Climate blues:
or how awareness of the human end might re-instil ethical purpose to the writing of history

Mark Levene

> So far as we know, this is the only planet in the entire universe which has summoned forth life in all its brilliance and variety. To knowingly cut this flowering short is undoubtedly a crime, one more unspeakable even than the cruellest genocide or most destructive war. If each person is uniquely valuable, each species is surely more so. I can see no excuses for collaborating in such a crime. As the post-war Nuremberg trials established, ignorance is no defence: nor is merely following orders. To me the moral path lies not in passively accepting our destructive role, but in actively resisting such a horrendous fate.
>
> Mark Lynas, *Six Degrees*

Have we really arrived at the point of no return? Is it conceivable that we, ourselves, *homo sapiens sapiens*, through our undoubted cleverness, have brought this planet to the brink of a biospheric destabilisation so enormous that it heralds not only our own destruction but all of Earth's multitudinous life forms? A very public answer from some people with considerable *sapienza*, not to say among those who have thought long and hard on the matter, was proffered in the august surroundings of the Royal Society on 17 January 2007. The Society was playing host to the Bulletin of Atomic Scientists who sixty years earlier had visualised a Doomsday Clock to symbolise the threat to human survival from nuclear weapons. Back in 1991 their clock had been in abeyance, at 17 minutes to midnight. Since then it has been moving forward, seemingly inexorably. At the 2007 meeting with, among others, Stephen Hawking, and Society president, Lord Rees, among the eighteen Nobel Laureate sponsors of the event, the Bulletin moved the clock forward once again, to five minutes to midnight. This time, however, the grounds cited for the gloomy prognostication were not just a matter of nuclear arsenals. The danger posed by climate change, the Bulletin pronounced, was nearly as dire and threatened 'irremediable harm to the habitats upon which human societies depend for survival.'[1]

How much then does climate change actually change a picture we already know? From the moment when the first atomic bomb was detonated at Trinity on 16 July 1945,there has existed a human potential for planetary destruction. Granted, the potential has not been vested in us all equally. As then, so now, nuclear weapons are a statement of political as well as technological power and domination. But while this might offer historians among the last women and men a final occasion to debate the hegemonic origins of the present world order, the reality of the weapons' primed existence underscores the ongoing twilight zone nature of our existence. Nor, even if the nuclear weapons were not there, would we necessarily require global warming to confirm 'that

we are now in a great dying time of evolutionary history.'[2] In 1972, in response to a commission from the industrialist Club of Rome, a group of MIT system analysts constructed a model of global humanity which forecast that on the basis of exponential growth patterns in industrial and food production, resource depletion, population and pollution, a resulting ecological overshoot was likely to engender a universal economic and societal collapse sometime in the 21st century.[3] Despite a torrent of criticism, not least from some of the report's sponsors for its alleged neo-Malthusianism, the findings of *Limits to Growth* have only been corroborated in similar, more recent, assessments.[4]

At first sight, it is not obvious how anthropogenic climate change adds to this gloom and doom scenario or indeed competes with the nuclear threat. Our possibly millennia-long impact on the climate has not been a conscious project and certainly not a malign one. On the contrary, one might argue that it is simply an indirect consequence of essentially *constructive* efforts at self-betterment, for which read most dramatically the historically recent emergence of a fossil fuel-based economy underpinning both the planetary reality of a 7 billion-plus human population and material and physical comforts for a significant proportion of them beyond even the wildest dream of kings even a few centuries back. The manner, moreover, by which climate change will bring disaster, or when, exactly, that might be, is opaque. Neither with a bang, nor necessarily a whimper, its remoteness from our daily lives, its lack of apparent existential threat compared for instance with the ever-present possibility of Cold War nuclear Armageddon, plus the obvious scientific complexity of understanding cause and effect, are all sufficient grounds for most people to push it to the very margins of their consciousness, or even to deny its existence altogether.

Unfortunately, what such responses tell us most about is a human propensity to avoid or repudiate inconvenient or unpalatable truths, particularly when those truths are bound up inextricably with the way we (certainly a Western 'we') live.[5] We may not be able to pin down with exactitude its precise contours or timeline but the scientific evidence on the reality of anthropogenic climate change and the mass-extinction threat it carries to life-forms on this planet is now overwhelming.[6] It is not our purpose (or competence) here to reprise the scientific arguments. It is our purpose to ask what this means for our understanding of that element of cross-generational human experience we have come to describe as 'history.' Whether we will be able during this century to keep the nuclear genie in its box remains a very open question. But by dint of hysteresis - in other words the time-lag before carbon dioxide and other greenhouse gas accumulations in the atmosphere really kick in - climate change *will* accelerate even if it were possible to turn off the fossil-fuel engine right now. [7] It is this very engine, of course, which is first cause as to why we are where we are. 'Nature,' one might say, stands in a form of dialectical relationship with it. The biospheric feedbacks, or more exactly 'blowbacks', now setting in - one very visible consequence, for instance, being the rapid implosion of the Arctic eco-system - we might consider Nature's antithesis to the globalised carbon economy we have created. If the latter continues on its present upward trajectory, the synthesis of the argument will not be human fulfilment. It will be foreclosure on progress, system, history - the whole human tragedy.

Jeremiad or not, the point of this exercise, then, lies in critical part in the requirement that historians among others, face up to the reality. The challenge lies in what we make of it. In other words, the degree to which in the coming precious years we chose to link our disciplinary explorations to urgent ethical responsibilities. The most fundamental of these, now, as perhaps always, relates not only to matters of human conduct with each other. What equally is at stake is our responsibility to all life forms on this planet whose future fate has unknowingly become one of utter dependence on *us* but without whose existence our own sustainability as a species is null and void.

