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A Reasonable Frugality*

1. I begin with a citation from *Our Final Century* (William Heinemann, London 2003). Its author is Sir Martin Rees, the current President of the Royal Society.

> A race of scientifically advanced extra-terrestrials watching our solar system could confidently [have predicted] that Earth would face doom in another 6 billion years, when the sun in its death throes swells up into a 'red giant' and vaporizes everything remaining on our planet's surface. But could they have predicted this unprecedented spasm [visible already] less than half way through Earth's life – these million human-induced alterations occupying, overall, less than a millionth of our planet's elapsed lifetime and seemingly occurring with runaway speed? ….
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> It may not be absurd hyperbole – indeed, it may not be an overstatement – to assert that the most crucial location in space and time (apart from the big bang itself) could be here and now. I think that the odds are no better than 50-50 that our present civilization on Earth will survive to the end of the present century without a serious setback….
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> Our choices and actions could ensure the perpetual future of life… or, in contrast, through malign intent or through misadventure, misdirected technology could jeopardize life's potential, foreclosing its human and post-human future (pages 7-8).

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So, where the earth is concerned, what line of action will humanity pursue? At the end of his first chapter (page 24), Rees describes a position he calls realism, according to which the best prospect of our surviving beyond a century is for 'all nations [to] adopt low risk and sustainable policies based on present technology'. That is one kind of realism, he remarks, but another sort of realism says that policies such as these

> would require an infeasible brake on new discoveries and inventions. A more realistic forecast is that society's survival on Earth will, within this century, be exposed to new challenges so threatening that the radioactivity level in Nevada thousands of years from now will seem supremely irrelevant.[1] Indeed … we have been lucky to survive the last fifty years without catastrophe.

2. But what about policy? The first kind of realism, if it were to be translated into a way forward that was saner and safer than either of the two realisms that Rees describes, would have positively to cultivate new technologies, though not in the spirit of the second possibility that Rees describes, where technology comes loose (one might say) from essential needs. Aspiring only to encourage others to think further about such a median policy, I shall point out (towards the end) that there are all sorts of things that we have good reasons to alter in our present way of living, reasons independent of ecological or climatological considerations. In advance of all that, I shall suggest that, once the ecological threat to human civilization becomes more completely evident and the prospect comes into focus of a world population of nine

[1] The state of Nevada is the location for the nuclear waste dump for the USA.

billion, the two attitudes will have to coalesce in a perception of our environmental circumstances that is far less dismissive of Malthusian warnings than the cheerful rebuttals and wild past-to-future extrapolations you will find in the textbooks. More specifically, these attitudes or outlooks will have to come together in an all-embracing effort (of reflection, discovery, invention and funding) to free us from our dependence upon setting fire to carbon and releasing it into the atmosphere.

Such assertions are apt to provoke either a feeling of fatigue that long antedates recent events in Copenhagen or else outright disbelief -- or else the blind anger that comes upon us from feelings of utter helplessness. But, in this paper, having set out the scientific argument that I accept for the claim concerning carbon-dependence, I shall dissent from some of the received responses to it. In their place, I shall describe a position that accords better (I believe) with a new perception of our true circumstances and better (I believe) with that which human beings can become ready to will and to do. When they start to do those things, they will perceive further necessities. Or so it is to be hoped.

3. The burning of fossil fuels[2] increases the carbon dioxide-concentration in the atmosphere. Carbon dioxide absorbs the infrared radiation which is sent out from the earth, and this raises the temperature at which the earth is in thermal equilibrium with its surroundings. Like a quilt, CO_2 traps heat and prevents it from escaping the atmosphere. As a result land and sea rise gradually in temperature. On the level of theory, all this has been understood since well before the twentieth century (by the labours of Joseph Fourier, John Tyndall and Svante Arrhenius). On the level of

[2] Here I shall lean not upon Rees, whose preoccupations cover a much wider area, but upon chapters 1 and 31 of David J C MacKay's book *Sustainable Energy without the Hot Air* (UIT Cambridge Ltd, 2009).

observation and reconstruction (from tree rings, ice-cores, etc.), it is known now that since 1769, when James Watt patented the steam engine, carbon dioxide concentration in the atmosphere has increased from 280 parts per million to more than 380 parts per million. It is now increasing at more than 2 parts per million every year. Looking forward upon this rate of increase, it is predicted that, when the 1769 concentration of carbon dioxide[3] is doubled, that will have the same effect as increasing the intensity of the sun by at least 2 percent and raising global mean temperature by at least 3 degrees (MacKay, page 10). Among the likely consequences are a rise in sea levels which will be simply calamitous for many millions of coast dwellers; the misery of millions upon millions of refugees; serious and unpredictable (already incipiently evident) disruptions of the weather patterns on which farming and much else depends; and the shrinkage or disappearance of numerous glaciers that supply the rivers upon which some billions of human beings have largely to rely for fresh water….

These predictions arise from a larger picture that places the 26 gigatons of CO_2 per annum that our burning of fossil fuels adds to the atmosphere alongside the 440 gigatons the rest of the biosphere emits and the 330 gigatons the oceans add to it. These other emissions belong to a cycle that long pre-existed human emissions. Within that cycle, flows of carbon out of soil, vegetation or atmosphere more or less balanced flows into soil, vegetation or atmosphere, even as the atmosphere equilibrated with the surface waters of the oceans. Such were the conditions under which, long ago, human civilization came into being. The thing that is relatively new is the imbalance between the CO_2 being emitted into the atmosphere from fossil fuels

[3] And of other gases, CFCs, HFCs, methane, nitrous oxide etc., as measured in terms of the number of molecules of CO_2 it would require to produce the same greenhouse effect. Taking these into account the current figure is not 380 but 400.

