. 216-217; 8. Ibid, pp. 216-217.
9. I first heard this fundamental dharma of silent meditation from my vipassana teacher, Dr. Bill Knight. It is important to understand that 'noble silence' applies not just to the cessation of overt speech, but to the 'letting go' of mental commentary altogether, because when this persists it creates a sense of 'self'-identification with the 'pushing ', 'holding onto', and 'ignoring', and the many other automatically chaining pre-verbal movements and tensions we experience in our 'subtle bodies'.
10. Edelman, 2000, pp. 216-217.
11. Darwin, 1968, *The Origin of Species*, struggle for Existence, p. 115.

EIGHT

1. Dogen, 1986, p. 1.
2. Rinchen, 2003, pp. 55-65 (with commentary), 91.
3. When we try to imagine what it might be like to be aware, without *any* reference to the senses, of course it's impossible. But the whole exercise of trying to imagine these other scenarios prods us to see that, even with these, we're *only* imagining; we're not experiencing them. To be honest, I don't know what it means that "time goes missing" when I'm in deep sleep—maybe this is just what it's like to be a sleeping brain—but before I took up my practice, like others before me, I was also largely unaware of my 'unconscious mind', and now, with a little *undivided attention*, all but my most obstinately self-ish attitudes disport themselves in plain 'sight'. When we work with 'method philosophy' this "hard problem", arising as it does out of neurological and other 'models', doesn't get resolved as a model, but it does resolve. Mind, and consciousness, are just object-ive ways of saying *suchness*. In fact, since we're seeing Totality here, not separating out *this* from *that*, this is just The Way.
4. Low, 2006, p. 20.
5. Edmonds, 2001, pp. 158-159.

Part II

1. Krebs, 1972, p. 231.
2. Darwin, 1968, *The Origin of Species*, Struggle for Existence, p. 115.

NINE

1. Thich Nhat Hanh, 1974, p. 34.
2. Darwin, 1968, p. 115.

3. From a private letter, source unknown. The original quote (though variously translated) reads, "Once the realisation is accepted that even between the closest human beings infinite distances continue to exist, a wonderful living side by side can grow up, if they succeed in loving the distance between them which makes it possible to see the other whole against the sky". I have only deleted the word "human".

TEN

1. Sagan, 1994, pp. 6-7.
2. Eldredge, 1972.

ELEVEN

1. Lin-chi. 1993. Burton Watson, trans. *The Zen Teachings of Master Lin-chi: A Translation of the Lin-chi Lu by Burton Watson.* Boston: Shambhala Publications, Inc. p.31. [Ch. 13 (Part Two)].
2. Gould, 1989. *Wonderful Life*, pp. 27-43. Gould's view is roundly expressed on p. 43. "The fatuous idea of a single order amidst the multifarious diversity of modern life flows from our conventional iconographies and the prejudices that nurture them—the ladder of life and the cone of increasing diversity. … these false iconographies … are adopted because they nurture our hopes for a universe of intrinsic meaning defined in our terms. We simply cannot bear the implications of Omar Khayyam's honesty: 'Into this Universe, and Why not knowing, Nor whence, like Water willy-nilly flowing: And out of it, as Wind along the Waste I know not Whither, willy-nilly blowing.'"

   I think Gould was right to denounce the blinkered, self-centred, view of evolution that sees only a ladder with humans at the top, or a cone of system-internal diversification, but there is a third iconography: a sphere of *novel* adaptations that 'reach out' into the universe. Surely Life's incremental movements from sea to land, then to air, and now into interplanetary (indeed, with the Voyager I spacecraft, interstellar) space, counts as advancement? The 'centre' of *adaptive reach* might be construed as 'away from self'.
3. From William James' 1890 *Principles of Psychology*. Often quoted in introductory psychology textbooks.
4. Gautama loved to make lists; by "right view, right thought, right speech, right action, right livelihood, right effort, right mindfulness, right concentration", he just meant we should do all these things while remaining fully present and non-judgemental.

5. In subsequent editions of "The Origin", Darwin in fact tried to appease his detractors by entertaining a more Lamarckian theory of heredity. The original edition is now more fully substantiated.
6. Rumi, 1996, p. 99 (from "The Tent").
7. I am thinking of course about the Book of Genesis and the Bhagavad Gita in particular when I allude to consuming, attachment, and fruits; but the connection between mindfulness, attentiveness, and love is a familiar theme in Christianity, and is fundamental to all Buddhist teachings; and the italicisation of *this* represents a Zen Buddhist convention often used to draw a reader's attention to immediate experience. Zen has ties to Taoism, and the preceding poem by Rumi is representative of the Sufi tradition within Islam.

TWELVE

1. "Lao Tzu", 2000, verse 26.
2. Gould, 1989, pp. 35-52, etc.; Gould, 1991, pp. 168-181 ("Life's Little Joke").

~ Natural History Primer ~

1. Thoreau, 1973, pp. 178-193 (The Succession of Forest Trees). Also, Thoreau, 1993.
2. Krebs, 1972, p. 231.
3. Ibid, p. 231-242.
4. Wilson, 1992, pp. 220-223. MacArthur and Wilson demonstrated that species diversity is directly related to island size and inversely related to distance from the mainland. But of course these terms can apply as easily to ecosystems that are cut off by barriers such as mountain altitude or human development.
5. Odum. 1971.