In the face of this foreclosure - and thus, as the truth sinks in, what will inevitably be a monumental societal crisis of hope - we will be required to tear down many, perhaps all of our standard assumptions as to how history 'works' and begin a probably very painful process of 'reconstruction'. Working backwards we almost certainly will wish to reconsider the very basic map of history - the architecture of human experience over centuries and millennia - to understand how we arrived at this end-game. From this perspective, too, it may be that some areas of great recent historiographical debate may by degrees seem rather academic, superfluous, even quaint. By the same token, other elements, which point to practical resilience or even moral compassion in the face of past environmental breakdown or acute psychological insecurity may suddenly become very important indeed. Paradoxically, this may well lead us in directions many historians have been at pains to distance themselves from in recent decades: structure, metanarrative, even teleology. What *really* matters, though, is whether historians have the heart, the guts, 'the ethical fire', to grasp the enormity of what is now required of them.

R.G. Collingwood, in 1939, proposed: 'We might very well be standing on the threshold of an age in which history would be as important for the world as natural science has been between 1600 and 1900.' [8] More than seventy years on, history *can* have that role. But to do so *historians* would have to be willing to step up to the plate to help the rest of humanity see that the conventional wisdoms we have chosen to live by - as if they were normative and true - are neither self-evident, benign, nor written in historical stone but rather are representative of a particularly toxic turn in the human sequence whose ultimate planetary riposte is none other than climate change. Our purposefulness - *even in the face of the end* - is to demonstrate through the past that there are alternative ways of right living. But the past is only relevant in this context if it can help illuminate the future. With the bridge between the two the present. The rest of this argument follows this three-part, if interlinked schema.

Past

In a recent piece in *Rethinking History*, my discussant, Prof. Corfield, revisited the whole notion of staging history and whether it is objectively possible to offer clear breaks between one age and another. With a cacophony of voices all offering their own subjective criteria on the matter, the idea that historians can arrive at some consensus as to where and when, for instance, modernity begins, or even more nebulously something called postmodernity, is bound to fail. Corfield's response is not to throw the baby out with the bath-water but to offer a three-dimensional model which might incorporate 'very

long-term micro-changes' alongside dramatic revolutionary 'breaks' enabling turmoil; momentum; persistence, to 'intersect and cross-impact in complexly different ways in different eras and climes'.[9] This is sane, sensitive and well-considered historical thinking, arguably at its very best. Perhaps it even represents a form of culmination of such thinking to this point in time. The question I have to pose, however, in the light of what we now know about the *natural* historical times-space framework in which all this operates - and its limits - is, can it serve as a benchmark for ongoing historical good practice? To which my answer can only be an unequivocal no.

Let me bold, therefore, and offer a different approach, one which takes its cue *not* from historians but earth scientists. In 2000 the atmospheric physicist and Nobel Laureate, Paul J. Crutzen, along with his marine scientist colleague, Eugene F. Stoermer, proposed that we now inhabit the era of the Anthropocene.[10] Clearly, some cross-reference to other successive geological periods, such as the Eocene, or Oligocene, was intended in this statement. But what was entirely more startling was the proposition that this new geological sequence was the result of human activity on a global scale, or, put another way, anthropogenic agency was 'changing the most basic physical processes of the earth.'[11] In fact, the idea was not new. The great Ukrainian earth scientist, Vladimir Vernadsky, had recognised humanity's geological impact back in the 1920s, though his metaphysical leanings also led him to propose that human consciousness had the ability to be a world historical, creative force which could transform the biosphere into a new, better condition which he called the 'noonsphere'. Vernadsky's hopes also, however, carried the caveat that the misuse of reason could also lead to self-destruction.[12]

Vernadsky had already suggested that an increase in biogenic gases in the atmosphere since the 18th century was human-caused. Crutzen and Stoermer had at their disposal data from retrieved glacial ice cores by which they were able to more precisely mark the threshold associated with this shift. They agreed that assigning a specific date might seem 'somewhat arbitrary.' However, up to c.1750-1800 greenhouse gas concentrations had been relatively stable for a relatively, long time, carbon dioxide, for instance at 280 parts per million. After then, its almost inexorable increase, year on year, to the present c.390 ppm closely mirrored the acceleration of energy usage from fossil fuels which began with the Industrial Revolution. Indeed, Crutzen and Stoermer noted the coincidence between James Watt's invention of the steam engine in 1784 and the onset of their proposed new geological epoch. While more recent historical consideration by Paul Dukes resets the threshold at 1763, citing not just technological but others factors associated with the geo-political rise of Britain to hegemonic status,[13] what is interesting about Anthropocene advocates is the degree to which they are able to turn to changes in earth system processes to validate with some precision, a major historical sea-change.

But is such conflation of the historical and geological justified? The term Anthropocene has yet to become a given, though there has been sufficient acclamation from a wide range of scientific and non-scientific disciplines to suggest that it is well on its way there.[14] There is, to be sure, a wider debate about the degree to which human activity, especially associated with deforestation and the advent of intensive farming, was already causing climate change as long as 8000 years ago. Environmental scientist, William

Ruddiman and key proponent of this thesis, for instance, has proposed that rising atmospheric methane concentrations in particular, as caused by millennia-long Eurasian agriculture, may well have slowed down a scientifically-anticipated earlier return to ice-age conditions.[15] Ruddiman, however, has not challenged the basic Anthropocene premise that only in very recent time has the human impact on climate *exceeded* that of nature.[16] If thus, we have our geological-cum-historical marker for the advent for what otherwise we might term Modernity, what would operating to this same formula reward us with for the rest of history ?