For another way and importantly different way of looking at the link between CO_2 emissions and global temperature, see Myles R. Allen et al, pages 1163-6 in *Nature* 458 (30 April 2009).

etc. and the CO_2 that is taken up from this by the forests and oceans. (MacKay p. 242.) . It has been suggested that, as things are now, roughly half of the CO_2 emissions from our burning of fossil fuels are staying in the atmosphere. But even that figure gives a poor basis for extrapolation into a future where there will be less rainforest and the acidification of the oceans (already evident in a 40% decrease in plankton since 1950) is likely to have diminished the capacity of the oceans to take up CO_2 from the atmosphere.

Human life as we live it is slowly but surely disrupting the conditions that make that life possible. So much is more certain than any specific meteorological or geographical prediction can be. The things that are almost beyond dispute are, first, that CO_2 in the atmosphere is already at a concentration never exceeded at any time in the last 400,000 years; and second, that the full consequences for surface temperatures and weather systems which will ensue from this accumulated concentration and from the acidification of the oceans will take a hundred years or more to become fully evident.

4. If economic theory or 'ethical theory' as we now have it finds difficulty with the claim that any of this must matter to us – living as comfortably as we do here and now in the cheerful way that is natural us, without any particular care for those who live in the future – then so much the worse for these forms of 'theory'. Each of us knows that our concerns as human beings are not confined to ourselves or our own offspring. We are disturbed, for instance, if we perceive that something we are doing can seriously endanger other people. [4] It does not matter *who* these people are. Where we can see how to do so, we feel an obligation to desist or to put things right.

[4] Consider the act of leaving behind unmarked radioactive waste, unexploded ordnance or landmines.

But, in so far as that is so, we can scarcely think it permissible, at the beginning of the end of the age of plenty, for us to remain simply indifferent to the harms that we do to the Earth on which others will have to rely directly or indirectly for almost all their vital needs. If we will not recognize the wrong we do in this way to a common possession whose riches are finite and exhaustible, then we are not following through from things we are *already* involved in caring about. If we will not invest the Earth itself with a significance transcending our concern with the fate of particular people or see its resources as a matter of concern in which all mankind must share, then we shall be strangers to the only frame of mind that offers us any chance of evading Rees's gloomy predictions. (See section 18.)

This point has rather little or nothing to do with active or positive benevolence or altruism, where we have relatively few *duties* and everything is subject to Aristotle's dictum at *Nicomachean Ethics* 1168b8 that the knee is closer than the shin. By contrast, our obligation to the civilization of the future is essentially negative and prohibitive.[5] Nor is it well described as a concern about the 'net present value' of the income stream of future generations. The new and important thing that we learn from the scientific findings set out in section 3 is that the atmosphere's capacity to carry CO_2 (relatively) safely is comparable in its way to any other natural resource. It is at once precious and exhaustible.[6] Placed as we now are, we cannot at the moment do enough to conserve this resource. For we still have to discover ways to live more sustainably. This problem is at once technical *and* ethical. (See section 18.)

[5] See my 'Solidarity and the Root of the Ethical', *Tijdschrift voor Filosofie*, 71/2009, pages 239-269, developing what I say in *Ethics: Twelve Lectures on the Philosophy of Morality*, Penguin and Harvard, 2006. See pages 11, 15 and the Index sub 'prohibitive aversions'.

[6] Indeed we are well on the way to the point, the trillionth tonne perhaps of CO_2, where it will be exhausted and accumulated emissions will make the Earth uninhabitable for us. See again here Myles R. Allen, op. cit. at note 4.

You may ask how a morality that arises from human concerns and feelings can advance so far beyond the immediate reach of those concerns and feelings. I reply by agreeing entirely that it is indeed human concerns, feelings and prohibitive aversions that give us our first understanding of values and obligations and furnish us with something we can recognize as the standard of morals. (This is Hume's phrase.) But, once we come upon these things, our understanding of the way in which they support that standard (even as the standard itself sustains our sentiments)[7] engages us to think harder about the harm we are doing to others and to the earth upon which they will have to depend. Where injury and misappropriation are concerned – where our negative duties are concerned and benevolence as such is not the thing demanded of us -- Aristotle's dictum has no application. Where the earth is at issue, we have to act as if human civilization has an entirely open future[8] – even if the best we can do is to delay, as if indefinitely, its demise.

5. In the face of these findings and all the responsibilities that flow from them, what are human beings now thinking and doing?

At the 2009 Summit meeting in Copenhagen, there was general agreement that steps should be taken to limit any further increase in global temperature to below 2 degrees. This was widely taken to mean limiting emission of greenhouse gases to the CO_2 equivalent of 500 parts per million, which is the halfway point in the 450-550 range proposed in the 2007 *Stern Review on the Economics of Climate Change*.[9]

[7] I enlarge upon this point at *Ethics: Twelve Lectures*. See pages 46-50, 11-12.

[8] I note that in the case of Lord Rees the nature and degree of the concern that he feels for the way that human beings act in this or that connection is not visibly diminished by the pessimistic odds that he gives for humanity's surviving the century.

[9] In effect, the UK committee on climate change aims not to do better than to respect this limit. See Stephen Plowden, 'Trust the People on Climate Change', *Oxford Magazine*, no. 299, Trinity Term 2010, pages 4-5.

(Some countries wanted a ceiling far below 500 and Stern himself now favours a limit of 450 ppm.) Despite that consensus, however, it proved impossible to arrive at 'legally enforcible' international treaty to replace the Kyoto protocol which expires in 2012.

Such a treaty might have come into being if some sufficiency of First World countries had been prepared to offer Third World countries something along the lines of the 'contraction and convergence' proposals advocated by the Global Commons Institute.[10] This would have involved drawing up a 'contraction budget' for greenhouse gas emissions and assigning entitlements to each country on the basis of its population in a baseline year, agreeing at the same time two dates -- a date by which the entitlements of all countries would converge to being equal per capita (relative to the baseline year) and a further date by which there would be no further increase in the carbon concentration of the atmosphere. It would have been a question whether the United States negotiators were prepared to submit such a treaty to Congress (especially when it raised so many questions of verification and enforcement). It would have been a question whether Third World countries would persist in the objection that, even under this proposal, there is insufficient recognition of their substantial innocence of the noxious emissions that have brought the atmosphere to its present state. But in the end, the simple but fundamental thoughts that prompt such proposals were effectively obscured.