THIRTEEN

1. Darwin, 1968, *The Origin of Species,* Natural Selection, p. 136.
2. The original view of speciation assumed a certain degree of geographical isolation between two populations of a single species, which allowed for *character displacement*, followed by renewed contact; and from here it was supposed that *competitive exclusion* takes over. Throughout this book I am favouring a view closer to Paul Colinvaux's (2007, pp. 121-122.) which gives far more credit to the subtlety of co-evolution. Isolation needs not be so crudely "geographical" in very large and complex ecosystems. It is still generally assumed that novel traits favouring the exploitation of new resources, at the expense of more species-typical resources, will get

quickly diluted by the interbreeding of a large population. But it was demonstrated by Patrick Bateson as early as 1982 (Gould, 1995, pp. 379-380, "The Great Seal Principle") that sexual selection goes beyond the establishing of *overt traits* to ensure advantageous mating; and in fact a general rule for perhaps *all* sexual species is "maximal attraction to intermediate familiarity". It's understandable that avoidance of breeding with *close* family is adaptive, but why is mating with *intermediate* family more adaptive than mating with more distant relations, unless selection for *racial disparity* is at play here? Nature seems to have evolved ways to get around even "novelty dilution", so who are we to insist on a model of speciation simply because it's crude enough for us to represent?

FOURTEEN

1. Stanley, 1973.
2. Darwin, 1968, p. 460.
3. Wilson, 1992, pp. 180-181.
4. Lovelock, 2000.
5. Wilson, 2002, p. 132.

FIFTEEN

1. Colinvaux, 2007, pp. 121-122. On p. 292 we find this: "Among these properties [found by ecologists seeking to explain high diversity in niche arrays in tropical forest] are elaborate physical structure, year-round productivity, intermediate disturbance cycles of tree fall and succession, the way that high diversity itself lessens exclusion by dominance, and the absence of ice-age catastrophe proclaimed by Alfred Russel Wallace but reinstated by refugialists. Add to this mix the separations by distance inherent in the size of the [Amazon] forest, together with the opportunities offered by its unique age, take all this into account, and isolates seem more likely than not."

SIXTEEN

1. Epstein, 1999, (Quote taken from p. 763 - IV. Real-time Prediction)

SEVENTEEN

1. Nietzsche, 2009, p. 5.

Part III

1. d'Huy, Dec. 2016, p. 64.
2. Darwin, 1968, p. 221.
3. Ibid, p. 239.
4. Kabat-Zinn, 2005, p. 351

EIGHTEEN

1. Browning, 1870, p. 418 (from Aurora Leigh, Sixth Book).
2. Darwin, 1968, pp. 220-221.
3. Ibid, p. 115.

NINETEEN

1. Kneale, William and Martha. 1962. *The Development of Logic*. London: Oxford University Press. p. 243. (Ockham only cited an extant version of "the razor".)
2. Stout, Apr. 2016, p. 34.

TWENTY

1. Lopez, 1979, p. 10.
2. Pinker, 2002. Steven Pinker's critique of the empiricist 'blank slate' philosophy of human behavioural development is not without ongoing criticism itself. But, wherever you fall on the spectrum of 'nature vs. nurture', it is generally agreed that nurture needs something to work with. In any case, it seems that an emerging confluence in the fields of behaviour, cognition, and evolution is slowly bringing the argument to a resolution.

TWENTY-ONE

1. Coleridge, 1994, Part VI. (No page numbers)
2. Wilson, 1992, p. 176.
3. Stanley, 1973.
4. Wilson, 1992, pp. 188-192. For example, atmospheric oxygen reached the 21% level argued to be necessary for large, active, animals around this time; and a stronger ozone layer had developed, which could protect novel forms on intertidal reaches and on dry land. But of course, this can't be the whole story. In a nod to the role of heterotrophy in the Cambrian Explosion, even for microscopic organisms, Wilson writes, on p. 188, "Bacteria and single-celled organisms had long since attained comparable levels of biochemical sophistication. Now, in a dramatic new radiation, they augmented their niches to include life on the bodies and waste materials of the newly evolved animals. They created a new, microscopic suzerainty of pathogens, symbionts, and decomposers".
5. MacKinnon, 2013, pp. 111-113; 129-131.

TWENTY-TWO

1. Adams, 1988, p. 215.

~ Phenomenology Primer ~

1. It might be argued that Aristotle's *tabula rasa* refers less to a child's mind than to *any* mind 'before thinking'. *De Anima*, 429b29-430a1: "Have not we already disposed of the difficulty about interaction involving a common element, when we said that mind is in a sense potentially whatever is thinkable, though actually it is nothing until it has thought? What it thinks must be in it just as characters may be said to be on a writing-tablet on which as yet nothing stands written: this is exactly what happens with mind." This predates Dogen but post-dates Gautama.
2. Locke, 1974, pp. 9-30.
3. Hume, 1888, p. 252.
4. Pinker, 2002.
5. Hegel began with a startlingly insightful premise: our deepest desire is to be *seen*. That he immediately spun this into a vast political philosophy shows the thinking mind's power to distract us from a more intimate journey, and the frightening anomaly of being an animal with a confusing 'covert life'.
6. Husserl, 1967.
7. Kant, 1970, p. 60. "I call all representations in which there is nothing that belongs to sensation, *pure* (in a transcendental sense). The pure form therefore of all sensuous intuitions, that form in which the manifold elements of the phenomena are seen in a certain order, must be found in the mind *a priori*. And this pure form of sensibility may be called the pure intuition (*Anschauung*)."
8. Kwant, 1967, pp. 383, 387.
9. Berman, July 2004, p. 132.