Logically we could only offer a basic tripartite division. Working back from the late 18th century divide, the comparable moment prior would be the last time there was significant climate change - in this case caused by a *natural* orbital oscillation of the planet. c.10 - 11,000 year ago. This brought to the estimated five to ten million members of our species at that time a quite rapid deliverance from the severe glacial conditions of the Younger Dryas and in its place offered a much warmer but also *relatively* stable (inter-glacial) climate which enabled our ancestors to take 'increasing control over biospheric flows of energy and resources.' Humans by then, were already almost ubiquitous but an indication of their long-term good fortune is expressed in the rise of the global population to over 500 million by c. 1500.[17] There is another side to that demographic equation, of course, of which more below. But compare and contrast these population levels with the situation before the onset of this Holocene epoch. If we were to go back into what most historians would call pre-history (deep history would surely be more appropriate) finding a further threshold would admittedly be more difficult, not least as the palaeontologists have yet to determine with exactitude a clear timeline for the emergence of *homo sapiens* - as opposed to other hominids - some two hundred thousand years back. Recognition that climate change was crucial to our species' African evolution is universally accepted by the experts. But in this sequence there is a particular moment of geological truth which ought to grab our very particular attention: the moment when we as a species were almost wiped out. That moment came some 73,000 years ago with the massive Mount Toba volcanic explosion on Sumatra. Putting aside the immediate devastation - geologists believe this to be the largest volcanic eruption in the past 25 million years - it threw up so much smog into the atmosphere that it triggered an intense ice age which was to last for a thousand years. The impact reduced our hominid ancestors to perhaps as few as two thousand; these survivors of a previously geographically expanding population clinging on for dear life in a handful of East African enclaves.[18]

The story of Toba proves more than simply a geological threshold in the human experience; more than simply a reminder of our dependence on the stability, approximate predictability, not to say benignity of the climate for our survival. Rather, its human consequences ought to offer a fundamental object-lesson - and motif - for ourselves as we hurtle towards our renewed encounter with extinction. The post-Toba hell lasted for something in the region of forty generations. But soon thereafter what has been described as the 'Revolution of the Upper Palaeolithic ' kicked in. This did not involve a genetic change in the make-up of human beings but rather a behavioural and cultural one. The anthropologist and Toba expert, Stanley Ambrose, proposes 'that the harsh conditions "selected strongly for an unprecedented degree of social cooperation," ' while David

Christian has spoken of 'an accumulating ecological virtuosity 'as human beings began to encounter very different environments in their renewed migratory movements. [19] At the centre of our new box of crystallising cognitive tools was one striking item which would set *homo sapiens* apart from all other species, including other hominids : *anticipation*. As a new ice age kicked in some 60,000 years ago, only to reach its last glacial maximum 40,000 years later, the ability to anticipate and hence adapt and fine-tune survival skills for resilience during those never-ending millennia - when for instance, the earliest European *homo sapiens* were confined to a handful of ice-age *refugia* yet outlived their better physically-prepared Neanderthal cousins - offers a precious life-line from our ancestors to ourselves.

Reprising pre-history as something historians might wish to pay a little more attention to, I appreciate, is as little likely to enthuse most practitioners within the discipline, as is Christian's plea that 'history is *not* an attribute of human society alone, but that the earth itself, life on earth and even the universe have histories'.[20] To make the further proposition that to think 'big', including time-scales and possibly ideas and methods more in keeping with not just archaeology and geology but even astrophysics would seem to demand of working historians not only an unconscionable wrench out of their comfort zones but almost a perverse desire to wreck the whole order of specialisation (very often for the individual practitioner painstakingly mastered), each sub-division of which underpins 'entire systems of teaching, examination, research funding, public assessment' and so on.[21] My response would have to be we are no longer living in normal times, where normative rules apply. Nor do we have the luxury. More to the point, however, there are already key components in place for a purposeful history for the end of (human) time, which *can* help fill the gaping void.

To my shame, I only came across Christian's work, or the notion of 'big' history of which he is a leading exponent, after I offered my contribution to this public debate. Yet to my surprise I find that my proffered periodisation approximates quite closely with his own three-part schema through Palaeolithic, Holocene and present era (from c. 1500) as founded on the merging of natural history and human history.[22] The reconfiguration of the latter into a much deeper cosmic timeframe does not preclude micro-levels. Just as geological epochs can be broken down into more specific strata, each sediment with its own distinctive signature fossils, so can the detailed human record be equally recovered, through increasingly sophisticated environmental techniques. While most historians, myself included, will not or ever be expert in such techniques, each will have other more traditional, including, written sources to which they can turn enabling them to argue the case for major breakpoints in history.

Rightly wary of single causation and like all good practitioners wanting to see the wood for the trees, they will want to chart the totality of political, societal and cultural trends over decades or even centuries before they might be willing to adjudge that this or that climate sequence or its consequent environmental impact was *really* the determining factor changing the course of history. Is the onset of the little ice age c.1300 AD the key to the great spurt of north-west European expansion into the wider world, with its major take-off two centuries later? What we do now know is that it *was* climatic shift which

was the fundamental cause of first the 'Great European Famine' of 1315-1318, then a generation-later, the epidemiological after-shock in the form of the Black Death which literally tore Europe apart.[23] Further back into the 'ancient (Old) world', the series of combined climate and tectonic plate shocks, c. 1250-1100 BC, associated with the onset of neo-glacial conditions, seem to have brought deeply-embedded Bronze Age civilisations to a spectacular end in one of several 'Dark Ages' in the Holocene record.[24] For most historians, to date, the really interesting questions have usually been bound up with what happened next? Out of Bronze Age collapse came a slow, tortuous recovery, over many centuries, the trajectory of which seems to have been towards, on the one hand, the even more aggressive, violently empire-building and power-hungry civilisations of the new 'Iron Age,' on the other, the cosmological life-affirmations of the 'Axial Age religions and their descendants. Out of the catastrophe of late-medieval and early modern plague, combined with repeated bouts of poor harvests and food shortages came a European path of radical reformation, in every sense of the word. Yet if human agency in response to these environmental challenges is the proper focus of historical study - providing us with multi-causal explanation for further major events and turns in history, a high degree of contingency and accident notwithstanding - we can hardly avoid the existence of what Dipesh Chakrabarty has referred to as the 'parametric conditions' of the Holocene, providing for the basic climatic stability which (mostly) year on year, millennium upon millennium, allowed for cereal grasses to grow, humankind in large numbers to prevail.[25]

