

What the Pelican tells us: Natural Capitalism and Sustainability

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In recent years, the doctrine of natural capitalism has become increasingly influential, particularly in circles charged with developing ecologically sustainable social, economic and industrial policy. It has been seen as a revolutionary new conception of capitalist production and exchange, a doctrine which shows how market forces can be vehicles for, rather than obstacles to, achieving sustainability. This paper starts by defending natural capitalism against any *simplistic* objection that it is simply a much more energy-efficient version of the current consumerist *status quo*. This objection remains simplistic to the extent that it *just assumes* the spuriousness of natural capitalism's claim to be a radically new social, economic and industrial order. The paper then argues that the great vagueness of its general recommendations blinds natural capitalism to sheer impossibility of realising them in a genuinely sustainable way. It thus blinds natural capitalism to the need to tread lightly (and not just more cleverly and efficiently) in nature if we are to secure anything like sustainability; this is what the simplistic critique of natural capitalism was really getting.

Adherence this ecological imperative to tread lightly is then shown to require us to ask what it is to 'live well' *before* we consider issues

of waste and efficiency. The underlying basis for natural capitalism's claim to radical novelty is then examined. This is its appeal to a 'whole systems' approach. The paper shows that, when taken literally, much in this appeal is neither radically new nor sufficient to bring about the radical shift in production and consumption which achieving sustainability arguably requires. Yet when this appeal is reconstructed, it yields a fundamental 'ontological' insight which suggests that in our social, technological and industrial design we should attempt to preserve a role for skilful human management and judgement 'on the fly'. Adherence to this *technological* imperative to keep technique in technology is then shown to be required by adherence to the *ecological* imperative to tread lightly. The paper concludes by intimating what it might mean to build into our processes of design prior reflection on whether we need these designs at all, i.e., on what it is to 'live well'.

According to Paul Hawken, Amory Lovins and L. Hunter Lovins,¹ if we are to attain an ecologically sustainable yet still prosperous economy, the notion of capital must be extended to include the natural resources and natural systems without which no economy

is possible. Such resources and systems must be seen as a natural capital which the economy draws upon in the shape of numerous essential services: supply and purification of air and water, pest control, flood management, land management, food supply and so on. There is of course nothing new in the idea that on pain of ecological collapse we must somehow factor natural resources and systems into the economic equation.² The novelty of the doctrine Hawken, Lovins and Lovins call natural capitalism lies elsewhere: they claim that in order *effectively* to factor natural resources and systems into the economic equation, indeed in order even to *understand* what it means to treat nature as a form of capital, we need a completely new mind-set. Natural capitalism, they say, represents the possibility of a new industrial system – new in that it is based on a very different mind-set and set of values than conventional capitalism (p.9).

At first sight, it is hard to see how they can make this claim, given what they list (pp.9-10) as the fundamental assumptions of natural capitalism: these are all exceedingly conventional socio-economic and political views. Perhaps indeed it is these motherhood statements which have misled some critics into thinking that natural capitalism is no more than conventional capitalism plus enlightened stewardship with a dash of clever engineering. Ted Trainer, for example, simply assumes that Hawken, Lovins and Lovins are advocating energy efficiency measures against a background acceptance of the prevailing socio-economic order. Hawken, Lovins and Lovins then become an easy target for him: they are simply free-marketeers who (1) obscure the

connection between the market, poverty and ecological destruction, (2) proclaim that intelligently designed policy measures of a free-market, non-regulatory kind can reconcile ‘consumerism’ with sustainability, and in particular (3) fail to see that an economy which is only stable if it grows can never be sustainable.³

But Trainer’s neat and consistent picture comes at the price of accuracy: *pace* Trainer, Hawken, Lovins and Lovins have never promoted hypercars as a solution to the environmental and social problems resulting from contemporary patterns of car use.⁴ Nor do they deny that in many areas we in the West must significantly reduce overall per capita consumption and change our lifestyle. So in this sense they do challenge “consumerism”. Certainly Hawken, Lovins and Lovins do not challenge it in the sense of calling for renunciation of the kinds of comfort and enjoyment made possible by modern technology. But then neither does Trainer. And certainly they do not challenge “consumerism” if by this one means a self-understanding (or ‘mind-set’) which falsely locates self-identity in possessions, thereby generating manic acquisition of consumer goods. But this is only because there is no such thing as “consumerism” in this sense: Hawken, Lovins and Lovins would rightly reject any talk of “false consciousness” as an incorrect, indeed incoherent picture of life in modern industrial society. In any case, even if there were such a thing as “consumerism” in this antiquated “New Left” sense, the only *ecological* (as opposed to social, political or ethical) reason for challenging it would have to be that it leads to ecologically unsustainable levels of production and consumption. And Hawken, Lovins and Lovins certainly do

maintain that our current levels of production and consumption are ecologically unsustainable.⁵ So even if there were such a thing as “consumerism” in this sense, then natural capitalism would be a challenge to it.⁶ At this point, Trainer’s charge has been reduced to the simple claim that Hawken, Lovins and Lovins fail to see that radical energy efficiencies and the like will not be sufficient to achieve sustainability. But this is not a *critique* of natural capitalism, that is, an *argument as to why* natural capitalism is insufficient, it is simply the *mere assertion* that it is. Moreover, it is an assertion rooted in misunderstanding: Hawken, Lovins and Lovins are not simply advocating radical energy efficiency as the sole answer to the environmental crisis.

Finally, although they recommend market rather than regulatory solutions wherever possible, it would be wrong to think that Hawken, Lovins and Lovins are free market ideologues; in fact, they advocate a very anti-neoclassical degree of intervention into market mechanisms in order to secure environmental, social and political objectives.⁷ Trainer is of course right to say that they do not regard the “growth” economy as an obstacle to sustainability (although it is worth noting that they do not explicitly deny that it is or could be an obstacle). Presumably, Trainer thinks that unless one challenges the very idea of “growth” as essential to an economy, even a highly efficient, natural capitalistic economy will eventually grow beyond the limits of sustainability. One can, however, only plausibly regard this claim as true if one tacitly understands it as the claim that even a natural capitalistic economy, *if left to itself*, must eventually grow beyond sustainability – a claim which is

arguably true, and indeed could be acknowledged as such by Hawken, Lovins and Lovins. And there is no reason to think either that a natural capitalistic economy has to be left to itself, or that Hawken, Lovins and Lovins recommend this. They would surely say that creation of such an economy slows resource use and depletion⁸ so greatly that we gain time to introduce the kinds of measures which keep the economy within sustainable limits, e.g., reduction of world poverty, population control, radically new, environmentally friendly technologies, etc. Trainer has given us no reason for thinking that they are wrong in this. So he has given us no real reason at all for thinking that natural capitalism *will* be unsustainable.

Trainer’s critique misses its mark primarily because he simply does not take seriously the claim made by Hawken, Lovins and Lovins that natural capitalism represents a new industrial system based on a new mind-set and set of values (p.9). A more accurate, hence more effective critique must proceed from, and attempt to elaborate, this claim even if the picture of natural capitalism which emerges thereby is not as coherent and clear-cut, hence as easy to dismiss, as Trainer would like it to be. In fact, only if one proceeds from this claim, and thus from a more accurate understanding of just what natural capitalism is supposed to be, can one reveal the truth implicit in Trainer’s charges that Hawken, Lovins and Lovins fail to challenge “consumerism” and the ideology of growth. To this task I now turn.

The New Industrial Order

Why Hawken, Lovins and Lovins regard natural capitalism as qualitatively different only truly emerges when they turn from their fundamental assumptions to what they regard as the “four central strategies of natural capitalism that are a means to enable countries, companies, and communities to operate by behaving as if all forms of capital were valued. These four strategies are: radical resource productivity; biomimicry; service and flow economy; and investing in natural capital.” (p.10) Particularly the second and third of these ostensible strategies manifest the mind-set which distinguishes natural capitalism as a genuine alternative to conventional capitalism, and no mere ecosmart version thereof. Indeed, at least these two strategies are arguably ill-conceived as mere means for realising the independently intelligible idea of natural resources and systems as a form of capital. For in a certain sense, they intimate what it means to treat natural resources and systems as capital,⁹ that is, as something whose preservation and enhancement is a *sine qua non* of socio-economic operation. We thus need to look more closely at these two strategies:

... BIOMIMICRY. Reducing the wasteful throughput of materials – indeed, eliminating the very idea of waste – can be accomplished by redesigning industrial systems on biological lines that change the nature of industrial processes and materials, enabling the constant reuse of materials in continuous closed cycles, and often the elimination of toxicity.

Industry is already moving away from being very wasteful and inefficient to reinventing itself to be more in accord with biological systems.

... SERVICE AND FLOW ECONOMY. This calls for a fundamental change in the relationship between producer and consumer, a shift from an economy of goods and purchases to one of *service and flow*. In essence, an economy that is based on the flow of economic services can better protect the ecosystem services upon which it depends. This will entail a new perception of value, a shift from the acquisition of goods as a measure of affluence to an economy where the continuous receipt of quality, utility, and performance promotes well-being. This concept offers incentives to put into practice the first two innovations of natural capitalism by restructuring the economy to focus on relationships that better meet customers’ changing value needs and to reward automatically both resource productivity and closed-loop cycles of materials use (pp.10-11)¹⁰

Note the frequent reference to ‘systems’ in both these characterisations. This reflects something to which Hawken, Lovins and Lovins are deeply committed: the general design strategy they call ‘whole-system design’,¹¹ ‘whole-system thinking’ (p.288 and p.322) or, at least at two places, ‘whole-system engineering’ (p.113 and p.287). In fact, strategies two and three appear to be intended as applications or results of what they describe as “a systems view of our society and its relationship to the environment.” (p.xiii) A ‘whole-systems perspective’ is thus the basic constituent of the mind-set which renders natural capitalism a new industrial order. Of course, if this is so, then, while an industrial order based on this mind-set might itself be something new, the mind-set underlying it

is not: the doctrine of natural capitalism is yet another variation on the familiar theme of systems theory.¹²

Biomimicry

Looked at one way, the idea of biomimicry is unproblematic, indeed commonplace: of course we should take advantage of, and maintain, the pest controls provided by the natural environment rather than resorting to typically toxic controls of our own. Of course we should investigate and, where possible, borrow the mechanisms of nature as far as possible since clearly they are what Hawken, Lovins and Lovins call life-temperature, low-pressure, solar-powered assembly techniques (p.15), hence low in impact.