TWENTY-THREE

1. Feynman, 1999, pp. 122-126. "There's Plenty of Room at the Bottom"

TWENTY-FOUR

1. Husserl, Edmund. 1973 [1931] Dorion Cairns, trans., *Cartesian Meditations: An Introduction to Phenomenology*. The Hague: Martinus Nijhoff.

TWENTY-FIVE

1. Kabat-Zinn, 2005, p. 421.
2. Gottlieb, Aug. 30, 2016. *The Dream of Enlightenment*. p. 106.
3. See note 1, essay twenty-four, for source. Also see Husserl, 1967, p. 73. "That which we have submitted against the characterisation of what is given to us from the natural standpoint, and thereby of the natural standpoint itself, was a piece of pure description [of reflection] *prior to all*

"theory". In these studies we stand bodily aloof from all theories, and by "theories" we here mean anticipatory ideas of all kind. Only as facts of our environment, not as agencies for unifying facts validly together, do theories concern us at all." Husserl doesn't set out to answer the question of free will, but rather to free the mind to do truly objective science; which, by favouring un-predetermined scientific 'advancement', I suppose amounts to the same thing. This reminds us of mindfulness meditation, except that the ego's "intentionality" towards its "environment" is ever present, but never directly an object of mindfulness.

4. Hagen, 2004, p. 5.

TWENTY-SIX

1. Thoreau, 1960, pp. 49.
2. Thoreau, 1960, p. 1.
3. Consciously turning between discursive thinking and a whole-some presence, in the moment, and 'seeing' the difference, is called *kenshō*, but though I was focusing on breathing at the time, to 'stay open', my incomplete understanding made the 'turning' unreliable.

TWENTY-SEVEN

1. Warner, 2007, p. 48. See also, Dogen, 2010. p. 4-5/11.
2. Dogen, 2010, p. 4-5/11.
3. Bargh, Jan. 2014, p. 35, the "chameleon effect".

TWENTY-EIGHT

1. Kwant, 1967, p. 383. To be clear, this is followed with, "Understood and interpreted religion is no longer affirmed religion."
2. Colarossi, Jul./Aug. 2013, pp. 17-19; also see Merleau-Ponty, 1967, pp. 356-374.
3. Ibid.

Part IV

TWENTY-NINE

1. McLuhan, 1964, p. 23.
2. Begun, Aug. 2003. Also, Tattersol, Sept. 2014. "It seems likely that tools and other technologies allowed early hominins to launch themselves into new environments, although when conditions periodically deteriorated, those aids could no longer guarantee survival. As a result, many populations splintered, allowing genetic and cultural novelties to take root much faster than could have happened in larger groups, leading to rapid evolution." —p. 56. I think what we are actually seeing here is a two-stage

evolutionary stimulus from climate instability. First of all, new environments become available, and these would naturally favour opportunistic behaviour (like tool modification); then, as conditions deteriorate further, geographic isolation would favour genetic diversification to consolidate these behaviours.

3. deMenocal, Sept. 2014, pp. 48-53. See also, Tattersol, Sept. 2014, p. 55-59.
4. Darwin, 1968, p. 454. "Therefore I cannot doubt that the theory of descent with modification embraces all the members of the same class. I believe that animals have descended from at most only four or five progenitors, and plants from an equal or lesser number. Analogy would lead me one step further, namely, to the belief that all animals and plants have descended from some one prototype." In fact it's not nearly so controversial to let analogy lead us to the view that the Canadarm, plucking a satellite from its decaying orbit, is a direct descendant of a stick poking a bee's nest from a tree.
5. In Joshua Kendall's *The Man Who Made Lists: Love, Death, Madness, and the Creation of Roget's* Thesaurus, Berkley Books, 2008, we find some intuitive reflections on ideas as species. On page 265 the author notes, "[Richard] Whately argued in his synonym book—the only one Roget would footnote in his *Thesaurus*—there really was no such thing as a synonym, because no two words can mean exactly the same thing." And on the next page, "Roget ended up categorising each idea according to class, division, and section, just as natural historians like Linnaeus had catalogued animals according to phylum, class, and order."

THIRTY

1. Pinker, 2002. Many feel that Steven Pinker's *The Blank Slate: The Modern Denial of Human Nature*, goes too far in emphasising the role genes play in controlling our behaviour. But over-emphasis itself seems to be 'natural' when we feel the urge to restore balance to a conversation. Is this a specific genetic trait? Or is it just 'descended from' our survival instinct—in Pinker's case, and probably mine, a need to make a living selling books? Anyway, it has been my experience, as a mindfulness practitioner, that we become less defensive about our capacity to modify *both* innate and conditioned behaviours, when we begin to see, in a non-judgemental way, just how autonomous they really are. A strong emphasis in my book is how human insight allows for the 'evolution' of human nature beyond its animal roots.