In Europe after Copenhagen one might have hoped that, with the question of convergence adjourned, the emphasis could and ought to have shifted to absolute contraction. But the focus is not upon absolute contraction. In Britain at least, it is

[10] See Aubrey Meyer, *Contraction and Convergence: The Global Solution to Climate Change*, Schumacher Briefing No. 5, Green Books, Dartington, Devon. See also Aubrey Meyer, 'The Case for Contraction and Convergence', pages 29-56, in *Surviving Climate Change*, ed. David Cromwell and Mark Levene (Pluto Press, London 2007).

upon the mechanics of 'cap and trade' (see section 7 below); it is upon the endlessly debatable subtleties of discounting (9 below); and, distracting attention and resources from urgent research or development, it is upon the so-called Renewables Obligation (10 below). Each deserves some commentary.

7. The first distraction from the urgency of absolute reduction – the reality of contraction, I mean, all sources included – is a fixation upon the merits, scope and detailed workings of a system of 'carbon trading' -- 'cap and trade' -- already in partial operation, which requires larger companies whose activities involve substantial emissions to buy 'carbon credits' to a value proportionate to those emissions. The claim is that, by making carbon credit 'tradeable', the scheme directs new resources to wherever carbon intensive activities can best be modified or replaced. Either the polluter is motivated to alter his activities and escape the liability to buy so many credits, or else another agent -- from another and richer country perhaps and who needs carbon credits in order to offset the pollution he is creating there -- can be paid in these credits in exchange for doing or financing work of modification or replacement in the poorer country that is carbon-equivalent to his pollution. The claim is that, given a cap upon emissions, the trading scheme identifies the most efficient way of containing emissions within that cap.[11] The words 'the most efficient way' mean the way of staying below the cap that costs least in respect of human 'income'.

[11] Analogous claims were plausible enough when made on behalf of the US Environmental Protection Agency's cap and trade scheme for controlling sulphur dioxide emissions. This was the endlessly fascinating Coasean paradigm for the EU carbon trading scheme. But, depending as it did on the surveyability of a relatively restricted field of operation and a uniform rule of law under a single sovereignty, it is a strikingly poor paradigm for a worldwide system on a huge and unsurveyable scale. Indeed, even within one territory, the surveyability problems relating to CO_2 and SO_2 emissions are of altogether different orders of magnitude.

Was this scheme worth the ten years of effort it took to develop and gain favour for it? In appraising its merits it matters whether one supposes that there is a global cap upon emissions or one supposes that it is for each country to determine its own cap.[12]

If each country fixes its own cap but is empowered to issue carbon permits which are valid everywhere, that can only prolong and diversify the kinds of jiggery-pokery, exploitation and abuse in which carbon trading and the 'Clean Development Mechanism' have already been so heavily implicated.[13]

If there is a global cap and efforts are made to see that it is globally enforced – a managerial fantasy perhaps, but pregnant with sinister possibilities, if one is to judge by the way in which the World Trade Organization has impinged upon Third World countries – then carbon permits will rise steadily in price to match the severity of the cap, but that will not prevent the richer nations from protecting some of their most wasteful and irresponsible uses of fossil fuels. Rather than modify their emissions substantially, they will see the opportunity to pay poorer nations to reduce *their* emissions. (For any abatement is equivalent to any other abatement given similar reductions of CO_2. That is the doctrine.) The efficiency that is claimed for carbon trading is blind to the difference between wasteful activities and (emission-equivalent) activities which are indispensable or nearly indispensable as things are at a given time t to human life at t.[14] To this extent it is blind to opportunities to close down

[12] Gareth Jenkins made me see the importance of distinguishing these cases and helped me to demarcate the two objections that follow.

[13] For recent reportage of some prevalent scams, see page 26 of *The Guardian*, Wednesday 27th October 2010. No doubt steps will be taken to counter this particular fraud. Another puncture, another patch. See further 'A realistic policy on international carbon offsets' by Michael W. Wara and David G. Victor, Working Paper 74, April 2008, http//pesd.stamford.edu.

[14] This distinction rests on a moral judgment, someone will say. Yes, I reply, but at some point every practical argument in this area has to rest on some sort of moral judgment. Why try to postpone it?

It is a thought too rarely entertained that the methodological requirement to minimize or postpone ethical considerations is not necessarily 'ethically neutral' or promotive of objectivity. Why try to be neutral for as long as possible between just and unjust or good and evil? As regards the

emissions which needlessly and wastefully damage the Earth (cp. section 4). It is not to be denied that carbon trading makes transfers from richer to poorer nations. But there are many other ways to do this.

Such doubts about cap and trade point in the direction of a further disquiet. The efficiency claimed for cap and trade amounts to its restrictions costing less in respect of human 'income'/overall marginal satisfaction than any other system for controlling emissions of CO_2. Even as it stands this contention is doubtful in so far as taxes, regulations and prohibitions may reach down to many more carbon emitting activities than does cap and trade. (See below, sections 17-18.) More fundamentally though, the unfavourable comparison presupposes that a system to tax and regulate has exactly the same aim as the carbon trading system. It need not. Tax and regulate may set itself a different aim. It may aim to produce the largest possible absolute decrease in emissions that is consistent with an ongoing sense of fairness, while enforcing at the same time the effort to divert every resource that may be spared from the vital and immediate needs of human life into the business of making green energy plentiful and affordable enough for it to displace carbon.[15] In this respect it differs both politically and practically from cap and trade. It is no part of the rationale of cap and trade that a rise in the price at which carbon trades here and now must amount to sufficient motivation here and now, where delay is indefensible, to speed long-term research and investment into carbon-sequestration at coal-fired power stations such as the economies of China and India apparently depend upon. (Compare MacKay page 222.) In Britain where 'the price of carbon' has been a talking point for at least 15

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objectivity at t of the standards at t of vital need presupposed by judgments of wastefulness, see my *Needs, Values, Truth* (amended Third Edition Oxford, 2002), Essay One.