But Hawken, Lovins and Lovins do not mean anything as banal as this. When they talk of reducing the destructive or wasteful throughput, they do not simply mean systematic recycling and reuse within individual industrial cycles and systems. The best way to see that they mean more than this lies in appreciating that individual natural systems, no more than individual industrial or human systems, are or can be what Hawken, Lovins and Lovins call closed loops. A parakeet sitting in a tree, eating only a small portion of the fruit, nuts and bark it is stripping off a tree while letting the rest fall to the ground is, conceptually speaking, no less, but of course also no more, wasteful than a person drinking beer on the beach, the while throwing his empty cans into the scrub. Biomimicry thus cannot mean just copying *individual* cycles of production and consumption *within* nature, for (assuming one can sensibly attach a measure to them) these need be no more or less wasteful than human processes. Clearly, the biological processes

and systems which Hawken, Lovins and Lovins think we must imitate in our industrial processes must be larger. We must emulate not just the system comprising the parrot and its food trees, but the 'whole system' comprising the parrot, the food trees and the earth worms that turn the parrot's waste back into nutrients for the trees, etc. It is obvious that no principled limit can be drawn here: we must permit the system which we are supposed to mimic to expand until its inputs and outputs are those which enable and sustain the existing equilibrium. In effect, we are being asked to emulate not just individual cycles and systems, but the whole lot – nature itself, or at least a sufficiently large portion thereof.¹³

If this is right, then Hawken, Lovins and Lovins really are recommending something quite radical, something much more ambitious than rigorous recycling of the average Westerner's fairly enormous waste. Of course, appreciating what biomimesis is not does not tell us what it positively is. Thus far, we have no idea whether it is a coherent notion, even as a mere regulative ideal towards which we can only asymptotically approach. Nor do we have any idea how to set about it, that is, what concrete procedures there might be for approximating to it, and in particular, for measuring distance from this perhaps merely regulative ideal. Crucially, we also have no idea how key concepts are being taken when the notion of biomimesis is itself taken seriously, i.e., radically. What, for example, is meant by 'nature',¹⁴ the *totality* of interacting natural systems? Do Hawken, Lovins and Lovins see it as *itself* a system, the system of all systems? Do they see it as any

kind of *individual entity* at all, on analogy to the set of all sets? Or does nature connote something adjectival, a certain feature or property of always only partial systems, namely, their essential relatedness to entities beyond themselves, i.e., which do not belong to them? These questions concerning the coherence and ontological presuppositions of biomimesis and ‘whole-system thinking’ must be deferred for the moment. We will find ourselves led back to them when, having determined what is wrong and confused about the doctrine of natural capitalism, we ask what is right about it.

Service and Flow

The third strategy which Hawken, Lovins and Lovins recommend for achieving natural capitalism is that of creating a service and flow economy in the place of our current goods oriented one. Like the previous strategy of biomimicry, this third strategy is in one way uncontroversial: of course it makes sense to centre the economy around the exchange *of the services desired from manufactured goods* rather than around the exchange of these goods themselves. People want photocopies, not photocopiers; much better, therefore, to sell copier services rather than copiers, i.e., to lease rather than sell photocopiers to the customer – a system first introduced by Agfa, but now universally in place. The environmental gain in this lies in the fact that possession of, hence responsibility for, a product remains with its manufacturer; in consequence, rather than passing from producer to consumer to landfill, “... products would be returned to the manufacturer for continuous repair, reuse, and remanufacturing” (p.17)

But the deeper, more radical meaning Hawken, Lovins and Lovins attach to this strategy becomes more apparent when they imply that this third strategy is a way of structuring the rewards and penalties driving the economic and industrial system so as to encourage people to embrace the first and second of their four strategies, namely, radical resource productivity – “getting (much) more from the same” – and in particular, biomimicry. It seems that as Hawken, Lovins and Lovins understand it, to recast the economy and industrial system as the provision of services rather than goods just is to recast it in the image of nature. It is, they say, is to refashion the human and industrial economic world “... as a series of of metabolisms in which the creations of human beings, like the creations of nature, become “food” for interdependent systems, returning to either an industrial or a biological cycle after their useful life is completed.” (p.17)¹⁵

So apparently this third strategy both fleshes out what is meant by the second strategy of biomimicry and gives some indication how to operationalise and implement the same. This just confirms the point made in discussing biomimesis itself: human *mimesis* of the natural is intended to take place at the very highest level, i.e., between the economic and industrial system and nature *as such*; we are not talking here about a relation of mimesis, an isomorphism or analogy, between *individual* industrial systems and *individual* natural systems. Once again we see that natural capitalism is no mere plea for more intensive recycling and energy efficiency; if the idea of biomimesis is at all coherent, then it is indeed a qualitatively new way of structuring human economic and

industrial activity. For Hawken, Lovins and Lovins are calling upon us to restructure human economic and industrial activity in *its* totality in structural analogy to nature in *its* totality.

Towards a Rational Reconstruction of Natural Capitalism

Hawken, Lovins and Lovins are thus not simply calling upon conventional capitalism to smarten up its act and implement a radical programme of energy efficiency measures. Of course, to say this is not at all to clarify just what it is that Hawken, Lovins and Lovins are offering us, nor to indicate what, if anything, is really wrong with their notion of natural capitalism. We must, therefore, tease out and dissect the little we have already learnt about the key ideas of biomimesis, service and flow and in particular the basis of these ideas in systems theory. Perhaps indeed, when the final analyses and assessments are in, natural capitalism will turn out to have little more coherent content than the concrete recommendations it makes on improving energy efficiency, reducing waste and enhancing productivity in environmentally sensitive ways. In this case, it is *de facto*, although not *de jure*, what Trainer thinks it is, namely, an apology for the current status quo.

Perhaps an economic and industrial system designed to provide services rather than goods is in some sense more like nature than a goods-oriented one. It should be clear, however, that from the point of view of sustainability, any such analogy with nature and natural processes *is not the decisive issue*. It simply will not do to talk vaguely about either returning materials to a biological cycle or keeping them so completely in the industrial cycle that they can do

no harm to natural systems and processes. Humans do not damage natural systems and processes by “taking too much” or “returning too much” in the abstract, for there is no such thing as “taking” or “returning too much” in the abstract.¹⁶ What counts as “too much” to take from, or return to, nature without ecocollapse is relative to the often highly specific context and environment in which things are taken and returned.¹⁷ So if we are serious about closing loops, then the sheer complexity, hence unpredictability of natural equilibria demands that what we take, we return as far as possible to exactly to where we have taken it from, and what we return, we take as far as possible from where we will return it to. This simple point already makes clear that Hawken, Lovins and Lovins are far too sanguine in their systems-theoretic talk about closing loops. At the very least, we must acknowledge that closing loops is a hard thing to do in *any* way, much less a genuinely sustainable one.¹⁸ And it can only become all harder, indeed presumably exponentially so, the more desires and needs one seeks to satisfy, hence the more one must take and return.

But talk of closing loops is not merely far too complacent. As we have seen, by closing loops, Hawken, Lovins and Lovins do not simply mean mere recycling and reuse within individual industrial cycles; they mean a structural, even ontological feature of the whole social, economic and industrial complex as such. As far as possible, *nothing* is to exit *the totality of* our social, economic and industrial processes, and when it does, it is to return to some biological cycle, that is, return to some biological niche in the natural totality in which these processes are embedded. Biomimesis is thus the idea of

closing loops in the very strong sense of creating *within* the Earth's natural environment a system *of the same kind* as this environment – *of the same kind* in that it stands to the natural environment as this environment itself stands to solar system from which it receives its sustaining energy.

At this point, techno-optimism becomes techno-hybris. The idea of closing loops in the only sense which would count as genuine biomimesis, namely, a precise taking and returning *across the totality* of our economic and industrial activity, is not merely *difficult*, it is *impossible* to achieve (in that it contradicts the ontological nature of nature).¹⁹ For if closing loops in any truly radical and genuine sense were to be a real possibility for us, we would have to have some way of determining whether we are precisely taking and returning across the totality of our economic and industrial activity. It is clear, however, that across the complex totality of densely, if not necessarily tightly coupled natural systems there can be no such measure.²⁰

In the face of these two considerations – first, the sheer difficulty of closing loops in the requisite sense, then secondly and more decisively, the impossibility of a genuine measure of whether we are really closing loops in the required way – prudence dictates not so much biomimesis as bioinvisibility. Hawken, Lovins and Lovins themselves recommend that we adopt the practice of less technologically sophisticated peoples, who have always sought to derive multiple benefits from what they take from nature. Some such policy does indeed make good sense for us today. Crucially, however, it does so for an entirely different, indeed diametrically

opposite reason: whereas natural conditions forced less sophisticated peoples to satisfy a number of wants with what little they could take, these same conditions force us today to satisfy our wants with as little as we can take. Our science and technology have turned us into creatures whose collective power is itself a geological and evolutionary force. Consequently, because we have become bulls in the china shop, we today stand under an ecological imperative which our less technologically powerful predecessors could for the most part get away with ignoring.²¹ In virtue of what we have become, we today must explicitly seek always to tread lightly, i.e, to plan and act only in a such a way that overall we take and return less rather than more.