2. Marean, Aug. 2015. While the "genetically encoded penchant for cooperation with unrelated individuals" arising from the need to defend the "dense and predictable" coastal resources around Pinnacle Point on the southern coast of Africa is postulated as the key to understanding the expansion of modern humans out of Africa and around the globe, we also see, once again, that "*H. sapiens* … needed a new technology—projectile weapons—to reach its full potential for conquest."
3. Wong, Apr. 2014, "Neil T. Roach of George Washington University…and his co-workers identified three features present in modern humans but not in chimps that greatly enhance our upper body's range of motion and thus its ability to store and release this [elastic energy in our shoulder muscles]: a flexible waist, a less twisted upper arm bone and a shoulder socket that faces out to the side rather than upward as it does in apes."—p. 49.
4. Ibid, p. 51.
5. Liebenberg, 2013.
6. Darwin, 1968, p. 239.
7. de Waal (2016, chapter 3, sub-heading, "Redefining Man" e-book location 1257) maintains that "the survival of chimpanzees is quite dependent on tools"; and he maintains further (ibid, location 1395) that the great apes, unlike other primates, appear to use "a representational mental strategy, which allows solutions before action." I couldn't agree more that human beings are on a continuum with other animals, but with symbolic language being a rather big jump and on this de Waal (ibid, location 1753) concurs, saying, "You won't often hear me say something like this, but I consider us the only linguistic species". My focus, however, is on discontinuities in evo-ecological function, and here we see that humanity's *progressive* technology has thrown Gause's principle (see ***Natural History Primer***) out the window, and invited the multiregional hypothesis (see note 2, essay **THIRTY-SIX**) in the front door; leaving the great apes out in the cold.

THIRTY-ONE

1. McLuhan, 1964, p. 105.
2. That robots, like children, learn from "the shape of the body and the kinds of things it can do" has been recently demonstrated by Angelo Cangelosi of the University of Plymouth in England and Linda B. Smith, a developmental psychologist at Indiana University Bloomington. Source:

Diana Kwon, *Scientific American*, March 2018 (volume 318, number 3), "Self-Taught Robots" pp. 26-31.

3. See: Fernando, Chrisantha. Aug. 2013. From Blickets to Synapses: Inferring Temporal Causal Networks by Observation. *Cognitive Science*, Vol. 37, Issue 8, pp. 1426-1470. —"We have reason to believe that language learning is an evolutionary process occurring during development, in which populations of constructions compete for communicative success. We have reason to believe that during human problem solving, multiple solutions are entertained recombined and mutated in the brain. We have reason to believe that evolutionary methods provide a powerful ensemble approach to combine populations of decomposed and segmented predictive models of the world, policies, and value functions. We have reason to believe that causal inference can play an important role in copying patterns of connectivity between one part of the brain and another part, by one part of the brain observing the spikes from another part of the brain, and that the same mechanism can be used to infer causal relations in perceived inputs. In short, multiple constraints at many levels make the idea of evolutionary neurodynamics not as crazy as it would seem from any one perspective."
4. Simmons, 2012, pp. 390-392 (lyrics from Leonard Cohen song, "Anthem"; selection includes commentary).
5. Aristotle, 1941, p. 595 (*On The Soul*, Bk. III: Ch. 8). "Since according to common agreement there is nothing outside and separate in existence from sensible spatial magnitudes, the objects of thought are in the sensible forms, viz. both the abstract objects and all the states and affections of sensible things. Hence (1) no one can learn or understand anything in the absence of sense, and (2) when the mind is actively aware of anything it is necessarily aware of it along with an image; for images are like sensuous contents except in that they contain no matter." Earlier (Bk. III: Ch. 8) Aristotle "establishes" from certain "considerations" that "there is no sixth sense in addition to the five enumerated—sight, hearing, smell, taste, touch…". However, in Bk. II (p. 577) he avers that it is problematic that touch may be a "group of senses" and that its organs may be "situated further inward".
6. Kant, 1970, p. 60. "Now it is clear that it cannot be sensation again through which sensations are arranged and placed in certain forms. The matter only of all phenomena is given as *a posteriori*; but there form must be ready for them in the mind (*Gemüth*) *a priori*, and must therefore be

capable of being considered as separate from all sensations." Here, once again, covert behaviour is not detected as 'sensible'.

7. Locke, 1974, pp. 9-30.

THIRTY-TWO

1. Aristotle, 1941, p. 712 (993b3-993b11 of Bk. II, Metaphysics). In Locke, 1974, p. 20, we see how this acknowledgement, that ideas are prior to language, continued in Western science: "The simple ideas we have, are such as experience teaches them us; but if, beyond that, we endeavour by words to make them clearer in the mind, we shall succeed no better than if we went about to clear up the darkness of a blind man's mind by talking…"
2. Locke, 1974, p. 25. "If then external objects be not united to our minds when they produce ideas therein; and yet we perceive the *original* qualities in such of them that singly fall under our senses, it is evident that some motion must be thence continued by our nerves, or animal spirits, by some parts of our bodies, to the brains or the seat of sensation, there to produce in our minds the particular ideas we have of them." But since he then goes on to say these qualities "may be perceived at a distance by sight", and says it is the eyes that "convey to the brain some motion; which produces these ideas which we have of them in us", I think it is fair to say that Locke, true to his Enlightenment origins (or rather, this is a truth about its originators), seems to have been stuck in McLuhan's "visual mode".
3. Bargh, Jan. 2014, p. 34. Brain areas that respond to textures also light up when someone is having a "rough" or "smooth" social interaction. (Box insert, "Why Some Social Science Studies Fail".)
4. Gottlieb, Anthony. Aug. 30, 2016, *A Dream of Enlightenment*, Ch. 6. 'The Best of all Possible Compromises'. "Leibniz noted in his copy of Berkeley's *Principles* that 'much here … is correct and close to my own view. But it is expressed paradoxically. For it is not necessary to say that matter is nothing, but it is sufficient to say that it is a phenomenon, like the rainbow.'" George Berkeley famously held that things only exist subjectively: 'it's all in the mind.' Perhaps expressing things paradoxically is just the thinking mind's paradoxical attempt to clear its 'self', so we can 'touch the truth of things'?