[15] Let not the second of these two concerns become any kind of substitute for the first. If we concentrate sufficiently upon the first, we shall of course see the case for carbon rationing. See note 10.

years, such research has accounted for an almost negligible fraction of GDP. Is this an accident?

8. This is as good a place as any to point out how dangerous and lazy is the widespread acquiescence in a limit of 500 or, as some say, 500-550 parts per million. Those who do acquiesce too easily forget the terms in which Jim Hansen and other scientists have described the peril that attaches to settling for any concentration of greenhouse gas emissions beyond 400 parts per million (as measured in CO_2 equivalents). One of their several arguments is this: that where the permafrost melts, this releases methane, a gas whose greenhouse effect is 21 times more pernicious than that of CO_2. If this happens to any significant extent, and if such a tipping point is reached, it will be almost impossible to 'reconsider' (this is UN speak) the limit chiefly under discussion at Copenhagen or to conceive of the 'long term stabilization' (this is Stern speak) to a level of greenhouse gas concentration less than the limitation proposed in the *Stern Review*. It is not clear that those who are content to think in terms of 450 or 500 or 550 parts per million have any *scientific* answer to Hansen.[16] It would also appear that they are assuming recklessly that ocean and forest will continue absorb CO_2 from the atmosphere in the same quantities as they do now.

9. The pros and cons of the carbon trading mechanism are not the only distraction from post-Copenhagen realities. Another distraction derives from continuing controversy and confusion concerning not the means but the proximate end itself of present action. More particularly it concerns the whole question of discounting or not discounting the future.

[16] For one set of responses to Hansen, see Nicholas Stern, *A Blueprint for a Safer Planet* (Bodley Head, London 2009), pages 150-152 and page 39. For more on the said acquiescence, see Stephen Plowden, op. cit. and Myles R. Allen, cited at note 3 above.

So far as ordinary morality is concerned, it was claimed in section 4 and thereafter that we are now at a point in the diminution of natural resources -- including the capacity of atmosphere and ocean to absorb CO_2 (relatively) safely -- where the act of wasting these things becomes comparable to the act of stealing from a common store. Conjoining that finding with the commonsensical finding that we do not know how to live without to *some* considerable extent diminishing those resources, we arrive, not at a contradiction (neither logic nor ordinary morality nor the two together can turn this conjunction into a contradiction), but at a practical conclusion[17]: we must look always for any means consistent with ordinary happiness and ordinary justice to reduce our demands upon resources which are not renewable. In this matter we have to see what we can do, prefer the more sustainable way of living over the less, and profit from the example of countries which find ways better than ours to do these things.

Here (as in sections 4 and 7) it may be complained that such formulations are too vague to constitute any effective basis for action. But the formulations we have used are given in terms whose meanings are well rooted in the language. They give expression to ordinary ideas that have a clear hold upon us and a dialectical point. *In a given context* formulations such as these can combine with vague, defeasible but (so far as they go) accurate descriptions of actual states of affairs to yield definite and persuasive (however defeasible) conclusions in that context.

Prescinding from convergence under treaty, prescinding for the moment from all internationalist hopes, and concentrating for the moment on contraction, we might

[17] Compare Frank Ramsey 'Discounting is a practice which is ethically indefensible and arises merely from weakness of the imagination', page 261 in *Foundations: Essays in Philosophy, Logic, Mathematics and Economics* ed. D H Mellor, RKP 1978.

Some say that *ought* implies *can*. Do they mean that, if I live irresponsibly enough, I can release myself from my obligations to my debtors? A careful statement of the connection between *ought* and *can* will not affect the claim in the text.

say this: let each country do its own utmost to reduce absolutely what it sends into the atmosphere. By placing taxes upon carbon-emitting activities differentially (lower if they are essential to vital human needs and higher if they are inessential) while forbidding entirely activities that are at once profligate and pointless, let each country secure that end, so far as possible, without damage or detriment to human solidarity.[18] If nations can compete in quasi-friendly fashion at sport, in cultural achievements and in the assistance that they offer to the Third World, can they not compete in the contributions they will make to this end as well? Apart from countries such as Sweden and any other small countries which are similarly sensible, why has almost every nation supposed that it must wait for every other nation to do something?

By way of reply, someone is sure to assert that it is in the interests of each party that *someone else* reduce emissions. But, on the true view, which can be explained to almost anyone anywhere on the basis of a less impoverished notion of self-interest, it is in the interests of each and all countries that *every possible* reduction in emissions be attempted. For that is the point of emergency we are arriving at. On a true view, no nation or country can know when or how it will itself be stricken by the effects of climate change. It is a strange idea of self-interest that makes it nothing better than short-sighted idiocy.