This point is perhaps obvious enough. Yet it is important for understanding what the inadequacies of the doctrine of natural capitalism are. For it shows that Hawken, Lovins and Lovins misconstrue, or even fail to see, the *order* of the questions we must ask when seeking sustainability. The first question to ask is not in fact one which Hawken, Lovins and Lovins primarily consider. Their primary question is how we can do the things we do in ways which do not (significantly) impact the natural systems and resources which sustain us. Yet this question is, as far as sustainability is concerned, conceptually secondary. Of course we must ask how to do the things we do in non-, or at least significantly less destructive ways, but insofar as addressing this question is understood as part of achieving sustainability, it presupposes our first explicitly facing the question of whether we need to do these things in the first place – a question imposed upon

us by nature and our position in it, i.e., by the ecological imperative that we tread lightly.

The conceptually prior question must therefore be “Is this what we really want?” since the very character of natural systems entails that treading lightly in the sense indicated is our *only* prudent means of ensuring that we are not impacting nature in ways she cannot handle. There simply is no way of rationally determining, for whatever quantity we care to take or return, some strategy of biomimesis or loop closing which renders this practice benign. So we must aim always to reduce what we take and return. And this in turn compels us ultimately to ask whether we really need to do the kinds of thing that require such taking from, or returning to, nature. In short, it ultimately compels us explicitly to ask how we might live in ways which do not involve us wanting these kinds of thing yet nonetheless count as “living well”, that is, as living in such a way that what one wants to do (‘desires’), what one ought to do (‘morals’), what deserves one’s respect and admiration, or elicits one’s care and concern (‘values’), each receive their optimal, hence legitimate due as this is determined by the particular circumstances.

But we need to gather some more resources before we can profitably ask just what it might mean to integrate such reflection into the very structures of their production and consumption. So let us defer consideration of this question for the moment. Let us simply note that perhaps here we find the kernel of truth in Trainer’s charge that Hawken, Lovins and Lovins fail to challenge “consumerism”: while doing more with the same (or even with less)

is a very sensible and necessary thing to do, it is, conceptually speaking, not the primary issue as far as achieving sustainability is concerned. Trainer inchoately sees that - for the kinds of prudential reason outlined - the primary question must be whether we need to do the things we in fact do, in other words, whether our actual patterns of wanting, desiring and acting constitute “living well”. And he also inchoately sees that this is a perspective either not present, or present only on the sidelines, in Hawken, Lovins and Lovins. He sees that the strategies they recommend, the constraints they would impose, *do not themselves express the will to sustainability, but at best presuppose it.*²² For this will resides primarily in a process of self-examination driven by a concern always only to tread lightly, to take and return as little as possible, as an overriding principle of one’s practice. Raising resource productivity, increasing efficiencies, cutting waste and in general doing more with the same or less are not themselves the will to sustainability,²³ but merely ways of implementing this will as painlessly as possible.

Bring on the Engineers?

But why is that reflection on ends to which the imperative to tread lightly constrains us so absent, or at least so sidelined, in Hawken, Lovins and Lovins? We need to remember that their background is basically engineering and economics, disciplines which, *as traditionally conceived and practised*, see no role for questions concerning ends *as an integral theoretical issue*. Like most engineers, economists and technocrats, Hawken, Lovins and Lovins assume that, in one’s capacity as an engineer or economist, the

ends to be served are given and not themselves part of the problem. The task is always only to find appropriate means and compromises, given that people want what they want.

This is of course the traditional methodological stance of ‘value-freedom’: it is not part of any design process that the ends which initiate this process be assessed according to intrinsic merit – although of course they must be assessed according to their practical realisability and the costs of their realisation. In order to do justice to Hawken, Lovins and Lovins, however, it is important *not* to confuse this classic neo-Kantian conception of ‘value-freedom’ with another view associated with Weber,²⁴ namely, that all genuinely axiological questions of ‘value’ can only be answered decisionistically. For in fact Hawken, Lovins and Lovins do not endorse any such decisionism. On the contrary, they appear explicitly to acknowledge that in addition to strictly normative considerations of toleration and respect there *are* further prescriptive notions of “living well” which pick out certain patterns of wanting and desiring as more ‘satisfactory’, more appropriate to being human, than others. Thus, they claim that people, at least when not distracted by

... the shrill divisiveness of media and politics, are remarkably consistent in what kind of future they envision for their children and grandchildren. The potential outcome of natural capitalism and sustainability ... aligns almost perfectly with what American voters are saying: They want better schools, a better environment, safer communities, family-wage jobs, more economic security, stronger family

support, lower taxes, more effective governments, and more local control. In this, we are like all people and they are like us (p.321).

So human life is indeed structured by various intersubjectively shared and intersubjectively valid notions of good and these form an unproblematic and adequate basis for determining what counts as “living well”.

In one way this is right enough; that better schools, environments, safer communities, well-paid, secure employment, etc. are goods is obvious. At the same time, this whole passage itself insinuates an extraordinarily complacent attitude to the issue of what it is to “live well”. For its implicit message is that there is no great theory about this, hence no particular need for us to reflect *in any explicitly theoretical, indeed philosophical way* on contemporary notions of the good and whether they are adequate, given the current environmental crisis. The truth about “living well” is unproblematically out there, embedded in the hearts and minds, the cultures and traditions, in the *collective commonsense* of all right minded, ideologically unblinkered individuals.

This naively commonsense view both explains, and is presupposed by, the assumption *de facto* made by Hawken, Lovins and Lovins that environmental problems are standard engineering ones for which the classical stance of methodological ‘value-freedom’ is appropriate. On this naive view, what it is to “live well” is an empirically ascertainable datum, so the design process quite correctly treats it as such: engineers and designers quite correctly take existing conceptions of “living well” for granted, i.e., as true,

and simply set about finding better ways of realising them. Consequently, with regard to environmental issues, whatever intersubjectively shared visions of “living well” characterise late modern societies are not an essential problem or issue for these societies. That is, on this naive view, the search for solutions to environmental problems need not incorporate as a structural feature explicit thematisation of current conceptions of what it is to “live well” in the light of whether they are compatible with the ecological imperative of treading lightly and, if so, what alternatives to them there might be. With this, environmental problems, for all their enormity, become just so many engineering problems more.

This point, however, must not be overdrawn, that is, seen as the whole story. It would be far too simplistic to portray Hawken, Lovins and Lovins as *nothing more than* just another bunch of economists-cum-engineers who think that the environmental crisis merely requires good engineering and correct market signals for its resolution. Here as elsewhere, there is another, more radical side to them, a side which ameliorates their tendency to cast environmental issues in engineering terms even as it makes their position considerably more diffuse and contourless. This is precisely their general philosophical commitment to a ‘systems view’, to ‘whole-system thinking’. As they see it, ‘whole-systems thinking’ is precisely a *non-traditional, novel* conception of design *even within engineering and economics themselves* (pp.67-68). It is, they think, a new approach necessitated by the very nature of the environmental crisis, one which they explicitly construe as an alternative to what

engineers have traditionally done, or at least been traditionally trained to do (p.112ff., esp. p.115f). There is in fact something right in these kinds of claim. Their talk of ‘whole-systems thinking’ gestures towards, even as it obscures, something which makes the doctrine of natural capitalism much more interesting than critics such as Trainer assume.

What the Pelican tells us

According to Hawken, Lovins and Lovins, architects, engineers and designers are traditionally taught that “design is the art of compromise,” that is, a search for the least unsatisfactory trade-off between many competing goals. And they relate how J. Baldwin, once a technology editor of *Whole Earth Review*, came to see that this was wrong, indeed “a political technique masquerading as a design process”: while gazing out the classroom window at design school, Baldwin

... saw a pelican catching a fish. For the past 3.8 billion years or so, nature has been running a successful design laboratory in which everything is continually improved and rigorously retested. The result, life, is what works. Whatever doesn’t work gets recalled by the Manufacturer. Every naturalist knows from observation that nature does not compromise; nature optimizes. A pelican, nearing perfection (for now) after some 90 million years of development, is not a compromise between a seagull and a crow. It is the best possible pelican.

A pelican, however, is not optimized within a vacuum. It exists in a ecosystem, and each part of that ecosystem, in

turn, is optimised in coevolution with the pelican. A change in the pelican or in any aspect of its ecosystem could have widespread ramifications throughout the system, because all its elements are coevolving to work optimally together. For the same reason, an engineer can't design an optimal fan except as an integral part of its surrounding cooling system, nor an optimal cooling system without integration into the building around it, nor an optimal building without integration into its site, neighborhood, climate, and culture. The greater the degree to which the components of a system are optimized together, the more the trade-offs and compromises that seem inevitable at the individual component level becomes [sic.] unnecessary. And this in turn exposes a core economic assumption as a myth (pp.112-113).

There is a genuine insight lurking in this otherwise rather silly²⁵ parable of the pelican. In order to draw this insight out, let us examine the ostensibly novel concept of design which Hawken, Lovins and Lovins use this story to illustrate. Such examination reveals not merely that this concept is nothing new at all, but more importantly for our purposes, *why, in what respect* Hawken, Lovins and Lovins fail to come up with anything new. This intimates in turn what the pelican tells us, so let us now see what this is.