THIRTY-THREE

1. Dogen, 2010, p. 5/11.
2. Bensley, Jul./Aug. 2003, pp. 36-37.

3. Wegner, Daniel M. 2002. *The Illusion of Conscious Will*. Cambridge, MA: MIT Press. Pp. 52-56; also, Sukhvinder, Jul./Aug. 2004; also, Shermer, Aug. 2012.
4. When Robert Epstein launched his Generativity theory in a 1985 paper titled, "Animal Cognition as the Praxist Views it" (*Neuroscience & Biobehavioral Reviews*. Vol. 9, pp. 623-630.), he included a revealing account of the muddle, and the raising of academic hackles, when a new, and in its own right legitimate, science of behaviour became "*a movement to change psychology*" (italics in original, p.624). "Psyche-ology", is the older, and equally legitimate, study of mind (consciousness, character, soul, etc.), and the "movement" to change all this had become known as behaviourism. "Watson put the study of behavior on a steep and thorny road", Epstein said, and this lead inevitably to the entrenchment of two warring attitudes: for the many who called themselves behaviourists, psychology's "old subject matter was now forbidden", and for those who didn't comply, the war was far from over; for indeed "in the 1950s, with the advent of computers and the alliances that were formed between psychologists, linguists, computer scientists, and philosophers, the study of mind began to flourish as it never had before."

   Epstein's Solomon-like solution to the quarrel—establish two scientific departments, one to study the mind (consciousness) and one to study the body (behaviour), leaving those who want to keep the "ism", safely in the philosophy department—has still not fully materialised. Even today, many cognitive scientists, at least when sitting at computer terminals, still view behaviour as a relatively crude end product in their sophisticated "computational" models of mind; and those who follow behaviour into its more subtle levels still find themselves confronted with James' blooming, buzzing confusion. Dogen would appreciate the plight of these last, and he would probably tell the others an amusing story about an ox and a cart.
5. McLuhan, 1964, p. 105.
6. As reported by Jason G. Goldman (Mar. 2014. "Thought Control". *Scientific American*. p. 28.) experiments by Bruno Laeng and Unni Sulutvedt found that our pupils adjust to *imagined* objects of varying brightness.
7. See note 3, Essay **THIRTY-ONE**. Also see Gottlieb, Anthony. Aug. 30, 2016, *A Dream of Reason*, Ch. 12. 'The Master of Those Who Know'. "If Aristotle had never existed, it would be pointless to try to invent him. Nobody would believe that there could have been such a man, …The

[only] surviving works are treatises that Aristotle used as the basis of his teaching at a research institute which he set up in Athens in 335 BC, known as the Lyceum. … two of his contributions stand above the others for their originality and power: formal logic, which Aristotle invented from scratch, and biology, of which he was by far the most influential investigator until Darwin evolved." Aristotle has been associated with stuffy and erroneous nitpicking since the Enlightenment only because the Scholastics of the preceding 500 years had focussed exclusively on his conclusions, which contained inevitable errors, and ignored his generous investigative spirit. He would have been the first to modify his conclusions according to new evidence, and to read him directly is to understand why he is considered to be the founder of a modern science that finally re-established this spirit fully 1000 years after his time.

8. de Waal (2016, chapter 3, sub-heading "Redefining Man", e-book location 1395) points out that the great apes, unlike other primates, appear to use "a representational mental strategy, which allows solutions before action." Their numbers in the wild have certainly been reduced by human 'competitive exclusion', but we might even invoke the multiregional hypothesis (See note 7, essay **THIRTY**, and note 2, essay **THIRTY-SIX**.) as we do not interbreed.

~ Anthropology Primer ~

1. Marean, Aug. 2010,
2. Werdelin, Nov. 2013.
3. Wong, Kate. May, 2017. The New Origins of Technology, *Scientific American*, vol. 316, no. 5, pp. 28-35. In 2015 Sonia Harmand and her husband Jason Lewis discovered 3.3-million-year-old stone tools at Lomekwi 3 on the northwester shores of Lake Turkana in Kenya. This predates genus *Homo* and the climate shifts that gave rise to our immediate progenitor species by a half-million years. Clearly tools are necessary to establish progressive technology, but not sufficient. It's becoming harder and harder not to conclude that it took prolonged ecological disturbance to defeat some kind of evo-ecological self-regulation that limits innovative tendencies in the wild.
4. Marean, Aug. 2015. Also see note 2, for Essay **THIRTY**.
5. Thorne, A.G., Wolpoff, M.H. 1992. Also see note 2, Essay **THIRTY-SIX**.

THIRTY-FOUR

1. Gould, 1989, p.14.

2. deMenocal, Sept. 2014, pp. 48-53. Also see, Tattersol, Sept. 2014, p. 55-59.
3. Tattersol, Sept. 2014, p. 56.
4. Wong, Sept., 2014. "Arguably, no chapter of the human odyssey has been so dramatically rewritten as the one detailing the ascent of *H. sapiens*. Far from being a slam dunk, destined for world domination from the outset, the fossil record now paints a picture of a species that had no sooner debuted than it nearly went extinct as a result of climate change."—p. 39.
5. deMenocal, 2014. "There was no one-time habitat switch from forests to grasslands but rather a rapid succession of wet-dry cycles that moved, in distinct steps, toward dryer conditions." —p. 50. These swings reflected the known sensitivity of African and Asian monsoonal climates to Earth's orbital wobble, which occurs as a regular 23,000-year cycle. However, overlaid on this more general trend, deMenocal says there were two "major shifts in African climate … roughly a million years apart, that mark significant changes in our family tree. The first evolutionary shakeup happened between 2.9 million and 2.4 million years ago. The famous ancestral lineage of 'Lucy' and her ilk (*Australopithicus afarensis*) became extinct, and two other, quite distinctive, groups appeared. One of them had the hints of some modern-looking traits, including larger brains. The owners were the very first members of our own genus, *Homo*. The first crude stone tools appeared near these fossils. The other group besides *Homo* that emerged at this time looked different: a stoutly built, heavy jawed and ultimately unsuccessful lineage known collectively as *Paranthropus*." —p. 51.