Before the Holocene the parametric conditions for 'civilisation' simply did not exist. To be sure, it was human beings who created 'civilisation'. Just as it was human beings who took advantage and made the most of the improved conditions in the post-Toba world to spread across it. Once ubiquitous, populous, organised in ever-more complex societies, the possibilities for how history might pan out became endless. Chakrabarty speaks of us 'stumbling' into the Anthropocene, Tom Griffiths of 'tumbling' into it.[26] In this sense, nothing is written. But whether we want to hear it or not, there was *always* an overriding determining biospheric factor. It was one supposedly sophisticated societies just chose repeatedly to take for granted, or worse, ignored at their peril, whenever they set themselves on paths of self-aggrandisement.

The litany of civilisational collapses where societies have attempted to operate beyond ecologically plausibility litter the historical landscape.[27] As does the counterpoint in the repeated religious-cum-philosophical warnings from ancient texts that such *hybris* - literally 'wanton violence' - against the divine order of Nature would receive and deserve punishment. [28] Where societies have thus attempted to take control of biospheric flows of energy and resources in excess of nature's own ability to replenish itself the early signs of descent into the abyss have included unmitigated violence within social organisms.

In the contemporary world, of course, most of us - where we bother to interpret the signs at all - do not do so in terms of Nemesis. However, there is a singular paradox in that failing. What indeed makes the Anthropocene so significant in its *historical* dimension is the three-fold manner in which it exposes *all* humanity to catastrophe. On a first technological level, it is the very way in which we have vaulted over traditional

dependency on renewable natural resources in favour of fossil fuels for all our energy needs that reminds one of Paul Tillich's definition of 'sin' as 'separation' from the divine-cum-natural order.[29] What after all are we talking about but sequestrated solar energy in the form of rotted organic material, as laid down over a period of 350 million years, but which we are now emitting into the atmosphere in the twinkling of a geological eye ? The oil, gas and coal in question is not limitless energy even if it is a statement of aeons of yesterday's sunshine. But the current rate at which we are burning it up is quite mind-boggling: 196,442 kilos of coal, 103, 881,279 litres of gas, 150, 179 litres of oil *a second*.[30] To be sure, the 'magical powers' we have gained from this alchemy-like conjuring trick is the other side of sin.[31] The transgression has given us - at least the rich 'us' of this planet - literally 'everything' which makes our society work, without most of us having to do any *work*. And one precise-indicator of how fast this has transpired might lie in the single sobering statistic that a 100 years back there were a mere 4,142 US cars and a grand US total of 10 miles of concrete road. [32]

It is, of course, the carbon dioxide emissions from our thraldom to petrol, plus the methane, in large part a consequence of wealthy people's predilection for eating too much meat, which are now driving greenhouse gas concentrations to levels the planet has not experienced since the Late Pleistocene, 650,000 years.[33] But, again, what is significant in historical terms is that Nature's blow-back seems primed to take its full effect when all humanity is encapsulated within this uniquely oil-driven but also *global* political-economic system. Whereas in the past the environmental consequences of hubris in Mesopotamia, Easter Island, or Maya Meso-America might have been isolated to these regions or their hinterlands, the second, further outstanding characteristic of the Anthropocene is that collapse is likely to take place within a single human world order.

But what thirdly and finally makes the Anthropocene so very singular is how psychologically ill-prepared *its* humans have become in relation to what awaits them. In previous historical epochs there was always religious authority reminding rulers and ruled alike of the consequences of overweening appetite even when that authority was not heeded. But another classically defining characteristic of our age - largely indirectly thanks to the Enlightenment - is that the drive to insatiable material covetousness is terrestrially-sanctioned as a perfectly warrantable, desirable and common *good*. Are we not, after all, now, masters of the universe? And do we not have a universally accepted method, capitalism, to enable us all to benefit ? There is thus no constraint or restraint on profligacy because there is no moral, let alone sacred framework to remind us that anthropocenic hubris is leading towards the most monumental environmental cul-de-sac. And hence no wider psycho-dynamic grounding to enable our individual or collective imaginations to be mentally alert to, let alone provide awareness -*wakefulness* - of what all this signifies.[34] .As a result when we ought to be scared witless by what the *science* is telling us, the majority of us, with or without the Murdoch media to help us in our desensitisation,[35] are literally going gentle into that good night.

Future

Except that it will neither be gentle nor good. When the penny finally drops, long after there is any chance of mitigating the situation (which, indeed, in all probability, may have already past) there will be both rage and violence. It is unlikely to be limited to a demotic fury. For what it is worth, my own forecast is that it will not be climate change *per se* which will bring the Anthropocene to its squalid terminus but a sequence of universal self-destruction, including a possible resort to nuclear weapons, consequent on nation-states, *in extremis* - the hegemons in the van - turning against each other in a final frenzied set of struggles for the remaining residual sources of water, food and oil. [36] Nevertheless, there is an assumption built in here that the Anthropocene will not only be a very short historical epoch and nothing more than a passing blip in the *ongoing* geological succession but that whatever comes next is unlikely to involve a period of human recovery or replenishment. We can thus dispense at this point with any notion of something we might look forward to as Post-Modernity. Indeed, the very crossing of the threshold into a new geological phase can only denote for us either the Post-Modernity of the graveyard, or one in which humanity has so utterly turned round its *modus operandi* that it has not only cut its present carbon footprint to zero but set itself on a long-term course of decelerating the level of dangerous green house gas concentrations in the atmosphere to somewhere prior to high-Anthropocene levels.