From all this it follows, I conclude, that if we look at things from the viewpoint of an ordinary prudence which does not exclude morality, then the rate and manner of 'discount' (but that is an unnatural word to use in treating of a negative duty) is to be fixed by the experience of living responsibly, not stipulated top-down by the fiat of boffins and consultants. No doubt, if we look at matters from the point

[18]. More specifically, let the objective be to secure that future while respecting so far as possible the ideal that looks always to a state of affairs where each and everyone will want each and everyone else to be protected in his/her efforts to pursue (through means constrained by the same ideal) his/her own most in his/her circumstances unforsakeable vital needs. See here my 'Solidarity', op cit, p. 265

of view of 'theory', then it will seem we are told that we have first to concern ourselves with the income streams available to our posterity and then (God help us) to adjoin to economic theory another theory, namely the theory of justice -- equal concern for all, inequalities only justifiable where they result in a larger benefit for all, especially those who have least…or whatever else is your favourite theory. If we allow ourselves to be drawn into this line of thinking, however, then we arrive almost immediately at the question how many more billions than our own billions of people there will then be, enjoying what income stream… in 10 years, 50 years, 100 years, 1000 years… time. Faced with the uncertainty and controversy to which such thoughts lead, one may see the philosophical attractions of some older and more commonplace account of justice, drawing upon a larger plurality of intuitive ideas in some natural development of Aristotle.[19] This will prompt us to concentrate our thoughts upon the harm or damage we do to our descendants if, at this point in the history of our inhabitation of the Earth, either we help ourselves to more than we vitally need of the Earth's resources (see above) or we inflict upon our descendants arrangements that deprive them of all resilience against the kinds of problem that mankind is heir to, water-, energy-, or food- shortage, the passionate hostility of neighbours, armed struggle for natural resources….

10. In countries such as Britain, yet other things have drawn attention away from the duty to reduce emissions absolutely. Among these further distractions I shall mention two.

The first is the marvellous illusion of absolute contraction already achieved, an illusion that we owe to the fact, that in this country, manufacturing industry has been

[19] For one version of this, see *Ethics: Twelve Lectures*, op. cit. Chapter 10.

allowed or encouraged to migrate elsewhere and we rely now upon imports without assuming any responsibility for the emissions that arise from their manufacture.[20]

A second distraction has been HMG's preoccupation with an EU directive requiring every member country to produce at least 15% of its energy by the year 2020 from renewables -- and the feeling of intense engagement and prolonged activity against climate change which ministers and their civil servants derive from seeking to meet this target. The target has taken on a life of its own which has come loose from any call for absolute reduction. I do not deny that, in so far as householders have been encouraged (singly or in concert) to contrive their own small-scale wind or solar installations, this interest in renewables has served valuable purposes. But large-scale projects such as wind farms which involve huge connection and construction costs together with massive (recorded or unrecorded?) emissions of CO_2 (and more in the pipeline) are another matter altogether. Dieter Helm writes:

> A study by the National Audit Office has found that the Renewables Obligation 'is several times more expensive than other measures currently being implemented by the government'. Compared with the EU ETS carbon prices in the range £20-£30 per tonne of carbon, the UK renewables programme is staggeringly expensive. Perhaps only the Italian renewables programme looks more expensive. Recently it has begun to be appreciated that current biofuels policy may be even worse – not only in terms of cost, but also in terms of the very limited carbon savings and the impact on agriculture.

[20] See Dieter Helm, 'Climate-change policy: why has so little been achieved', *Oxford Review of Economic Policy*, Volume 24, No. 2, 2008, pages 211-238. I am indebted to this article.

11. So much for the distractions from real reduction. We come now to the larger picture into which renewables have to fit and to a survey of all possible alternatives to oil.

Focusing on Britain as an example, let me lean again upon David MacKay. In outline, MacKay formulates five alternative energy plans (and then a sixth), insisting throughout, that whatever strategy one considers, the projected supply must measure up to some recognizable summation of the actual demand (unless demand is to be reduced – see section 13 following). Each plan involves some particular combination of clean, carbon-sequestered coal, wind, hydro, wood, nuclear, tide, wave, pumped heat, solar, biofuel, etc.[21] Each plan, dispensing almost entirely with the burning of fossil fuels, involves a near-tripling of electricity consumption. (Or so it seems *if we treat the demand for energy as a simple given*.) Taken in conjunction, Mackay's explorations of these plans point collectively towards a simple conclusion: Britain will never come anywhere close to living by its own renewables. In Britain – as in Europe, MacKay goes on to show – a 'low-carbon economy' would have to depend on one, the other, or both of nuclear energy and solar energy, the latter to be purchased (in some just imaginable future) from other people's deserts, e.g. the deserts of the Sahara, and delivered northwards by high-voltage, direct current transmission lines. (See MacKay page 233, pages 178-9.)

On the evidence MacKay provides, it appears nearly impossible to supplant this conclusion. That is what is so useful about MacKay's analysis and the discipline which insists that the policies should add up to the demand. With heavy heart and the utmost reluctance, the reader of MacKay's book – unless driven to think that demand itself simply has to be reduced more radically than most of his readers will be ready to

[21] It is a pity that MacKay, like Stern, says little or nothing about agriculture and its dependence upon fertilizers derived from fossil fuels, but let us supply this deficit by supposing that they have undergone a quiet conversion to organic agriculture, permaculture or whatever.

contemplate -- is led to the conclusion that Britain has no alternative but to build one more generation of nuclear-power stations. That might be the last generation, it might still be hoped, if enough technological and diplomatic ingenuity, and enough material resources were to be put into some sort of Sahara plan or some other plan still to be devised.

Speaking personally, I find some consolation for this awful conclusion in another thought prompted by MacKay, but not his responsibility. Nuclear and solar apart, small scale domestic or municipal wind power, pumped heat and carbon sequestration of coal-fired power must be worth persisting in. But, *if there is no alternative to nuclear and nuclear will have to happen anyway*, why persist in wind farms which alienate great stretches of land, will depend forever upon hidden subsidies, contribute little to the larger problem, abstract resources from more effective measures, and are environmentally criminal – an outrage against a natural heritage we ought to leave undiminished -- or in offshore wind and wave schemes where unforeseen engineering difficulty and expense can only be increased by the uncertainty of future sea levels?