   "The second shakeup occurred between 1.9 and 1.6 million years ago. An even larger brained and more carnivorous species, *Homo erectus* (called *Homo ergaster* by some scientists), appeared on the scene. Its taller, more lithe skeleton was nearly indistinguishable from that of modern humans. This species was also the first to leave Africa to populate South-east Asia and Europe. Stone tool technology also got a major upgrade: the first hand axes showed up, with large blades carefully shaped on two sides. …While these broader shifts were happening, the climate whipsawed rapidly between wet and dry periods, so to thrive, our ancestors had to adapt to rapidly changing landscapes. …Rick Potts, a paleontologist at the Smithsonian Institution, calls the role of flexibility in making us what we are 'variability selection.'" —p. 50.
6. Stix, Sept. 2014, p. 72-79. On p. 76 Stix quotes Michael Tomasello criticising the linguistic contention that grammar is genetically hard-

wired: "Language is such a complicated thing that it couldn't have evolved like the opposable thumb."
7. Chomsky, 2002, pp. 11-17.
8. Dogen, 2010, p. 5/11.
9, Kenny, 1974.

THIRTY-FIVE

1. Hagen, 2004, p. 5.
2. McLuhan, 1964, p. 222 for example.

THIRTY-SIX

1. Jack Kassewitz. "We Are Not Alone: The Discovery of Dolphin Language." www.speakdolphin.com —November 2011. (Jack Kassewitz: speakdolphin@mac.com)
2. Thorne, 1992, pp. 76-83. Milford H. Wolpoff, Alan Thorne and Xinzhi Wu proposed the Multiregional hypothesis in 1984, claiming that for the last two million years the various forms of hominins essentially represented a single, if loosely integrated, genepool with wide clinal variations. This does not necessarily mean that the widely accepted "out of Africa" theory is wrong, in the sense that a central maternal line of descent cannot be identified, but the proposition is rather that, because of the high degree of niche overlap allowed by technological exchange, the many populations could not have survived unless they interbred—at least enough to deny them the term "extinction" that would inevitably apply to distinct species that succumbed to this unrestrained competition. Perhaps the best evidence in favour of the hypothesis however, and certainly for the argument I want to make here about our current situation, is not found in the fossil record, but it is the simple observation that humanity today, in all its *potential* for adaptive radiation, shows no signs of further speciation: human kind is demonstrably a "melting pot", and this is profoundly unlike any "natural species".

THIRTY-SEVEN

1. Dobbs, Apr./May 2006.
2. Ibid, Apr./May 2006. See also, Stix, Sept. 2014, p. 72-79. (See especially Michael Tomasello's work, p.76-78.)
3. Sceptics often point to the doctrine of reincarnation as a reason to dismiss Buddhism in general. But during silent meditation, long after words and stories cease to agitate the thinking mind, we still bump into monolithic body attitudes that might well be described as 'former selves'. In my own case, I experience successive 'in-carnations' of Mr. Fix-it, Tootles

(looking for his marbles), the Outsider, and sometimes (((No Panic Here!))), among others. Each of these 'old friends' (or demons) seems to have a life of his own, even when his story line is completely silent. I am unshakably confident, even as I 'let them go', that they will always come back, because they are embedded in a cultural memory whose fabric is this body itself. Maybe it's only the meditator's strong sense of 'selves within a non-self' that makes reincarnation such a natural way of talking about these passing attitudes.

4. Stix, Sept. 2014. In reference to Michael Tomasello's work at Emery University comparing chimps and children: it was not just that "apes do not ape each other the way humans imitate one another", but "More important, there was no attempt to go beyond the basics and then do some tinkering to make a new and improved ant catcher." —p. 76. This is not to say that our fellow primates don't possess the rudiments of that which became accentuated in our hominin line. In *The Chimpanzees of Gombe* (1986, Harvard University Press: Cambridge MA) Jane Goodall observed that adult male chimpanzees often did a 'rain dance' at the outset of thunder storms. When I first read about how they would get all excited, and bang sticks and other noisy objects together, it occurred to me that 'aping' the thunder storm was their means of under-standing it. It has become customary for philosophers to try and find some discontinuity between human and nonhuman animal cognition (de Waal 2016, chapter 4), and if I am to play this game, I would say 'real' discontinuity can only be found with the completion of the language field to re-present *every-interior-thing*. (Also see note 7, essay **THIRTY**.)

THIRTY-EIGHT

1. See Essay 31, Note 2.
2. Gould, 1991, p. 476 (from "The Median Isn't the Message").

THIRTY-NINE

1. Taken from Loy, David R. 2010. *The World is made of Stories*. Boston: Wisdom Publications. p. 19.
2. See: Donald T. Campbell, and "blind variability, selective retention (BVCR)", in **TWO**, note 2.