But how can I be so sure this latter trajectory will not happen? Is not the right and proper historian's riposte to prognostications of history's end to remind ourselves that such claims have been a facet of the more colourful language of disturbed individuals, or, more likely, millenarian religious sects across historical time, even while such claims may indeed tell us something about the nature of crisis in any given society ? When have societies not been in crisis, the historian might ask ? To propose that the sky is about to fall in, may offer good grounds for historical analysis of those making the claim; their mores, their social and cultural milieu but it does not obviously require the analyst to accept the forecast at face-value. And as I have set myself up here as the one wearing the 'end is nigh' sandwich board I have to say that I would like nothing better than to be proven wrong, my confession of error also coming with the sworn promise never to mention the subject of climate change again. *I wish*.

Unfortunately, in the week in which I was preparing the original presentation for the IHR debate I received a sobering communication from David Wasdell. Those familiar with his work will know that through his Apollo-Gaia Project Wasdell has been on his own independent, very highly specialised quest during this last decade to understand the dynamics of anthropogenic climate change in a total, truly holistic sense. Devotees of his work will also know that in combining into a macro-picture the various earth sub-system feedback mechanisms amplifying the effect of the anthropogenic disturbance, Wasdell has repeatedly confounded more conservative estimates for what will be the likely average change in surface temperature before the dynamic thermal equilibrium of the planet is re-balanced. If this more or less one-man attempt to bring everything together into a dynamic climate system matrix makes Wasdell an undoubted maverick, he remains one who is not only an accredited reviewer for the Intergovernmental Panel on Climate

Change (IPCC) but one - perhaps in no small part because he is not governed by political or institutional constraints - who is repeatedly invited to speak to the very highest levels of state and economic leadership around the world.

What I received from Wasdell in late March was the latest of his ongoing studies on the value of climate sensitivity : in basic laymen speak the likely change in the earth's temperature as measured against changes in its atmospheric composition, including the amplification effects from the feedback dynamics of the natural world. Wasdell's number-crunching conclusions are that once one factors in *all* the feedbacks, which he argues most of the major computer models to date have only partially or incorrectly done, the value of climate sensitivity would have to be increased by a factor of two and a half times that currently endorsed by the last IPPC ($4^{th)}$ Assessment Report in 2007. In terms of average surface temperature rise this would mean a difference between a consensual figure of 3 degrees and the minimum of 7.8 degrees Celsius which Wasdell proposes should now replace it. [37]

Let us again try and put these figures in some sort of very basic laymen's context. The historically very dramatic shift from the Medieval Warm Period to the Little Ice Age around 1300 AD involved a temperature fluctuation in the range of about 1 degree.[38] Standard 'state, corporate and NGO responses to climate change are predicated on normative assumptions of a 2 degree…"dangerous limit" ' even if this figure tells us more about how contemporary opinion-formers and policy makers seek to construct climate change as a quantifiable but manageable problem primarily for the *future* rather than as something which is already dangerous in the present.[39] Mark Lynas in his rightly acclaimed *Six Degrees*, offers us a series of gut-wrenching insights into how, as we might approach the five degree marker, our planet becomes increasingly unrecognisable and the chances for sustaining life on it decrease to zero. One might add that before even three degrees the still conventional wisdoms that risk assessments based on the precautionary principle and linked to cost-benefit analysis will enable society to make calculative planning geared towards long-term recovery disintegrate into an irrelevance as the scale of destruction and the, by then, likely run away effects of feedback amplification set in.[40] Siginficantly, Lynas when he arrives at six degrees - the very far-end of the IPCC's worst-case scenario - can only offer evidence from the deep geological record to demonstrate what the earth might be like. There were indeed great swings of temperature in the past; after all, we have been living in a very unusually benign episode *within* a Quaternary (Pleistocene, Holocene and *now* Anthropocene range) in which ice ages have been the norm. What Lynas emphasises, however, is how the shift into global *warming* in previous epochs was associated with the gradual, then dramatic build-up of interacting composites of positive feedbacks. The relevant literature repeatedly focuses on the release of high levels of methane hydrates into the atmosphere. It was such an eruption which brought about the mass extinction event at the end of the Permian period, 251 million years ago, the worst of its kind in the geological record, wiping out 95 per cent of species on earth. It took a mere '50 million years - well into the Jurassic - before anything like pre-extinction levels of bio-diversity returned.'[41] The escape of methane from the permafrost of a melting Arctic happens to be currently a point of very acute

anxiety among earth scientists studying the circumpolar effects of climate change.[42] And Lynas was 'only' speaking of 6 degrees. Not the 7.8 degrees of Wasdell's calculation.

Present

What, then, is the point of pursuing this discussion at all, unless perhaps as some peculiar statement at the far end of deep ecology thought celebrating humanity's demise? Along with the critical thinkers who have put together 'Uncivilisation, The Dark Mountain Manifesto' - to my mind the most bold (UK-based) initiative to date exploring the 'social, economic and ecological unravelling of our time ' - I would probably concur 'that we are not the point and purpose of this planet' and that truly, 'our whole way of living is already passing into history.'[43] But what I equally propose should matter is the manner of that passing and most fundamentally whether it can be achieved without a resort to a violence over and beyond what we are already perpetrating against our planet and ourselves. Alastair McIntosh, as always, has put the matter eloquently but succinctly:

> The question of whether technology, politics and economic muscle can sort the problem is the small question. The big question is about sorting the human condition. It is the question of how we can deepen our humanity to cope with possible waves of war, famine, disease and refugees without such outer wounds festering to inner destruction.[44]

From this perspective, climate change as such is the occasion, *not* the cause of humanity's ultimate challenge. The crisis it has and will continue to engender thus, is both the moment, and perhaps also the *reason* (in the ancient, philosophical sense of *Logos*) for our summoning. In 'living the pathos of the end' there thus remains a way of 'bringing hope to crisis', [45] and so of creating the possibilities for a human empowerment geared not towards a 'material mastery over his non-human environment, but for a spiritual mastery over himself.' [46]