12. At risk of seeming to go backwards I revert here for one moment to the international scene and Copenhagen (2009). If what I have said so far is right, then such a summit might have avoided the idea that everything but everything, absolutely everything, depended on the effort to arrive at 'legally binding' agreements concerning future emissions and, negotiations apart, might have taken the opportunity for the free exchange of ideas. Such a summit, a summit where nations could listen to one another in a spirit less defensive and more inquisitive, might even have begun with an open-ended discussion of world population trends and the unwisdom or idiocy

of employment taxes and policies which have the effect of displacing human labour at a time when there is a massive excess of human labour. Attending for a moment to the question of feeding the billions, it might have dwelt on the ways in which the world's fisheries are being destroyed by greed and destructive technology, even as the acidification of the oceans destroys plankton on which marine life depends. Then it might have explored what it would take for the rest of the world to induce, bribe or help Brazil, Paraguay, Guyana, Indonesia, Burma, Australia and other countries with rainforest still standing to treasure and conserve it and to implement a total ban on road-building there. So far as CO_2 is concerned, nothing could be more urgent. Such a ban might at least safeguard or prolong the present capacity, such as it is, of the atmosphere to carry CO_2 safely. Next, without waiting for a binding agreement on any of these things, the First World countries might have expressed their willingness not only to reduce their own emissions absolutely (by whatever means they devise) but also to put all their available resources into exploring *with* Third World countries the full variety of technological and political possibilities for the collection and transmission of solar energy. Who knows? Once real progress were made with all that, solar energy might even become cheap enough for African and other countries themselves to desalinate water from the oceans and seek to afforest the desert. That is pure fantasy perhaps. The solid point is that what would be at issue is the promise of huge capital flows from the First World to the Third World, and a sustainable rent upon which they could go forward in their own way. (Let us hope or pray that that way will not be a copy of our way.)

13. I promised in section 2 to try to say something about how Martin Rees's first kind of realism might be turned into a policy of sustainability, measured risk and the

training of human effort upon the ends of life which we can pursue by means of carbon-free enhancements or replacements of present technologies. There is room here for a huge variety of contributions. My own, such as it is, starts out from certain things that MacKay makes evident to reflection (and anticipates at his page 213): namely, the cost at present levels of energy-use of carbon-free energy; the cost in consumption forgone, natural consumed or natural beauty destroyed of wasting energy; and the large unknown potential of that which some environmentalists have called the forgotten fuel. They mean by that the fuel we waste but don't need to waste in pursuing ends we do need to pursue and the fuel we could save in abandoning certain other ends we might decide to abandon.

14. Like so much else that is at issue here, such thoughts involve changes in the way we live now. Above all, they involve examples. In some of the more benign cases, they involve going back to ways of living that were familiar to our mothers and fathers or to our younger selves. In other cases they will involve possibilities we shall have to discover. I begin however with changes which, even now, have much to be said for them, both positively (I mean) and independently of climate change -- either because they steer us away from things which seem crazy in their own terms, once we see that they arise from unsolved co-ordination problems, or else because they help to secure the self-sufficiency and the resilience of regions or localities.

Why do I mention self-sufficiency? Because, even if (despite the grounds Martin Rees gives for pessimism) our present civilization on earth will in fact survive up to 2100, it is a fallacious and gratuitous extrapolation from the prosperity of the twentieth century to suppose that the new form of that civilization will be exempt from new kinds of economic collapse, exempt from so far (relatively) unfamiliar

disputes over natural resources or exempt from other major disruption issuing in armed conflict, or from other major disruption. Why suppose that everywhere some arm of government will always be in a position to ensure, in whatever way it has so far, that every place have sufficiently secure supplies of food, manufactures or other essentials that it now relies upon coming to them from elsewhere? What a pity it is that the political architects in London and Brussels of farming and industrial policy never look beyond the dogmas of 'trade liberalization' to ancient history. Here let me quote from the author of *The Fall of Rome and the End of Civilization*, Bryan Ward-Perkins:

> [By 450 AD] the Romano-British population had grown used to buying their pottery, nails and other basic goods from specialist producers, based often miles away, and these producers in their turn relied on widespread markets to sustain their specialised production. When insecurity came in the 5th century, this impressive house of cards collapsed, leaving a population without the goods they wanted and without the skills and infrastructure needed to produce them locally. It took centuries to reconstruct networks of specialization and exchange comparable to those of the Roman period. The more complex an economy is the more fragile it is and the more cataclysmic its disintegration can be.

15. This matter of self-sufficiency or resilience is closely connected with an example or eminent instance by which I hope to illustrate another inherently desirable kind of change that might in the names of realism and economy be forced upon us by the exigencies of environmental degradation and climate change. I introduce that

example with the words of a former captain of industry, Sir Daniel Pettit, speaking as long as 35 years ago, at the Mercedes Benz Conference in Eastbourne, 18-20th June 1975:

> Responding to the freedom and the new opportunities that road transport has given it, industry has moved steadily away from locations near a railhead, port or inland waterways and has evolved a new, more dispersed approach to Land Use than was evident in the 19th Century with its emphasis on consolidation in metropolis and conurbation. Much new light industry is situated either on industrial estates on the outskirts of established towns, or in new towns. Warehouses in which goods are prepared for final delivery are often located in rural or semi-rural areas where land prices are lowest and supplies of labour are still reasonably consistent and of quality. Research into this area consistently underlines and reflects the irrefutable hold which road transport now has secured over the channels of supply, illustrated by the Mercedes Blue Book and the FTA Handbook and studies in my own organization and the ever-increasing and well justified need for road infrastructure as a prerequisite for growth … there can be little doubt that growth will continue and, while it will extend the pleasures of increased affluence to more sections of the populations, it will also make more pressing the problems that affluence brings, and highlight the less attractive aspects of the road transport industry as it responds to the increasing demands made on it….

> We must give a great deal more thought and determination to developing the concept of the dispersed society, one which in both its appeal to individual liberty and mobility and its use of land is more attuned to the motorcar and the lorry responding to individual needs than the concentration and conurbation developments of the 19th century dependent on and conditioned by the railways, providing for the pattern of supply in commodity terms to the population en masse.