Part V

1. MacKinnon, 2013, p. 72.
2. Rumi, 1996, p. 265 ("The Worm's Waking").

FORTY

1. Browning, Elizabeth Barrett. 1860. StanzaVI from the poem. *A Musical Instrument*.
2. Dogen, 2004, p. 21.

FORTY-ONE

1. Dickinson, 1993, p. 205.
2. Wilson, 2002, p. 152.
3. Jeffrey D. Sachs, *Scientific American*, 4/07.

~ Technology Primer ~

1. McLuhan, 1964 and 1969.

FORTY-TWO

1. Keller, 1996, p. 15-16.
2. Lorenz, 1972. P. *xi*.

FORTY-THREE

1. Thoreau, 1960, p. 218.
2. See **FORTY-FIVE**, Note 2
3. Ramachandran, May 2003. This could be another case involving 'synkinesia' [See **FORTY-FOUR**, Note 2. Ramachandran, The Puzzle of Language], but this time, instead of spillover between hand-gestures and mouth, a more obvious connection between conscious diaphragm movement and larynx? Of course it's all 'association', whether learned or innate; and it's not only by the strength of our associations, but by their fullness, that we 'measure' consciousness.
4. Einstein, 1954, p. 35-36: 'A Mathematician's Mind'.
5. Stix, Feb. 2013.
6. Keynes, 2002, pp. 194-195.
7. Rosenblum, Jan. 2013; also, Ramachandran, May 2003. p. 57, experimental evidence supports a "cross-activation theory of synesthesia".

FORTY-FOUR

1. Glassman, 2002, p. 86.
2. Ramachandran, May 2003. "…a kind of spillover of signals occurs between two nearby motor areas: those that control the sequence of muscle movements required for hand gestures and those from the mouth. We call the effect 'synkinesia'. As Charles Darwin pointed out, when we cut paper with scissors, our jaws may clench and unclench unconsciously as if to echo the hand movements. Many linguists do not like the theory that manual hand gesturing could have set the stage for vocal language,

but we believe that synkinesia suggests that they may be wrong." —p. 50, in box: The Puzzle of Language. Also see Rosenblum, 2013; and Sacks, 1995, pp. 227-228.

3. McLuhan, 1964, p. 105.
4. McLuhan, 1969, p. 102.
5. McGuigan, 1978.

FORTY-FIVE

1. Darwin, 1968, *The Origin of Species*, Struggle for Existence, p. 115
2. Here we might revisit de Waal (2016, Chapter 3, sub-heading "Redefining Man", e-book location 1395) in which he points out that the great apes, unlike other primates, appear to use "a representational mental strategy, which allows solutions before action." I wonder, would it be practical to hook a chimpanzee's face up to an electromyograph, as well as a human's, to see whether or not the hypothesised 'facial closed behavioural imaging field' fragmentation was already present in our pre-verbal common ancestor before our lines diverged? We know tools are important, if not essential, to chimpanzees in the wild (ibid, e-book location 1257), and this capacity might be needed even in the early stages. Or, was full-body rehearsal good enough?

FORTY-SIX

1. "Moses" 1968, p. 6.

FORTY-SEVEN

1. Dogen, 2011, p. 24.
2. Rumi, 1996, p. 237 (from "The Three Brothers and the Chinese Princess").
3. Goleman, 2003, pp. 28-30.

FORTY-EIGHT

1. Thoreau, 1960, p. 227.
2. Wilson, 2002, pp. xi-xxix. Wilson's prologue, 'A Letter to Thoreau', gives another side to the traditional literary argument that Thoreau's writing suffered after he took up his scientific mission seriously. Here we begin to see why work on 'the Book of Nature' required more from Thoreau than just his pen. As it did also for Edward O. Wilson.
3. This characterisation of Thoreau as "personifying an ethos that transcends racial identity" refers to his 'A Plea for Captain John Brown' essay, which is based on a speech he delivered in Concord Massachusetts on October 30, 1859, two weeks after Brown's raid on Harper's Ferry; he repeated the speech several times before Brown's execution on December 2, 1859.

(The song "John Brown's body lies a mouldering in the grave" was a rallying cry for the anti-slavery movement.) His "transcendence of animal hunger" refers not just to his vegetarianism, but to the "Simplify! Simplify! Simplify!" economics that forms the basis of Walden. Did I mention he was a surveyor, ran a pencil factory, declaimed against war (the essay 'Civil Disobedience', which influenced both Tolstoy and Gandhi) and invented raisin bread?

4. Thoreau, 1973, pp. 178-193 (The Succession of Forest Trees). Also, Thoreau, 1993.
5. Thoreau, 1960, p. 221.
6. McLuhan, 1964. The title, "Understanding Media: The Extensions of Man" says it all, but we usually only think of media as 'soft media': writing, radio, television, and now the internet.
7. Werdelin, Nov. 2013, pp. 34-39.
8. MacKinnon, 2013, p. 18. The phrase "shifting baseline syndrome" was coined by Fisheries scientist Daniel Pauly in 1995 to account for the 97 percent decline in the biomass of the North Atlantic since written records were first made there.
9. Ibid, pp. 65-66; _ 10. Ibid, p. 54; _ 11. Ibid, pp. 54-55. _ 12. Ibid, pp. 197-199; _ 13. Ibid, p. 124; _ 14. Ibid, p. 127; _ 15. Ibid, p. 124. _ 16. Ibid, p. 128; _ 17. Ibid, p. 149; _ 18. Ibid, p. 210; _ 19. Ibid, p. 214; _ 20. Ibid, p. 213; _ 21. Ibid, pp. 195-215.
22. Browning, 1870, pp. 69-70. Also 2003, p.115.