The unreconstructed 'his ', aside, the last quote comes from Arnold Toynbee's great valedictory work, *Mankind and Mother Earth*, an all-encompassing metahistory of 'civilisation' within its biospheric context, yet in which Toynbee clearly intimates human salvation can only come through the abandonment and renunciation of present destructive objectives in favour of an opposite ideal founded on a spiritual consciousness of the 'non-material and infinite.' The loftiness of the appeal combined with its obvious ethereality, may go some way to explain why few contemporary historians have time or patience with his once very popular work. Yet in his defence, I would propose that writing in the early 1970s, Toynbee was actually extremely prescient in the degree to which he recognised - considerably before anthropogenic climate change was widely understood - that humanity's potency had become greater than that of the biosphere itself and that this carried a suicidal ability to liquidate all planetary life. Nor did he stop short of describing this as nemesis. [47] The burden on today's historians to share this recognition may simply be too much to bear. But in returning to our profession and hence our broader responsibilities to the common weal I want in conclusion to briefly outline an argument for disciplinary purposefulness even in this twilight hour.

The proposition can be best grounded by repeating a question I asked in an earlier piece : 'How exactly do we understand the moment we are in ?'[48] When I did so back in 2007 I still held onto the very faintest of hopes that the political movers within the international system might listen to what they were being told by the scientists and, thus grasping the gravity of the situation, would finally, belatedly, initiate a rapid but *orderly* retreat from the carbon economy. This was always a remote prospect given that the carbon economy is the same thing as the global capitalist economy, and - as Jared Diamond has pointed out - where there has been heavy long-term financial (and emotional) investment in any human project, the 'sunk-cost effect' generally rules, however redundant or irrational the premise upon which the investment was built.[49] In the years since 2007 it has become abundantly plain that any chance of political and institutional elites being able to kick-start the necessary change of course has come and gone. Much has been made of the Copenhagen climate summit (COP-15) in December 2009 as the great missed opportunity. But my guess is that historians of the very last days will instead focus on the economic meltdown of fourteen months earlier as the real moment of truth. Faced with the imminent demise of the banking system at the core of an economic growth engine which is first cause of all our contemporary biospheric woes, the hegemonic world leaders blinked and then, in the space of just days and hours, proceeded to plough all their (our) available resources into propping up that self-same system. While these efforts are still likely to unravel - indeed there is a writing on the wall yet to become fully manifest - what in world historical- cum-natural historical terms, the events of 2008 signify is that the international system *qua* system lacks the mechanisms, imagination or will for re-setting humanity on a course of renewal; there is no contingency plan-B; and no top-down road-map, bar the actually out-of-date, and entirely unsafe 'business and usual' one. Looked at in terms of a normative *longue duree*, this does not matter. Sooner or later, an outworn order is bound to implode or collapse, just as did the Soviet empire. But, given the *real*, environmental crisis against which the 2008 events are set, the latter's legacy in terms of human prospects for survival over coming generations is very profound indeed. Carbon reduction aims, hence climate change mitigation, always had to operate within a timeline determined by what the biosphere could cope with. That path is now blocked off. As for Nature, it has already passed its verdict.

But if this assessment is correct, it can only raise one of two options for professional practitioners of any kind, including historians. The first is to simply carry on making obeisance to the system and attempting to extract whatever short-term professional or individual advantage one can by feeding and supporting its moribund existence.[50] Of course, it will not die quietly. On the contrary, its hegemonic elements, sooner or later, will marshal and deploy whatever military and/or industrial resources they can throw in the path of the crisis in an attempt to recover what is environmentally unrecoverable. The systemic default position on the fast-approaching horizon is geo-engineering. There are plans, too, from the leading industrial countries, Britain included, for an accelerated programme of nuclear power stations. Independent bodies such as the Royal Society are likely to be drawn in to give endorsement to such representative projects of high-modernity, on the one hand, the most brazen examples of technical fix yet devised 'to take control of the climate', on the other.[51] There is no reason why historians - alongside

other professionals - cannot offer themselves as advisers, cheer-leaders and propagandists for such projects. For instance, they may, be able to garner policy makers' praise by helping to smooth the path of public opinion towards acceptance, or at least acquiescence, of such grand designs, perhaps by quoting any number of historical precedents where states have argued their efficacy and need in terms of the greater good and alleged long-term *developmental* benefits. They may even be able to offer a rearguard action in support of their institutional autonomy by offering caveats and the need for consultative processes and safeguards to be built into these Promethean programmes. Whether they prove futile or otherwise, to align oneself with them, is effectively to accept a super-enhanced phase of' business as usual', when all logic points to its redundancy, plus, much more pointedly, a prolonged spasm of ever more controlling, annihilatory violence not only against the planet, but its people - with, inevitably, the poorest, the weakest, the most vulnerable first in the firing line.

There is a second option: though it is an entirely more subversive one. It might read as simply jumping ship, though that would not be its primary purpose. Put more squarely, it involves what I would describe as the prising open and then widening of an *alternative space* where all those who have repudiated the possibility of amelioration through the system can fully concentrate their individual and collective energies towards reconciliation with Nature - and hence reconciliation with *ourselves*. Such a project does not preclude the probability of an end to humanity in the very near future. It cannot be geared towards some dispensation in the face of our individual or collective demise. Its compensation, if that is in any sense an appropriate term, lies rather in the knowledge that we have sought to act as guides towards a reawakened sense of humanity's psychic, including precognitive interconnectedness with the living planet, and in that process may have helped facilitate a *recovery* of wisdoms, both practical and spiritual, which have eluded most of humankind through the long centuries of hubris and domination. I do not have the scope here to fully develop this theme. Necessarily in down-to-earth terms, such a project can only be geared towards a right-living in which actual or anticipated material scarcity is both cultivated and celebrated instead as an abundance. The path towards reconciliation is also one fundamentally grounded in the principles of non-violence. That said, the notion of alternative space may take many forms and operate on many levels. A great myriad of communities, groups and sometimes more mainstream organisations world-wide, consciously, or unconsciously, practice its tenets.