Hawken, Lovins and Lovins draw from this story the conclusion that one cannot "... design an optimal fan except as an integral part of its surrounding cooling system, nor an optimal cooling system without integration into the building around it, nor an optimal building without integration into its site, neighborhood, climate,

and culture." (p.113) Since when, however, did engineers *not* design fans without regard to the *kind* or *type* of cooling system in which the fans were to be located? Since when did they not design cooling systems without considering the *kind* or *type* of building into which this system was to be installed? And since when have they failed to integrate into their plans such facts as that the intended site is prone to waterlogging, a mere 100 metres by 100 metres, next door to an explosives factory, and so on? Surely no one has *ever* been crazy enough to design things in isolation from their intended wholes in *this* sense.²⁶

Things only become more puzzling when Hawken, Lovins and Lovins go on to give some concrete examples of their allegedly new whole-systems approach to design. They tell how the Dutch engineer Jan Schilham, when designing a pumping system for a factory, specified that pipes fatter than usual be used so as to reduce pipe friction and that these pipes be laid out in straight lines *before* the equipment they were to connect was put in place. By doing this, Schilham produced a system with multiple benefits: 92% less energy used, smaller hence cheaper capital equipment, simpler and faster construction, less floor space used, greater reliability, easier maintenance and better performance. But, say Hawken, Lovins and Lovins, that such multiple benefits could be achieved was something only evident, given a whole-system approach. "The old idea," they say, "was to "optimize" only part of the system – the pipes – against only one parameter – pumping energy." (p.117) And then the advantages of using fatter pipes were not evident because the energy saved did not outweigh cost of the

fatter pipes. But Schilham "... optimized the *whole* system for *multiple* benefits – pumping energy expended plus capital cost saved."²⁷ (p.117) And when just these two parameters were taken as a whole, using fatter pipes revealed itself to be a dramatically superior option. Had even more parameters been included in this whole, e.g., the indirect benefit of easier maintenance, using fatter pipes would have shown itself to be even more dramatically superior.

Now what Schilham did was obviously a very good idea. It does not, however, deserve to be seen as manifesting and/or requiring a whole new way of thinking about engineering design. The difference between old and new turns out to be merely one of degree or quantity, so we do not have here a contrast between *qualitatively* different methods of evaluating design options.²⁸ In both cases, old and new, evaluating the option of using fatter pipes consisted in summing costs and benefits across a set of parameters. The only difference was that in the allegedly traditional case, this set of parameters was comparatively restricted, consisting merely of the greater cost of fatter pipes and the pumping energy saved by using fatter pipes. Schilham just applied this same evaluative approach more thoroughly, that is to say, to a wider and more judiciously selected range of parameters. As such, he was using a technique of optimisation which, however *inadequately* it might be applied in traditional design practice, is nonetheless *standardly* applied.

It is crucial to recognise, however, that Hawken, Lovins and Lovins are not *just* confused. It is not *just* that where they *think*

they are proposing some qualitatively different mind-set, they are in fact merely insisting that engineers and designers apply more consistently and rationally principles of good design which have always been acknowledged.²⁹ Above we pointed out the blindingly obvious: engineers and designers have *never* designed single components in isolation or abstraction from the *type or kind of* environment in which they are to function,³⁰ for this would be utterly crazy. It is just plain false to insinuate that engineers and designers have *ever* as a rule designed "a window without the building, a light without the room, or a motor without the machine it drives ..." (p.117) *if* we understand the terms 'the building', 'the room' and 'the machine' to be referring to entities simply in their capacity as instances of a certain *type or kind* of building, room or machine. But neither engineers nor designers, classical AI researchers nor enthusiasts for autonomous agents and artificial life, have *ever* designed something which fits into *its own* environment, *this one here*, in the manner in which each pelican fits, each in its own case, into *its* environment.

This suggests a hypothesis as to what Baldwin admired in the pelican. What provoked his admiration, what, however, he misdescribed in 'whole-systems' terms, is its fitting in *to its particular context of its action, this very one*. And this fitting in *to its particular* context of action manifests a capacity to cope with things which its designer never anticipated in advance, which indeed – since the pelican does not really have a designer at all – are not anticipated even in its *design itself*. Engineers have always designed individual components with the *general type or kind of*

wholes in which these components are to function; how could they not have? But the *general type or kind* of a whole, the kind of thing one captures in a systems characterisation, whether flow-chart, computer programme or set of non-linear dynamical equations, is obviously not to be confused with any of its possibly infinitely many instantiations. And no matter how comprehensive one's systems characterisation is, what instantiates it can be located in an environment which contains facts causally relevant for the operation of the system which are not represented, even implicitly or in general terms, in this characterisation.

To repeat, that character of fitting-in which Baldwin simultaneously celebrated and misdescribed is precisely the pelican's capacity to deal with a certain range of facts inherent in any environment which are not anticipated in its 'design'. It is indeed this ability to deal with a certain range of anomaly which makes the pelican's environment *its* environment. Only insofar as the pelican has this capacity is it genuinely *in* an environment, that it genuinely has an environment as *its*, as an *Umwelt*, with all the essential connotations of 'aroundness'³¹ which this German word suggests. In this case, it is quite wrong to describe the pelican as a 'system' at all, at least if by this one means that a pelican is something that satisfies some single systems characterisation specifying in advance exactly how any individual pelican will behave in response to certain external contingencies which are relevant for its existence as a pelican. This is of course not to deny that one can describe the typical life-cycle and behaviours of pelicans; it is merely to insist that this description is not a *systems*

characterisation in any strict sense, that is, a functional description of how the pelican accomplishes pelican behaviour in analogy to the differential equation which describes the dynamics of a steam governor, or a computer programme which describes the behaviour of a computer running it in terms of the way various discrete internal states mediate between input and output.³² For in this sense the pelican is not a system (although it no doubt is a whole of such systems).

This point can be extended to the pelican's environment itself. This, too, is not a system in the sense of something which satisfies some one general characterisation which fixes all behaviour. The environment, while it is always subject to numerous, indeed infinitely many *disparate* systems descriptions (in some more or less strong, hence more or less explanatory sense of the word 'system'), is never merely the referent of some *single, totalising* description which articulates its 'design' in the sense of what fixes its behaviour. Nature in the sense of the 'environment',³³ the necessary background to the foreground constituted by any intelligently behaving thing, is like the domain of natural numbers: there is always some fact about, or occurring within, it which any single general characterisation of it cannot capture.³⁴ And thus there is no *complete* systematisation of it. Although a whole of natural systems, it is never itself a system.

The Insight implicit in 'Whole-Systems Thinking'

Hawken, Lovins and Lovins only talk of 'whole-systems thinking' because they see it as something which will help us to understand what sustainability is and what is required to achieve it. So we

ought be able to demonstrate that the truth which they see but misdescribe in the pelican contains something of importance for these questions. This seems to me to be the case. For the requirement to tread lightly which our technological prowess imposes upon us arises out of a recognition of the essential finitude of our ability to know and deal with the consequences of our actions – consequences which, because of the power of our action, can be far-reaching. This finitude is not at all *contingent*. We cannot escape it, say, by extending and accelerating our capacity to compute the possible consequences of our actions; any such improvement and acceleration can only push the boundaries which define our finitude outwards, it cannot eliminate them. Finitude is intrinsic to our being in the world:³⁵ in any situation there is always the real possibility of some fact or event which is causally relevant to the success or long-term sustainability of our undertakings and technologies yet not anticipated and accommodated in the plan or design underlying them.

Typically, of course, we take the existence of such unexpectedly relevant facts or events in their stride. When, for example, I am riding on my pushbike and a man steps *dangerously* out in front of me, that is, so close and so fast that a collision will occur unless I do something, I *see* this fact and take appropriate action. I certainly do not *infer* to this fact on the basis of what I see – as if the *objective* fact which causally interacts with me to produce my evasive behaviour were inherently something *objectified*, i.e., the (no doubt locally co-extensive) fact that a man is stepping out at such and such a distance in front of me, at such and such an angle and such

and such a speed. My seeing and responding to the danger involves no appeal to rules, equations or any other kind of general principle which, in conjunction with other items of information, entail that I ought to swerve now. I do not *need* such rules, for I do not need to infer. Rather, I just see how the man is stepping out, namely, dangerously close, and thus have all I need to know simply through perception. Indeed, if I did need such rules, if I did need to infer, then I would not be able to respond appropriately. For there could always be some feature of how this man is stepping out whose general possibility is not factored into my rules, e.g., the fact that the man will be hit by a truck coming from the opposite direction *before* he reaches me. If this were so, then I would see how the man is stepping out in front of the truck, namely, in such a fashion that he will be hit by it. That but for the presence of the truck he would hit me is something I would not even consider, much place on any list of possible consequences of his action in order then – because of the truck – to rule it out as not applicable in this particular case.

In short, we and the pelicans genuinely *mesh with our environment and world* because, within the limits of our psychology and biology, we are able to see what is relevant for ongoing activity *as it arises, without prior precedent*. And this means that we see it not as something objectified, but in its capacity as relevant to us now in such and such ways, given what we are doing, or, as Heidegger might put it, are on our way to (*wozu wir **unterwegs sind***). This distinctive ‘sightedness’ is precisely what underlies Aristotle’s notions of *techné* and *phronesis*, Machiavelli’s notion *virtù* and Kant’s notion of *Urteilskraft*. It is what distinguishes us

as *intelligent* beings, that is, beings able to avoid the kind of stupidity which classical AI knows as the frame problem.

Now until recently, the limits of our knowledge and technological skills meant that technology always presupposed the skilled user who could see what is relevant in the particular context as it arises in order to mediate and regulate the technology's interaction with this context. In short, it always required skilled *application*³⁶ – technique in the real sense of the word. But these days, technological systems are frequently so large, fast and/or complex that their operation exceeds the factual psychological abilities of human beings to manage it in such skilled, context-sensitive ways. In other words, technology frequently exceeds technique, indeed sometimes the latter is explicitly built out.³⁷ That it has been built out manifests itself in a unique kind of failure to which such systems are occasionally subject, a kind of failure which is recognisably akin to the kind of failure which exposes classical AI systems as not really intelligent after all. The loss of Iran Air Flight 655,³⁸ Three Mile Island and certain kinds of crash which have recently occurred in highly complex, 'fly-by-wire' jet aircraft are examples. Such failures teach us that we construct such systems, which fly in the face of the very ontological character of our world, at our peril.