When he spoke of the growth and power of the system he was anatomizing, Pettit was a true prophet – as he was when he spoke of the need 'to give more thought to the concept of the dispersed society'.

To engage with this matter, the contrast we need is not exactly that between the dispersed and the not dispersed but the contrast between a settlement pattern created lengthwise and/or radially by local bus, foot, bicycle or train[22] and a settlement pattern that brings together consumers, producers, workers, employers, goods and services in the manner that Pettit describes (free that is from any of the limitations of older modes of travel), where we end up with a huge demand for unrestricted movement in almost any direction, from almost any point to almost any other point.

In the last 20 or 25 years alone, at once enlarging and ministering to that kind of demand, Departments/Ministries of Transport have expended more than £100 billion at current prices on roads and huge further sums I do not know how to calculate on other modes, all in the name of saving time spent on travel.[23] Result:

[22] Think, for instance, of 'Metroland' – the large area north and north west of London (Baker Street) opened out in the earlier twentieth century to new habitation and new commerce by the Metropolitan Railway. Think how it was *before* the motor car dispersed dwellings and commerce in every direction in the way Pettit describes, gradually filling all the spaces that lay between separate lines and stations.

[23] Meanwhile in London, the capital of one of the most capitalocentric countries of the world, planners have been reluctant to allow congestion on roads or tube lines to constrain demand or prompt

average speeds have risen by 50%. But the average amount of time spent travelling has scarcely altered by more than one minute. It seems that within the duration of the length of time they are ready to spend travelling, people simply rearrange their lives to travel further.[24] It is a fair guess that they are poised to take up any further improvements in just the same way. At the place where they now are, they have new mobility desiderata, no doubt. But, once these are satisfied, others will no doubt replace them. More and more vehicles will continue to get in the way of more and more other vehicles. No wonder that decade after decade transport occupies a larger and larger share of GDP, takes a larger share of natural resources, and pre-empts a larger share of public expenditure….[25]

16. There is no need to try to sit in judgment on the individual citizens who respond in this way to that which is in front of them. That is not the question. The question relates to changes in our present way of living which might both save carbon emissions and have something positive to be said for them in the present or immediate future. The question relates also to the wisdom or unwisdom of the public policies which have shaped the unconcerted choices that individual citizens make. It is rarely or never considered where such policies are leading. (The Town and Country Act of 1946 marks a rare moment of wisdom in this regard.) Still less are they considered in the light of problems of coordination which are inaccessible to individual choice.

Such questions are not new. For instance, the distinction has long been familiar between simple mobility and access to facilities, not least the access of those

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businesses to see for themselves whether the time has come for them to expand elsewhere into places where economic activity is conspicuously lacking and housing cheaper and more plentiful. Such a policy has railway implications, to which let the response have proper regard for freight transport.

[24] See David Metz, 'The Myth of Travel Time Saving' *Transport Reviews 2007*.

[25] I do not understand the arguments offered against recouping this expenditure by levying tolls on the motorway sections of the new network. Why should not such tolls reflect the engine capacities and CO_2 emissions of the vehicles paying the tolls?

too old, too young or too poor to drive or without access to the car which goes away each day with a wage earner. The question became visible in HMG's 1976 consultation document *On Transport Policy*:

> At the same time as mobility has been reduced for those without a car, [the] advantages [of car-mobility] have increased. For as car ownership spreads, schools become larger, hospitals are regionalized, out of town shopping centres multiply and the Council Offices are situated further away; meanwhile the local shop and post office disappeared [and local bus or railway services are diminished or, in some cases, never existed because whole neighbourhoods are themselves the creature of the pattern that Pettit has described for us.] Mobility becomes ever more necessary; but command over it for the minority grows less. This is perhaps the most important problem which emerges from our review of the Transport scene.

'Important' though this problem seems to have seemed to the government of that day, the same tendencies still continue almost unrestrained. Doctors are still encouraged (or almost compelled) to set up group practices. Hospital services are still amalgamated or sadly neglected in the expectation of imminent amalgamation. Thousands of post offices have closed. Policies for school education are still insensitive to such questions.

17. There is no easy way back to a universal way of life in which many an ordinary adult's everyday travel hardly exceeded eight miles a day and a huge generality of people found ways to locate their work and their dwelling-place (not to mention their doctor, dentist, shopping and recreation) along a good line of public

transportation or at a walkable distance.[26] But there is every reason meanwhile for public policies not to *aggravate* the problem we have made for ourselves (for it can still be aggravated enormously), not to acquiesce so readily or any further in the dispersed patterns of development that Pettit describes and not to discourage a significant minority who might decide that that old way is the way they would positively like to live.[27] It is hard to resist the thought that it would not only reduce our carbon dependence but bring about something else that is desirable in itself if public policies were reoriented to take advantage of the divers ways in which, even now, in a vast variety of places (not only the large city), human lives can still be lived without radical or near total dependence on the car. Too little thought has been given to the large public benefits of making ordinary life possible for a potentially numerous minority who might choose to live, or to continue to live, without any dependence at all upon the car.

Another thought it is hard to resist is how little we should lose if we simply dropped all that talk about 'getting people out of cars or aeroplanes' and doing that by spending billions upon billions on high-speed railway lines. Suppose that instead some smallish fraction of the money and resources saved from these projects were spent on restoring rural railway connections to the main lines and reinstating railway stations which have been removed to make headways for very high speed traffics.[28]

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[26] It is worth adding that at the time we are recalling such lives were nevertheless not confined within that narrow horizon. Almost any place in the UK was within reach of almost any other place in the UK by public transport. Contrast a journey made at nearly 200 mph for two-thirds or four-fifths of the way only to find no more public transport at all for the rest of the journey.

[27] The suggestion is offered in full awareness of countless differences between town, suburb, exurb and country.