So, let me instead concentrate on what the historical discipline could bring to this quest. First of all, as we have already implied, a re-alignment of history with natural history. That, interestingly would also mean the re-population of our alternative space with peoples who have repeatedly been flung to the very margins or even beyond history altogether by dint of their 'primitiveness' and, or, non- or counter-relationship with dominant, progress-driven, modernity. In other words, all the hunter-gatherers, nomads, peasants, and migrants, past and present, each in their different ways steeled in resource scarcity; each with implicit and explicit notions of restraint and limitation built into their cultures and cosmologies. By high-Anthropocene nearly all of these diverse societies had become the poor, weak and dispossessed of the earth. And yet for serious paradox,

through the very resilience built into their fibres, these are the self-same societies most likely, *if any*, to become the epoch's survivors. [52]

Of course, one might argue historians *have* taken into their embrace all manner of 'subaltern' groups, while they *have* increasingly worked in recent decades, through the adoption of many linguistic, psychological and anthropological insights, towards a sympathetic, even empathetic exploration of the *mentalite* of diverse human cultures. It is one thing, however, to analyse a society (even lovingly), quite another to take it *seriously*. How for instance, do we respond, to something one of my students uncovered in her research on Australian aboriginal views of water as something which is 'living' and therefore has 'moral, spiritual and social consequences'? [53] In other words, are we willing to take on board both the practical life-skills and cosmologies of human communities living before or apart from dominant Anthropocene modes, not as if they were relics of some quaint but outdated yesteryear but as cultures which might teach the rest of us something not just about managing our material wants but psychological well-being in times of unending adversity? [54] To continue the antipodean thread for one moment, while it was clearly the benign Holocene which forged the general environmental conditions enabling humanity's mainstream take-off towards civilisations, from our present vantage point how might we now view the utterly versatile and culturally creative Aborigines who sustained themselves through persistent ice-age droughts in the central Australian deserts from *fifty thousand years earlier*? [55]

Clearly, what is at stake here is something more than space but also time. There is, of course, the Braudelian long-view. [56] Magnificent and life-affirming as it is, however, I doubt whether it is *sufficient* to getting to grips with the anthropocenic temporal rupture we are already living through any more than Spenglerian pessimism - for all the latter's insight into a 'Faustian' (western) civilisational striving for the unattainable.[57] Early on in this piece I implicitly proposed that the probability of foreclosure on the human experience as an ultimate consequence of such striving ought to be making us think long and hard about our place in universal time. Explorations by physicists of a space-time continuum have led to dramatic shifts towards a four-dimensional model of phenomenal reality.[58] Whether such remarkable insights, however, can offer something by way of solace for the rest of us mere mortals, 'imprisoned' as we appear to be with within our climate-induced hour-glass, remains doubtful. Breaking out from that would require us instead to be able to see some *human* point and purposefulness as we move towards the end.

Interestingly, there have been historians, who while they may not have been able to confront the notion of complete species obliteration, have not only grappled with realities of catastrophic historical rupture but have sought to interpret such events as containing the seeds of a life-transforming potential. One who particular stands out is the German-Jewish historian-philosopher, Walter Benjamin. In various writings culminating in his posthumously published *Theses on the Philosophy of History*, from 1940, Benjamin contrasted 'empty time' with what he called 'Now-time' (*Jetztzeit*). What is also immediately striking about the contrast is Benjamin's representation of the former as quantitative, homogenous time (in other words governed by a Taylorian clock,

underpinned by the positivism associated with modern ideas of linear, temporal progress) compared with the qualitatively 'filled' but heterogeneous historical time of the latter. In short, Benjamin's repudiation of the former also carries as its corollary not just his affirmation of 'Now-time' but as an expression of historical *messianism.* [59]

At this point in this presentation, I wonder, how many readers who have stuck with the argument about biospheric catastrophe and consequent historical finality thus far, may finally throw up their hands in horror at what they may infer as a 'whiff of millenarianism'?[60] I did warn early on that against the grain of normative time, as if it were an ongoing given, prospects of finality demand us to re-think where we have come from and where we are going. Benjamin's sense of historical rupture came out of the early 20th century catastrophes of modernity, Nazism included, set against the initial optimism engendered by the Russian revolution. In fact, various thinkers - some of whom like Ernst Bloch, were associated alongside Benjamin with the Frankfurt school, while others, such as Martin Buber and Gershom Scholem, were not - found themselves in the mid-decades of the 20th century equally grappling with spate after spate of political and environmental catastrophes which progressive conceptions of history duly dismissed as little more than unfortunate aberrations, or collateral damage on the forward march of modernity. By contrast, our dissenting voices struggled both to find a wider but 'discontinuous vision of temporality ' against the inevitability of industrial civilisation and, at the same time a break-out from 'the eternal repetition of the ever-the-same' into a 'qualitatively distinct utopian world.'[61] The fact that these thinkers shared Jewish origins, does not obviously explain their embrace of actually very subversive Judaic ideas given that nearly all of them came from assimilated, sometimes stridently secular backgrounds. Instead the attraction to the messianic seems to have been in major part because it offered a resource for critical thinking about the possibility of discontinuity in historical time (as set against the mindless abstractions of cumulative progress) and, at the same time, a basis for a practical regrounding of revolutionary action, in which ordinary humans themselves might become active agents for radical change.