Thus, the intrinsic finitude of our being in the world already places a certain *desideratum* on the design of technological and industrial systems: we should aim as far as possible to keep the technique in technology and not replace human managers by plant operators. In other words, we should prefer those technological and

industrial systems in whose design a place is retained for a genuinely critical, genuinely managing instance which is not itself part of the system, but rather stands between the system and its environment, monitoring and adapting its operation to this environment from outside, i.e., on the fly.³⁹ But the sheer size and power of our current technological and industrial systems transforms this *desideratum* into a genuine imperative. These days, the implementation of genuinely manageable technologies is not just desirable because the abnormal operation of unmanageable technologies - Three Mile Island and Tschernobyll are the classic examples - can be very dangerous. It is in fact *imperative* because, given the size and scope of current systems, we need to be able to manage their interactions with the context in which they operate. In short, being able to stand at the interface of our systems with their environment and manage their impacts is an essential part of keeping these impacts to a minimum. The *technological* imperative that we construct systems in whose operation intelligent human sightedness, and thus human management, is both necessary and possible shows itself to be a necessary part of adhering to the *ecological* imperative to tread lightly.

This, I suggest, is the kernel of truth in the claim made by Hawken, Lovins and Lovins that in order to achieve sustainability we need a new design mind-set. We should not, however, call this new mind-set what they call it, namely, 'whole-system thinking'. For this term manifests the fundamental confusion in their position: taken literally, it represents nothing qualitatively different from what engineers and designers have always done.

One has to drop all such engineering jargon as inappropriate to what they really intend, to what through the engineer's and economist's glass one can see but dimly. The appropriate jargon is, as I hope already to have intimated, that of the philosopher, indeed one with the resources of an unashamedly Western tradition at his disposal.

Reflection on "Living Well" as an Integral Part of Socio-Economic, Technological and Industrial Planning

Our reconstruction of natural capitalism must have an avoidably promissory character as long as we have not spelt out what concretely it might mean to integrate reflection on what it is to "live well" into the designing and structuring of our production and consumption. In the remainder of this paper, I will attempt a sketch of what this might come to. I will assume to be true the (by no means uncontroversial) empirical claim that current patterns of production and consumption, particularly in the advanced industrial countries, are undermining in an unprecedentedly rapid and extensive way numerous natural equilibria constitutive of the Earth's current ecosystem. If this claim is correct, then it is fundamentally these patterns of production and consumption which need to be addressed if we are to reduce to an acceptable degree destructive human impact on such natural equilibria. But what is it to address, and hopefully change, such patterns of production and consumption in directions which would reduce this impact?

Clearly, this is at least in part a matter of changing and transforming the wants which generate these patterns of production and consumption. But what might this come to? No

doubt the great majority of people who participate unthinkingly in current practices of production and consumption would assent to the ethical and axiological commonplaces to be found in Hawken, Lovins and Lovins. This shows what is right in the naive attitude Hawken, Lovins and Lovins display towards wants and values: if you just go out and survey people, then at some sufficiently abstract level you will find a remarkable degree of unanimity across people whose more concrete behaviours and political views significantly diverge. Yet precisely the fact of very great difference and dispute across people who assent under survey to more or less the same general judgements of preference or value suggests that it is not at all a trivially ascertainable empirical datum whether some specific kind of behaviour represents in the given context an appropriate balance between competing wants, norms and values. To this extent, the fact of such great difference and dispute suggests that there is something drastically wrong with the conception of wants, norms and values underlying the naivety of Hawken, Lovins and Lovins.

In order to derive a more subtle and phenomenologically accurate conception of how these things 'interact', let us consider an example: the use of water skis, power boats and related gadgetry on our harbours and rivers. I am going to assume that such behaviour needs to be fairly rigorously controlled and reduced in the future: it destroys river banks, changes water turbidity, causes pollution, noise, destroys natural beauty and tranquillity, etc. This assumption may not, perhaps, be true. But even if it should not be true, this does not affect the argument since the *actual* truth of this

claim is not relevant. What is relevant is merely the phenomenologically ascertainable character of the dispute between those who wish to pursue this kind of activity and those who wish to proscribe it significantly. It seems to me that in this and similar kinds of debate, e.g., access of horse-riders and recreational offroad vehicles to National Parks, almost all parties would, when asked, claim to subscribe to a remarkably similar range of 'preferences' and 'values'. Presumably no significant numbers of jet-skiers have ever said, at least not in any public context in which what is said is likely to be taken as an expression of considered views, that they neither care about the damage they cause to rivers, nor acknowledge prevention of such damage as a 'value', i.e., as good.⁴⁰

This comparative unanimity intimates that in this debate as in many others not different 'values' are at issue, but whether the behaviour in question, considered not as the particular behaviour of this or that jet-skier, but of jet-skiers in general, does or does not constitute a sufficiently context-sensitive reconciliation of the kinds of prudential, ethical and axiological consideration which one would collate in a survey of people's preferences, values and ethical opinions. In other words, the dispute is primarily about whether engaging in this behaviour as a general rule represents a genuine reflective equilibrium between diverse prudential, ethical and axiological considerations more or less acknowledged by all. And this in turn suggests a rather different ontological picture of 'wants', 'morals' and 'values' to that implicit in Hawken, Lovins and Lovins and indeed in all those sheets of butcher's paper adorning the pinboards at community consultations.

For 'wants', 'morals' and 'values' are not just so much small change jangling around in the pocket – as if the people who have them were just mechanisms for summing the individual strengths of items in a bundle of drives, morals and values so as to yield some overall aggregate behaviour which could then count as the wise or appropriate thing to do. Thinking of things in this or any other purely descriptive and even psychologistic way gets the mereology of 'wants', 'morals' and 'values' wrong. These do not stand to the person who has them as individual bricks to a brick wall, but are rather dependent aspects or moments of ourselves which induce and guide behaviour in a process of skilful application and adaptation to the given context – something akin to practical wisdom in Aristotle's sense (*phronesis*). They only exist and have their motivational 'strengths' within, or against the background of, a process of deriving for specific contexts satisfactory reflective equilibria between potentially competing prudential, ethical and axiological considerations. By such reflective equilibria, 'trade-offs' are not meant since this latter notion presupposes that psychologising picture of persons, wants, morals and values to which Hawken, Lovins and Lovins, for all their legitimate hostility to the idea that designs aim at a 'trade-off', are nonetheless committed. Nor is the idea of a 'win-win' situation meant, for the latter is not really conceptually different from that of a 'trade-off'. Both ideas rely on regarding the wisdom or appropriateness of behaviour as a certain kind of vector sum of diverse motivational forces. No such purely descriptive notion is intended. The idea of reflective equilibrium intended here is a strictly *prescriptive* or *evaluative* one: achieving equilibrium consists not in summing or

weighing up pre-given strengths, but in giving different interests and competing claims the 'strengths' they *ought* or *deserve to have in the context*.

Now the participants to such debates as that about jet-skis on our waterways, whatever the *actual* conative, deontic and axiological springs of their action may be, are appealing to, and operating at, this prescriptive or evaluative level of bringing about reflective equilibrium between prudential, ethical and axiological considerations.⁴¹ This provides a clue to what it could mean to incorporate explicit reflection on ends into the planning and designing of our patterns of production and consumption. For this example shows that the call for such incorporation is merely to bring out into the open and explicitly acknowledge something that is going on anyway. It is to call for structures and institutions which make explicit and facilitate a process that is already going on implicitly and comparatively locally between the avid jet-skier and the defender of waterways.

The call for structures and institutions which facilitate this process is no mere plea for the kind of community consultation which has already become something of a fashion in our bureaucracies, technocracies and industries. Many frequently decry the empty character of such consultations, at which individuals are typically offered a set of options all equally unsatisfactory in different ways: "The freeway can go through the school or the church or the local park. Which do you prefer?" Importantly, the limited and unsatisfactory character of such events is as much due to the inadequacy of their theoretical underpinnings as the

undoubtedly frequent opportunism and cynicism of their organisers. Insofar as standard notions of consultation rest in any sense at all on a coherent theoretical conception of the nature of practical 'deliberation', they are naively positivistic, mere exercises in listing and summing all the things people spontaneously and without much reflection say they want. (That's why they need all that butcher's paper.) For if it really is just a matter of listing, summing and subtracting what people say they do and do not want, then there really is no point but to present individuals with a limited range of options determined initially by what the bureaucracy knows to be (a) the kind of thing it can implement and (b) the kind of thing which, when all the sums are in, reflects majority opinion. It is quite wrong to attribute whatever spuriousness there is in a given exercise in community consultation *merely* to the presumed opportunism and cynicism of evil consultants and bureaucrats.

The idea of making institutionally explicit what is already implicitly and locally done by the jet-skier and the defender of waterways is in fact conceived in diametric opposition to such positivistic conceptions of practical deliberation, wants, morals and values, and thus to the kind of conception implicit in Hawken, Lovins and Lovins. If we today, in virtue of our technological power, are constrained explicitly to pursue low-impact styles of life, then the institutions in and through which we conduct our very socio-economic, industrial and technological planning must include a dimension in which we seek to weigh up and decide the kind of controversy that exists between the jet-skier and the protector of

waterways. It lies in the very nature of this requirement that such a process of deliberation be at one remove from the debating of *specific* legislative proposals, or the planning and deciding of *specific* projects. This is of course because the formulation and airing of a *specific* legislative, administrative or planning proposal *already constitutes* a decision on what course of action represents an appropriate balance between whatever prudential, moral and axiological considerations are at issue. It thus *presupposes* the logically prior effort to determine whether such and such behaviour, for example, jet-skiing constitutes an appropriate reflective equilibrium. So if, as is currently the case in our socio-economic, industrial and technological planning, this prior kind of reflection has not taken place at an institutional level, then the specific legislative, administrative or planning proposal in fact preempts such reflection and forces it to occur at an inappropriate level – the level of negotiating compensation for, and compromise with, those who are negatively affected.