[28] See here more generally David Wiggins and Mayer Hillman, 'Railways, Settlement and Access', in Anthony Barnett and Roger Scruton eds, *Town and* Country, (Jonathan Cape, 1997).

Cannot the new preoccupation with high speed as such be moderated by a much closer concern with the first and last stages of a journey. So far as getting people out of aeroplanes is concerned, moreover, there is no need for an expensive bribe. Let HMG simply tax more heavily those who suppose they absolutely have to make some rapid inland journey by aeroplane.

18. In what I have said, however breathlessly, about the particular examples I have chosen in order to illustrate the possibility of changes which might be desirable independently of climate change, you may perceive a drift, or a further drift, towards the centralized economy. In emergencies such as war or earthquake, flood or drought … that is what you must expect. But those who direct from the centre must begin to concentrate more unsentimentally on bare essentials, which will be numerous enough. For in truth top-down policy-initiatives are only one small fraction of the answer. Indeed, if top-down policies now multiply and take on the forms of regulation that we see all about us, then we are doomed.

Almost everyone whom one speaks to on this subject reports the waste of heat, light and capital they see all about them, reports the unintended energy consequences of every visit by Health and Safety (and the even larger consequences of the fear of such a visit) – just as they report how every 'improvement' they see in the office, schoolroom, club premises … they frequent has resulted in a net increase in the light or heat used or in air-conditioning. Until some idea or notion reaches every citizen about the nature and magnitude of the problem that confronts us all – until some new awareness comes to be expressed in all the ingenuity and enterprise they can bring to bear upon everyday life -- we shall never know properly how much carbon we can

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It is noteworthy that in the same epoch in which rural public transport was dismantled hundreds of thousands of people were moving outwards towards rural areas. Witness the rise in house prices there and the lamentable effects of this for the rural economy.

save now *or* what energy we shall need in the future. (Cp again Mackay, page 213.) In the case of policy-makers, might not such an awareness fill the vacuum which has made politicians call for 'joined-up thinking'? In the case of town-planners, such an awareness might prompt them to think of the carbon cost of the building works and extensions they so often approve or even prescribe. In the case of architects, might not such an awareness prompt them to think of the carbon cost of the horrible material which they put down everywhere between London and Dubai and then beyond? I mean concrete. Five percent of human-originated carbon dioxide emissions result from freeing calcium carbonate previously kept safe within limestone and cooking the result to 800 centigrade.

These are simply examples. Is there any limit to the number of such observations which could be made? I doubt it. During the time when I was writing this paper, and within one square mile of central London abuzz with the sound of oil-driven machinery, I have witnessed road-sweeping machines deputizing (rather ineffectively in many situations) for brooms and human hands; helicopters idling endlessly back and forth over sporting events their hirers were promoting in a Royal Park; police helicopters hunting back and forth for one knows not what reason and police trucks lifting up private cars from expired parking spaces to take them to an official pound several miles away in South London (do the police have to buy carbon credits?); the semi-pedestrianization (price tag £25 million) of 1000 yards of a London street by the laying of a quarter of a million tiles which are shaped either off-site or there on the spot by a petrol-driven cutting machine to make them fit into an abstract mosaic; a host of gardeners in two London squares either collecting leaves not with brushes or effectively but with motor-driven blowers or else mulching fallen branches with a petrol engine; the rearing over Hyde Park of yet another cliff in steel

and concrete of luxury apartments far beyond the means of anyone poorer than a Russian olearch; the huge and unprecedentedly destructive surface works of a £17 billion 'Cross-Rail' project which will perpetuate the magnificent supremacy of the Greater London region over all other regions in Britain but continue the process which is depriving the capital itself of the low-value neighbourhoods that Jane Jacobs so eloquently describes as essential to the creativity and small-scale enterprise of the city…. [29]

Who shall keep track here of the distinction between essential and inessential or measure the distance these activities take human civilization towards the trillionth tonne of CO_2 emitted into the atmosphere?[30] Cap and trade? It does not even claim to be that sort of scheme. An agency or arm of the state implementing by yet further powers of selective prohibition an assemblage of targets whose proper rationale will all too easily be lost to view? A parliament already possessed of the power to pass a law prohibiting almost anything, but scarcely equipped to forbid precisely that which is involved in the more wasteful of the activities here described? A far better instrument, better designed to keep a constant watch upon the world and to forestall many ill-considered projects, lies within human beings themselves. I mean their eyes and ears, their minds and their rational capacity, given only the right conditions, to exercise the licence to ask what the thing they are doing is *for*. I mean also their innate capacity to embrace and enter into an *ethos*, mentality or way of being which can be animated by the understanding of something seriously at issue.[31]

[29] See *The Death and Life of the Great American City*, 1962.
[30] For the symbolic and real significance of the trillionth tonne, see again Myles R. Allen op. cit. at note 3.
[31] Here too belongs a frame of mind, which in his forthcoming *Green Philosophy: Turning for Home*, (Grove Atlantic 2011), Roger Scruton calls *oikophilia*, the love of home/homeland.

19. In 1939-40 when HMG was expecting the Blitz and a blackout was instituted in order to confuse the navigation of enemy bombers and fighters, it took only two or three weeks for everyone to catch on to the idea and to be ready to tap on their neighbour's door to tell them in friendly fashion if they were showing even a small chink of light. Citizens caught on effortlessly to the mentality that was expressed in posters put out by the government: 'Dig for victory', 'If you know something keep it under your hat'. What organized the thoughts and dispositions of citizens was the fear of destruction or invasion by a hostile power and an idea of liberty and human decency which they had resolved to uphold to the end. In the present what should organize our awareness and dispositions? A new awareness among the citizen body at large of the fragility and huge complexity of the life systems on which we depend and a concern for what remains of the beauty of the earth. But, in the place of 'Keep calm and carry on', I hope we may prefer some version of Hume's wonderful sentence

> All prospects of success in life or even of tolerable subsistence must fail where reasonable frugality is wanting.

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