FORTY-NINE

1. Holmes, 2008, pp. 444-445.
2. Suzuki, 2006, p. 12.
3. Cherry-Garrard, 1922, pp. 554-556.
4. I have been accused of apologising too much. Sorry about that.
5. MacKinnon, 2013, pp. 64-67.
6. Ibid, p. 111.

FIFTY

1. There is controversy over who wrote the Hsin Hsin Ming (Faith in Mind poem) around the turn of the seventh century in China. Some think it was *Seng-T'san,* Third patriarch of Chan Buddhism, which would become Zen in Japan.
2. Kierkegaard, 1958, p. 219.
3. Ibid. p. 219.
4. Ibid. p. 216.

5. MacKinnon, 2013, pp. 211-212.
6. Ibid. p. 215.
7. Ibid, p. 210
8. From "A Seaside Walk" by Elizabeth Barrett Browning, 1870, pp. 69-70. Also 2003, p.115.

Acknowledgments

"Thank-you" is not just an afterthought, but occupies a place of sober reflection at the end of this journey, short in time but long in thought, and in which I alone am responsible for stubbing my toes.

There are not enough words to thank my wife and daughters, to whom I have dedicated this book, for their patience, their love, and the practical support they have provided. Thank you Judy for doing my share of the chores more often than I can ever justify! In the category of practical support, however, I must also acknowledge co-workers in my *paying job* of building and design: in particular, my former head-man (and now sometimes my boss) Sam Stone, and our former team of tradesmen: James Latondress, Jamie Cousineau, Steve Gilchrist, and Rob Smith. These stalwart companions sometimes did my job while I played with this book.

As with all 'original' writings, the seeds for these notions were planted in the formative past during world-shaking conversations with those who have remained friends nevertheless: you know who you are. But while the book was taking shape, these ideas ripened under the professional guidance of Jim Bunn and Frank Thompson, and also Merry Bridges who not only drew the Tree of Life image on the cover, but patiently challenged my lazy habit of grasping at words that don't fully, or even accurately, express my thoughts. (She didn't always succeed.) Of course this flourishing of mental construction (and botanical metaphor) has been fed and supported throughout in the firm soil provided by my vipassana teacher, Bill Knight, all the while he was treading in footsteps that fade into a vertiginous past. And so many other friends! Many of them sitting companions with whom I have shared facilitation privileges in various mindfulness groups. But I especially want to thank a more restless, and indeed trail-blazing, companion: my big brother Terry, who believed in me before he knew quite what it was I wanted to say. Terry suggested the Inco Regreening Program as a proof-of-concept for extremophile living (while my dreaming tended more to space

stations), and has offered many other insights into nature, human and otherwise.

Also, for technical support, I would like to thank Stan Bevington at Coach House Press for insisting on an integrated format for the organisation of verse, commentary, and quoted materials in the original 2008 version of this book—*Darwin, Zen, and the LAST Niche*. Without his help, I'm sure you would find the book not just dense, but completely opaque! And, more immediately, I would like to thank Emily Bell at *treechicdesign .com* for help with the *extremopohilechoice.com* website, and Rajesh Kumar of *amnet-systems.com* for help with formatting the epub version of this book.

Too few literary influences are represented by my quotes at the top of these essays, but I must at the very least acknowledge two seasonable Steves: the late Stephen Jay Gould whose *This View of Life* column, for twenty-five years, served to sharpen and temper my 'personal' interpretation of evolution, and Steve Hagen whose book, *Buddhism Plain and Simple*, was there just when I needed it to make the buddhadharma, in all its antipodal obscurity, intuitively accessible to a hands-on builder-designer and life-long sceptic. But then of course the most pertinent debt I owe, for the single unbreakable thread which (believe it or not) holds this tangled little book together (and I bow to any of the preceding or following who might find some of the other threads impertinent), goes to a long line of *teachers*. Our dharma-ancestors' body wisdom, while conceptualised in a great number of books giving orientation and practical instruction in vipassana (mindfulness-insight) meditation, is ultimately experienced in the practice itself as it grows under the personal guidance of a teacher.

Finally, I am always conscious of my good fortune in having had the opportunity to get my scientific fingers dirty in the big backwoods back yard I grew up in. I can't tell you how dear and personal this last contributor is to me. But I've tried.

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About the Author

Ken Christenson is the grandfather, hiking companion, and guitar minstrel for Emma, Lily, Abigail, and Skylar. When they go home to their parents, Ken goes back to work part time with *Extremophile Niche Design*, the creative branch of his recently divided third generation design-build firm. Or, if he wants to get away from the desk, he works as an electrical contractor building and maintaining photovoltaic systems on the islands of Georgian Bay. Ken is a native philosopher, a recreational poet, and a long-time practitioner and facilitator of mindfulness-insight meditation. Also he has been a science and ecology watcher since a 'nerd' was an imaginary beast in Dr. Seuss's zoo. In fact, when he was in high school, the original *Star Trek* run was not 'scientific' enough for him, and it is therefore a fitting karma that he can find no better precedent for the ecological strategy he now advocates than the 'Prime Directive': a sci-fi principle that forbids meddling in the affairs of more primitive life forms by technologically advanced beings in the *Star Trek* universe.