Thus, the kind of reflection considered would take place precisely not, or at least not primarily, in the course of debate about the specific proposal made by the State Government of New South Wales, Australia, to ban jet-skis on Sydney Harbour. Rather, it would occur at the more general, ‘disinterested’ or ‘hypothetical’ level of whether jet-skiing and related activities, at least when engaged in generally, are compatible with whatever demands for the protection of waterways might legitimately be made. In effect, it would be a debate about what could in the current circumstances count as an *appropriate* form of tourism and recreation, the kind of

recreational practices a sufficiently reflective individual would acknowledge as striking a genuine balance between prudential, moral and axiological considerations, hence as constituting the kind of harmonious unity in which each of these different considerations has its legitimate place.

It would thus constitute a new dimension of activity for those engaged in public policy development, whether in government bureaucracies or the relevant industry bodies. They would be charged with the task of enabling people to forge a picture of an alternative way of conducting this activity, one which represents a more satisfactory balance between what participants want to do, what they ought to do, and what commands their respect and elicits their concern. This would require ongoing research, dissemination of information and indeed interaction with communities of a kind which is at one or more remove from the formulation and dissemination of specific legislative or planning proposals. In effect, it would be the institutionalised endeavour to provide people with the insights and information they need to envisage alternative notions not just of how to do what they already do, but of what they want to do. And it is precisely such alternatives which, through the eminently rational justice they do along all dimensions, the prudential, ethical and axiological, can over time change the ways people want.

This intimates that the articulation of such alternatives is thoroughly rational in its shaping (*bildend*) force. Of course, this rational force is not that of the valid argument, but of the valid illustration or example, which must no doubt be followed by

concrete experiments of such a kind that those affected can try them out without in the first instance having to repudiate the kinds of interest which need to change – dry runs, as it were, which make evident the possible superiority of an alternative way of doing things without requiring irrevocable commitment up front. No doubt this would require the coalface for such reflection on, and experimentation with, ways of living well to be fundamentally local. In any case it is already at the local level that the most heartening steps towards more sustainable futures are quietly being taken. So for this reason alone the first steps towards *this* kind of ‘community consultation’ might most effectively be taken at this level.

In conclusion, it is important to note that the rationale for this whole idea lies in the fact that in such a controversy as that concerning the appropriate use of our waterways, the process to be institutionalised and rendered explicit is already underway. The avid jet-skier *already* attempts to portray his behaviour in the prescriptive terms of a genuine equilibrium between competing claims and interests which must therefore be acknowledged. With this, the avid jet-skier, provided only that he is sincere in his portrayal, betrays that he is always already sensitive to the rational pull of alternatives more satisfactory overall. Therein he displays his fundamental educability, and thereby the power of what must at first be the merely hypothetical illustration and exploration of a viable soft tourism to modify his wants and behaviours in the long. In like fashion, and at an even more trivial level, a whole combination of factors from “Do the Right Thing!” campaigns through pictures of disgusting landfills to rises in

rubbish collection rates have made most people *want* to sort their recyclables, so much so that, all else being equal, they do not *want* to go back to a form of behaviour they now see as inappropriate.

Appendix: What is gained by the Rational Reconstruction of Natural Capitalism?

There is little point to any rational reconstruction unless it yields greater insight into the concrete problems with which what is reconstructed is concerned. In the case at hand, the rational reconstruction of natural capitalism, the central problem is that of sustainability. So it is a criterion of adequacy on our reconstruction that at its end we have a clearer idea of what is and is not involved in achieving it. We need to be able to see in it possibilities for deriving more specific theoretical conclusions and indeed specific maxims of concrete practical action of relevance to achieving sustainability, or at least, if these conclusions and maxims are already independently obvious and even commonplace, new possibilities of explaining and justifying them.

It seems to me that the rational reconstruction of Hawken, Lovins and Lovins just given is already sufficiently rich to permit at least a partial fulfilment of this condition of adequacy. At the theoretical level, it clarifies at least three important conceptual issues. Firstly, the demands to tread lightly and to keep the technique in technology, as well as the need to build explicit reflection on how we might otherwise live, are all strictly prudentially motivated. The philosophical issues and questions which the environmental crisis throws up are thus not primarily moral or axiological ones about whether rocks have rights, but 'ontological' questions about what we mean by nature and what it is for creatures as powerful as we have become to be 'in' nature. There is thus a way of motivating something akin to a deep

ecological perspective which does not depend on attributing to nature any particular moral or axiological status. This is not to deny that in some sense natural entities do have moral claims or a certain (non-economic) value. It is clear enough that at least the higher animals such as dogs and dolphins do have moral status, and that whole ecosystems, landscapes and the like have aesthetic value at the very least. But resolving these questions, the questions with which environmental philosophy has largely been concerned, by which indeed it is defined (as so-called environmental ethics), is *irrelevant* to philosophical reflection on sustainability, and only marginally relevant to the practical accomplishment of it.

This point needs to be understood properly. The claim is *not* that in environmental debates about, e.g., whether a dam should or should not be built at such and such a site, the impact of such a project upon other species, or indeed on future human generations (or whatever), is morally irrelevant. Once upon a time, the Tennessee River Valley Authority went ahead with a damming project which, as the Authority well knew, obliterated a very locally distributed species of water snail. I have intuitions and gut feelings (of an ethical rather than aesthetic character – the snail was presumably ugly) which tell me that for this reason, and always only *ceteris paribus*, this project should not have gone ahead. Even so, the issue of whether my intuitions are right or not, that is, the issue of whether or not I am right to think that species deserve protection for ethical reasons is not an essentially *philosophical* question. More precisely, it is not a question which one can only rationally resolve by doing philosophy or utilising distinctively

philosophical knowledge or expertise. Nor indeed is being a philosopher, or having philosophical expertise, sufficient for resolving it. (Note that this is not at all to say that philosophical knowledge and expertise cannot contribute to its resolution.) At least this kind of normatively ethical question seems to me to be neither necessarily nor sufficiently philosophical. And if this is so, then such questions are not essential to the philosophical discussion of what sustainability is and what general principles we need to acknowledge in order to achieve it. It must be and, I think, is possible to show that a philosophical account of sustainability and general arguments for sustainable practice can be made out which do not presuppose answers to these normatively ethical issues.

Of course the arguments for *concrete* sustainable practice – “Should we build a dam here?” “Should we build this kind of dam at all?” - presuppose the ethical principles and values people *should* have. The point is, however, that the philosophical discussion of sustainability – what sustainability is and what general principles we need to acknowledge in order to achieve it – must start with the set of ethical principles and values people do in fact have. (No doubt one could go on to argue that this set must always intersect with the set of the principles and values they should have.) For this discussion must start from the generally shared conception of what the problem of the environment is, a conception which presupposes those ethical principles and values which constitute the factual *ethos* in which we find ourselves. Already, without having to decide in philosophical debate whether animals or rocks have rights, there

is (a conception of) the environment as a problem. And this is certainly in part because as a matter of fact people at least to some degree already acknowledge, rightly in my opinion, that, e.g., we have some responsibility to future generations, that animals and possibly even species of animal have some right to exist, and so on. Thus, while in my dentist’s waiting room, I was reading a *National Geographic* in which some firm whose name I have forgotten was running a series of advertisements – I presume the idea was to imitate the notorious Benetton advertisements – in which numerous highly endangered species were depicted, from the Black Rhinoceros to the Red Panda. The captions to the pictures talked (quite rightly) about what a loss it would be for all of us and for our children were these species to disappear from the Earth. No doubt the firm in question was cynically exploiting the ethical or axiological beliefs of their target audience. But whatever their motives, they were *presupposing as a fact* that their intended audience had these ethical or evaluative beliefs. So here we see already that there is a conviction out there that *whole species* have some kind of claim on us.

Perhaps, therefore, in the course of discussion about what the environmental problem is and what general principles must be acknowledged if it is to be addressed, we might find that we need to widen the moral circle. Even so, the philosophical discussion of sustainability remains fundamentally a matter of clarifying the nature of this problem (as, e.g., philosophical and political rather than technological or scientific) and clarifying the nature of individual and collective practical deliberation, prudential, ethical

and axiological, rather than a matter of spelling out concretely what the relevant ethical principles and values are. It seems to me that while philosophers certainly have some role to play in this latter enterprise, e.g., clarifying claims and arguments, in making the relevant conceptual distinctions, and so on, the enterprise itself is essentially not the province of philosophy, or indeed of any other discipline or guild. It is rather a task for us all. There is of course implicit in this claim a certain view of ethical principles and values, namely, as precisely not the kind of things for which one could demand, for which indeed one should need, distinctively philosophical proof. What principles and values there *are* emerge in the course of our common human experience and (naturally at least partially philosophical) appropriation of this experience. At the same time, that this is how we must properly think of ethical principles and values – that this indeed is their *Being* - remains a distinctively philosophical task, one intrinsic to the contribution philosophy can make to the question of the environment and sustainability.

Secondly, the rational reconstruction of natural capitalism shows not merely the inadequacy of traditional conceptions of environmental philosophy, it also shows by its own example what useful role philosophical thinking might play in environmental issues. For it is no mere exercise in clear thinking or so-called critical reasoning. That is, it does not bring merely formal skills of argument analysis to bear on merely formal properties of the claims made by Hawken, Lovins and Lovins. Rather, it utilises *substantive* philosophical resources drawn from our own

philosophical tradition, most notably, but not solely, from the phenomenological tradition of Husserl and Heidegger. Furthermore, this rational reconstruction tacitly assumes that our own tradition, the tradition which is so often condemned as part of the problem, provides all the resources we *ultimately* need. The reason why it utilises these resources and makes this assumption is obvious enough: our task was and is a genuinely *philosophical*, indeed an *ontological* one. It was and is a matter of understanding what nature, the environment and our essential relation to nature are. However helpful at the beginning, the pronouncements of novelists, the insights of mystics and the wisdom of indigenous peoples are insufficient at the end. Such pre-philosophical claims at best gesture towards the ontological perspective upon which everything turns. And in moving beyond these gestures to take up this perspective, we are doing philosophy, and nothing but philosophy.

Thirdly, if it is uniquely philosophy which gets us beyond the gestures inherent in the literary, the mystical, the mythical, the feminine or the non-Western, then there is another respect in which we should correct Hawken, Lovins and Lovins. We must stop talking about mind-sets altogether. The causal process whereby we humans achieve sustainability will no doubt involve “adopting the right attitude” in some sense. That this is so is indeed implicit in the call to integrate explicit, institutionalised reflection on “living well” into our socio-economic, industrial and political planning. But adopting the right attitude is not a matter of seeing ducks where once one saw rabbits. It does not just come over us, as if it could be

induced by mystical experience, psychedelic drugs or, as Hubert L. Dreyfus once suggested (“Holism and Hermeneutics”, in *The Review of Metaphysics*, Vol. 34 (1980), pp.3-23), some countercultural happening à la Woodstock, where sheer weight of numbers brings about a truth-happening. (Dreyfus saw this kind of claim as telling us what Heidegger means by *Ereignis*!)

In general, we must stop talking in such ontic, indeed psychologistic and anthropologicistic terms altogether. The rational reconstruction of Hawken, Lovins and Lovins shows that what is at issue is not primarily the *prescription* of an arational attitudinal shift or Gestalt switch at the *ontic* level, but the *description* of what nature and the environment *is* at the *ontological* level. Such descriptions are of course ‘out there’; there is and must be a truth of the matter. As such, arriving at them must be a cognitive accomplishment, a move in theory, specifically in philosophical theory, hence something which, unlike any epiphanal Gestalt switch, can and must be rationally motivated. This is not to deny that such descriptions may be, perhaps indeed must be, something one can find *hinted at* in various empirically given cultural phenomena of whatever kind. In what specific cases and to what specific extent this is true will be a contingent matter to be investigated case by case. Even so, we cannot discover, much less justify, the genuinely theoretical perspective at issue here by recourse to such empirically given cultural phenomena alone. For clearly, if such phenomena have a philosophical content, and if they are to reveal this content, then they require distinctively philosophical interpretation and appropriation. So the theoretical,

indeed philosophical perspective from which this takes place must be already available to us.

But our rational reconstruction also fulfils the above-mentioned condition of adequacy at a practical level. The demands to tread lightly and to keep the technique in technology do entail, hence explain or justify, some commonplace, but also quite sensible and concrete, impact-minimising maxims of action:

- (a) We should strive wherever possible for networks which are both loosely and sparsely linked. For example, as Hawken, Lovins and Lovins themselves seem to recommend – see *Natural Capitalism*, p.16 - , we should aim for decentralised rather than centralised power grids, where power is as far as possible generated where it is consumed, and excess returned to the grid.
- (b) We should prefer lower- to higher-tech solutions since these are typically softer and more cost-effective. Thus, overall the humble sewer has saved more lives and in principle does less damage than the energy-intensive gadgetry of modern medicine.
- (c) We should prefer public over private solutions. This is most dramatically obvious in the case of transportation but can be extended to numerous other forms of consumption as well, e.g, the use of manufactured goods.
- (d) We should keep the things individuals need to know in order to deal effectively and responsibly with their own life-situations to a minimum. There should thus be no

ideology of choice for choice's sake, no product differentiation without real and clearly identifiable difference.

- (e) We should keep things local where possible since the more local things are, the greater the possibility of accommodating the need to make exceptions to rules, and the less likely making such exceptions will threaten overall adherence. (This constitutes the demand not merely to 'empower' the individual, but also, and more importantly, to create the conditions, the kind of framework of rules and regulations, under which the individual genuinely has the power to administer and apply rules in a context-sensitive, genuinely 'phronetic' way.)

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Endnotes

- ¹ See Hawken, Lovins and Lovins 2000. Unless otherwise stated, all references are to this book.
- ² Typically by assigning natural resources and systems some quantitative measure of economic value, hence in this sense treating them as a form of capital. Hawken, Lovins and Lovins clearly regard such assignment of economic value as possible and useful in at least significantly many cases - see p.319, where they recommend "... a financial system where all value is placed on the balance sheet, and nothing is marginalised or externalised because social or biological values don't "fit" into accepted account procedures." At the

same time, advocates of natural capitalism themselves see, hence do not have to be told by their critics, that the idea of regarding the natural resources and systems as natural capital does not necessarily entail or require the idea of placing a quantitative measure of economic value on these resources and systems. Thus, Tom Feiler, Head of Corporate Consulting at Lovins' Rocky Mountains Institute, points out that "... actually valuing the services is probably not the most important thing, because many of these ecosystem services have no known substitute at any value. What's most important is us behaving as if those ecosystem services had value and that's really what natural capitalism is about." (Feiler 2000) Given his comment that ecosystem system services have no known substitute, when Feiler speaks of our behaving as if ecosystem services had value, he presumably means that we treat them as invaluable, i.e., to be protected at all costs: their health and maintenance is to be factored into economic considerations as a *sine qua non*.

In any case, the argument over whether one can value environmental, natural and social goods in monetary terms is rather confused. Of course one can put a price on the availability of a natural park to visitors (just as one can put a value on the availability of great works of art in museums, etc.), namely, by working out the cost of running the park. And of course one can value the park as such, in that one works out what a business with such overheads and such earning potential would be worth (as one can a museum or gallery and its works of art). To this extent, those who think one can value environmental, natural and social goods and services are correct. It should be clear, however,

that the whole argument rests upon confusing economic value – how useful it is - with value in the aesthetic, moral and/or ethical sense. Of course, one can assign a quantitative measure of strictly economic value to natural and social goods. One should not, however, think that thereby one finding a measure of the aesthetic, human or moral value of these things. This is absurd and any society which thinks that it needs to do this is on the wrong track. We need a market and technological system in which no one feels the need to assign an exchange value to these things in order to protect them. Their protection and maintenance should have always already been decided in advance – as it is with works of art. The monetary valuing and exchange of works of art takes place all the time, yet no one thinks that this is any way of protecting them. Rather, it presupposes that they are valued aesthetically and already protected for this reason. Presumably, Hawken, Lovins and Lovins', as well as Feiler's, comments about behaving as if natural systems and services had value is a call for them to have something of the same kind of untouchability and 'undisposability' which enables works of art to have a strictly economic value.

³ See Trainer 2000.

⁴ Thus, they explicitly acknowledge that "(o)ne problem that Hypercars cannot solve is that of too much driving by too many people in too many cars: Hypercars could worsen traffic and road congestion by making driving even cheaper and more attractive." (p.40) They then go on to claim that we need less car use and that in order to do this, we must promote public over private transport and try to make human activities as local as possible, e.g., "...

resuscitating the concept of the neighborhood grocery store ...” (p.45) and putting “... the places people live, work, shop, and play all within five minutes’walk of one another” (p.46)

⁵ Indeed, they frequently advocate the social rather than individual patterns of consumption which critics of “consumerism” in the “New Left” sense also recommend. For example, they speak of redesigned communities which “could make time-sharing of major capital items more attractive [than individual possession of them].” And they point out that such shared use of consumer goods as the washing machine would not merely save energy and water; it could also have the side-effect of regenerating communal life and “aspects of many of the best values and attitudes of the first half of the twentieth century”. For the shared laundry facilities could become a new kind of business, “... an experimental amalgam of a community center, indoor garden, child-care center, laundry facility, and Internet café.” (p.107) As they make clear here, there is much of the the so-called New Urbanism in this. Of course, overcoming alienation and eliminating false needs (New Leftism) or rediscovering neighbourliness and community spirit (New Urbanism) are not their primary motivation. This is always the radical energy efficiency which these communal solutions make possible.

⁶ Note that on p.xiv of their Preface, Hawken, Lovins and Lovins endorse the sentiments of Wendell Berry, who in the passage they quote, is clearly calling for more than just radical resource productivity and energy efficiency.

⁷ In this connection Trainer is just plain wrong to suggest that Hawken, Lovins and Lovins fail to appreciate the potentiality of the market to wreak environmental and social havoc. “For all their power and vitality, markets are only tools. They make a good servant but a bad master and a worse religion. They can be used to accomplish many important tasks, but they can’t do everything, and it’s a dangerous delusion to begin to believe that they can – especially when they threaten to replace ethics or politics. America may now be discovering this, and has begun its retreat from the recent flirtation with economic fundamentalism.” (p.261)

⁸ It is of course crucial to distinguish between economic growth and increases in resource consumption. These two are clearly linked but they are not the very same thing. This is why Hawken, Lovins and Lovins could rightly point out that frequently, if not always, economic growth proceed apace even as resource consumption falls. In fact, the switch to natural capitalism is meant to secure precisely this happy combination.

⁹ Which is why, incidentally, the issue of whether one can or cannot meaningfully assign quantitative measures to the natural provision of goods and services is largely irrelevant to a critique of natural capitalism.

¹⁰ See also pp.14-16 for more on biomimicry and pp.16-19 and pp.134-137 for more on service and flow.

¹¹ This is how Hawken, Lovins and Lovins list this notion in their index – see p.383. - , so it is presumably their favoured term. For a discussion of the

general notion the reader is referred to pp.113-124 – and for a discussion of the social species of such “whole-system design” to pp.287-288!

¹² Although they use traditional systems-theoretic jargon sparingly. They do allow themselves one passing reference to “(c)ybernetics – the science of communications and control in machines and living things - ...”, “feedback”, etc. – see p.284. Incidentally, it is not clear whether their inspiration for such ‘systems thinking’ is the more traditional one of engineering or that of ecology and biology. Presumably it is a bit of both: the very idea of ‘systems’ has been inspired by at least the same general idea (of the importance, indeed priority of the whole) as ‘organistic’ philosophical traditions from German Romanticism through Lebensphilosophie (of the biologicistic rather than historicistic kind, i.e., Nietzsche and Eucken rather than Dilthey) to organistic biology of the late 19th and early 20th centuries. It is one of the few merits of Kelly 1994 that it makes at least part of this intellectual heritage clear. Of course, the global penchant inherent in all ‘systems thinking’ prevents either Hawken, Lovins and Lovins or Kelly from asking whether ecologists and biologists, economicists and engineers ever really use, or can use, the term ‘system’ in the same way.

¹³ That Hawken, Lovins and Lovins do indeed mean nature as a whole (or at least a significant portion of it) is indicated by what they say about Michael Braungart’s proposal for “... an Intelligent Product System whereby those products that do not degrade back into natural nutrient cycles be designed so that they can be deconstructed and completely reincorporated into technical nutrient cycles of industry.” (pp.17-18) “Another way to conceive this method,”

they say, “is to imagine an industrial system that has no provision for landfills, outfalls, or smokestacks. If a company knew that nothing that came into its factory could be thrown away, and that everything it produced would eventually return, how would it design its components and products? The question is more than a theoretical construct, because the earth works under precisely these strictures.” (p.18)

¹⁴ Or at least nature-on-Earth since in one way the asteroids in the solar system are just as much parts of nature as the tadpoles in the creek.

¹⁵ On p.71 they say, “In nature, nothing edible accumulates; all materials flow in loops that turn waste into food, and the loops are kept short enough that the waste can actually reach the mouth. Technologists should aim to do the same.”

¹⁶ Note that it is a question of quantity rather than quality, that is, of how much rather than what is taken or dumped. More correctly, it is a question of rate. Given the general laws of nature and the character of natural equilibria on earth, I can presumably dump one or two atoms of plutonium (per year) without doing any harm. If, however, I dump one or two tonnes (per year, that is, one or two atoms per however many nanoseconds constitute a rate of one or two tonnes per year), then I am much more likely to disrupt existing equilibria, with unpredictable destabilising effects.

¹⁷ And this is of course more an issue of rate than of sheer volume – “too much” is a rate which cannot be accommodated without the existing natural equilibrium being undermined.

¹⁸ Note that just closing individual industrial and economic loops is not inherently more sustainable than leaving them open. For example, closing the loop in milk distribution by reusing milk bottles can, depending on a number of variables, be more wasteful than using one-way containers which go to landfill – if, e.g., the energy costs of cleaning are high. Nor is there any reason to think that the more loops one closes, the closer one comes to something sustainable. Closing loops is not in itself a means of approaching sustainability; it all depends on *how* loops are closed.

¹⁹ That such closing of loops is indeed impossible, that it contradicts the very nature of nature, is shown by the spread of the invasive sea-weed *caulerpa taxifolia* from the Mediterranean to Australia. Everything we do – in this case merchant shipping - has the potential for such unexpected negative consequences, consequences which can themselves ramify beyond all control and prediction. The more we do, the more likely such completely unforeseeable consequences become. The only way to minimise the possibility of such disastrous unintended consequences is precisely to tread lightly, in this case, to reduce and to control very strictly the movement of good and services by sea. This runs against the spirit of natural capitalism both because it suggests we should try to do less overall (rather than just close loops) and because the effort to do less would probably require the kind of regulatory, non-market approach which natural capitalism regards as typically a second-best option.

²⁰ This is one of the lessons to be learnt from the numerous attempts, starting with Aldo Leopold in 1934 (see Kelly 1994, p.58), to recreate wilderness. There

is simply no way to engineer this in advance. With regard to creating ecosystems, Kevin Kelly quotes the ecologist Stuart Pimm as saying that “... there is no way to tell in advance which way a particular combination of species will go. Like most complex systems, you have to set them up and run them to find out.” (Kelly 1994, p.63) If this is so, then the idea of closing loops and returning to natural cycles in such a way that one can genuinely claim to know and control what one is doing is thoroughly illusory. Curiously, Hawken, Lovins and Lovins themselves appeal (p.67) to Kelly. It seems they have not understood the true implications of Kelly’s claims. It is of course ridiculous to think that we could leave technological systems to evolve in analogy to the only way possible to recreate North American hardwood forest out of degraded Michigan farmland – see Kelly 1994, pp.96-97.

²¹ Although they did not of course always get away with ignoring this imperative. The classic case is Easter Island.

²² Talk of a will to sustainability must surely be retained. We have no choice but to be active. It will not do to let things be in the sense of being quiescent, or of merely listening.

²³ Analogously, blockading an enemy might be a sensible strategy to pursue, given the resolve to defeat him, but it is not the same thing as the resolve to defeat him since one can have the latter without attempting the former.

²⁴ And, for that matter, with Karl Popper. The idea of ‘value-freedom’ (Wertfreiheit) derives from the Southwest German neo-Kantian, Heinrich Rickert (1863-1936).

²⁵ Nature is obviously not a designer, not even an unconscious one, not the least because it does not seek optimal solutions, compromise solutions, nor indeed, strictly speaking, solutions at all. Rather, it tends to that equilibrium which is as close as possible to existing equilibria while giving items in these existing equilibria a slight edge. This is, of course, not to deny that, given sufficient time, say, 90 million years, something as novel and as well-adapted as a pelican might arise. It is merely to insist that this process is not merely long and gradual, but also one involving enormous numbers of redundancies and imperfections. For example, after almost 2 million years humans are not optimally adapted to walking upright although our capacity for bipedalism is near enough to the optimum to have given us an evolutionary advantage. In nature, near enough is good enough (for the time being).

²⁶ This is of course not to deny that architects and engineers have often overlooked the aesthetic and/or social 'fit' of the buildings and technological systems they have designed and constructed.

²⁷ Hawken, Lovins and Lovins add parenthetically that Schilham "... didn't bother to value explicitly the indirect benefits mentioned [simpler and faster construction, less floor space used, etc.], but he could have."

²⁸ It would be a gross *non sequitur* to conclude from failure to see how great the advantages are when the costs and benefits of laying out fatter pipes in straight lines are summed across a wider rather than narrower selection of parameters that the designer is captive to an antiquated atomistic mind-set and blind to a novel holistic one. All one can infer is that the designer is

psychologically unable or unwilling to calculate data sets beyond a certain point.

²⁹ Note that at one point Hawken, Lovins and Lovins themselves acknowledge that what they are advocating, namely, "... whole-system life-cycle costing, in which all benefits are properly taken into account over the long run, is widely accepted in principle but almost always ignored in practice." (p.117)

³⁰ No doubt they have occasionally, perhaps even often, optimised components badly in that they have not considered all the parameters available as meaningful criteria of evaluation, given the nature and situation of the whole system into which they are to be inserted. enough parameters. But this is only to say that they have designed badly relative to standard and perfectly legitimate methods, not that they have designed correctly according to bad methods.

³¹ Das Umhafte der Umwelt, as Heidegger calls it (Heidegger 1979, H 101f.).

³² Note that this point is far stronger than mere rejection of the claim that entities capable of genuinely intelligent behaviour accomplish such behaviour by deducing consequences from an 'implicit theory' or 'model' of their world.

³³ And perhaps nature in this sense is the transcendental-philosophically primary sense.

³⁴ Lest one think that I am committed to attributing to pelicans rather remarkable abilities that perhaps only we ourselves could have, I hasten to add that my interpretation of what Baldwin admired in the pelican does not presuppose that he rightly identified, however obscurely, well-fittingness in

this sense. In watching and admiring the pelican Baldwin could have been illegitimately reading into the pelican an ability which arguably only creatures such as ourselves can possess. There are precedents for this: one can read such an ability into the behaviour of the Sphex wasp an extraordinary intelligence when one sees how, when it brings its prey back to its nest, it first puts its prey down to check to see if its nest is empty and then, having seemingly satisfied itself that the coast is clear, retrieves its prey and disappears into its nest. But this reading lasts only as long as nothing anomalous occurs, for example, one's moving the prey a little distance away while the wasp is busy checking the nest out. In this case, as I recall from Daniel Hofstadter, the wasp will retrieve the prey, put it down more or less where it originally deposited it and check the nest out again. And if one once again removes the prey, then this same behaviour will repeat itself. Clearly, one can trap the wasp in an unending, or rather lethal loop simply by continually relocating the prey. Such 'sphexishness' is a classic manifestation of being merely a system, hence of not really fitting into one's environment, or indeed of genuinely having an environment (as one's own). Whether the pelican's behaviour merely apparently or genuinely manifests the character of genuinely fitting in, of transcending all general systems descriptions, is of course an empirical matter.

³⁵ Indeed, it is arguably an intrinsic character of any world, understood as that in which intelligent, self-evaluating and monitoring activity takes place.

³⁶ Cf. Gadamer on Applikation in Gadamer 1975, S.290ff.

³⁷ The explicit building out of the need for technique, for skilled, sighted application, occurred first in military and related systems, e.g., modern guided missile destroyers such as the U.S.S. Vincennes – see in this connection note 38. But it is occurring in all complex technological systems, from nuclear power plants to modern 'fly-by-wire' passenger jets. (In the latter case, this development seems to be driven more by economic than technological exigencies: airlines want to cut staff, in particular, flight engineers.)

³⁸ Iran Air Flight 655 was mistakenly shot down on July 3rd, 1988 by the U.S.S. Vincennes while the latter was on patrol in the Persian Gulf - see the excellent analysis of this incident in Rochlin 1991.

³⁹ Note that this does not mean that such systems must necessarily be technologically simple. The point here concerns the interface between a system and its context of operation. As such, it does not concern how the system runs internally, which may be very complex.

⁴⁰ Note that the issue here has little to do with sincerity, and everything to do with what jet-skiers think they can rationally say, i.e., what they consider they can say without excluding themselves from the debate as participants with concerns and interests worthy of consideration.

⁴¹ Once again we must note that this says nothing about individuals' sincerity – although no doubt one could launch a 'transcendental argument' to show that most people would have to be sincere most of the time.