What particularly matters for our purposes is the core Judaic idea at the heart of this quest : *Et Ketz* , 'the time of the End.' The notion is predicated on a view of temporality in which disjuncture is not aberrant but inseparable from the *entire* historical sequence. It also happens to be one in which the overthrow of worldly powers, by God - but also in which oppressed humanity may have a hand - leads (as in biblical prophecy) to the establishment, or re-establishment of 'an age of harmony between 'man and God, between man and nature, and among men'.[62] To be sure, once one is onto this eschatological terrain, even metaphorically, one is effectively being drawn towards engagement with a whole raft of millenarian-infused ideas - utopia, chiliasm, prophecy, apocalypse - which are usually dissonant, even repulsive to modern, secular ears. But that in a sense tells us more about the way modernity has chosen to suffocate the historical relevance of the messianic rather the ideas themselves. For example, when the language of climate change catastrophe is particularly graphic it is often disparagingly referred to as apocalyptic, forgetting that the originally Greek term *apokalyptein*, meant an uncovering of something which had been concealed : a *revelation*. As McIntosh explains : 'The word has a technical usage that implies a transformation, perhaps in consciousness, by which an

existing corrupt socio-ecological order is turned upside down by the astonishing iruption of new hope.' [63]

This also happens to chime in well with Toynbee's juxtaposition between the age-old pursuit of worldly material power and the struggle for a spiritual self-mastery. Moreover, if we were to put this into its more precise historical context, we would arrive at that earlier set of civilisational crises of the Axial Age, where power for its own sake (with military might as its justification) was repeatedly challenged by religious counter-cultures which both defied the premises upon which that power was built, and sought to guide *all* humanity towards something entirely different : a path of redemption. In the Judaic case, what was further posed, was the creation of a wholly other world, a heaven on earth, a new Jerusalem. Its moment would come through messianic rupture. But this, as Benjamin rightly apprised from Judaic scripture, need not be distant moment in the course of an otherwise empty time, 'for in it every second of time was the narrow gate through which the Messiah could enter.'[64]

Benjamin's desire for an active human participation in the coming of the Kingdom has its close corollary in radical Christian usage of the term *kairos*. 'The notion of *kairos* describes transformation of lived time into a time of action. The translation from the Greek is generally given as "the right moment" or "the opportune." ' [65] But as Stefan Skrimshire has cogently demonstrated, this is not simply a concept with attraction to theologians. Jacques Derrida amongst others repeatedly explored the notion of a time which is 'out of joint', and hence unpredictable as also one in which the consequent destabilisation of 'the normal synchronic logic of events' has its own liberating potential.[66] The linked notions of *Et Ketz* and *kairos* as 'special, chosen, timely time' which is the God-given *now* is surely a bequest from the historical record which ought to have particular resonance for our current situation. We do not have to be 'believers,' or in any sense religious, to grasp their contemporary significance. From a historian's point of view what should especially matter is the way during times of relentless, ongoing, catastrophic crisis ideas have emerged which, questioning the normative *Zeitgeist*, have looked instead to the potential in the *human condition* for wrenching time out of its empty corruption and investing it with a transformative power. It is, indeed, ironic that we today live according to a calendar of supposedly normative time whose first cause was exactly such a moment of subversive, messianic rupture.

What is equally significant about this historically-grounded eschatological *resource* is the manner in which it transcends the argument for purely and simply merging history with natural history. Ideas about the end appear to be an *outcome* of civilisational development from the ancient Near East, yet have endured when all the civilisations out of which the ideas emanated have long gone the way of Nineveh.[67] Why ? Fundamentally, I suspect, because they are expressive of a deep consciousness about what is 'wrong' with civilisation and what needs to be put right to set humanity on its path to reconciliation with itself and Mother Earth. The ideas carry within them a great list of things which would need to be done by way of environmental and social justice to arrive at such a destination. In our own time, the climate campaigner, Aubrey Meyer has exquisitely captured the essence of this purposefulness in his entirely scientific

proposition for a route - Contraction and Convergence - by which all humankind might arrive at an *equal* carbon entitlement which would also provide a practical framework within which yearly, incremental carbon reduction could be brought to safe-limits. [68] While mitigation of dangerous climate change - and within an actually, normative time-ordered process - has been the project's ostensible aim, underlying it is an ethical end-goal suffused with compassion and loving-kindness for all living things. Yet the reason why Meyer's proposition has been, and remains still-born is not on account of its practicality, but, much more pointedly, because its implementation would undercut, indeed starve, the sources of hegemonic worldly power.

One can almost speak of Contraction and Convergence in the past tense now because the chronological time has come and gone in which the international system might have grasped mitigation as its urgent priority. Looking back from a further vantage point, we are unlikely to be surprised by the system's failure. Indeed, in a sense there was no failure because it had nowhere else to go other than 'business as usual'. What will be truly disastrous for humankind, however, is if - as a consequence of the system's impending climate-precipitated collapse - the rest of us give way to despair, anomie and even greater estrangement from each other. I have always said I do not wish to be around to see the further violent consequences. Yet there is an alternative to this 'system' dependency. As believers or agnostics, humanists or atheists, those who were system acolytes who have had their Damascene conversion, or dissenters who were never there in the first place, we might yet take into *our* own hands the opportunity which this crisis now offers: to create our own alternative, right-living space and to invest its accompanying special time with *meaning*. This is not the path of resignation but on the contrary, one of heightened awareness followed by practical grass-roots action for and by the common weal. And historians might have a critical role as pathfinders and beacon carriers in this process by bravely demonstrating that in the context of where we find ourselves this is neither misplaced nor lunatic but rather a project whose legitimacy and worth is embedded in human consciousness and historical practice.

The difference now is that we are truly living in an anthropocenic epoch which heralds the human end. It is time to put our house in order. For our individual and collective wellbeing what other choice do we have but to strive for some measure of what the kabbalists call *tikkun olam*, some healing of our condition on this earth and thereby, with it, some measure of cosmic repair? Or, as Christians, and indeed not just Christians might put it, so that we might finally receive some degree of *grace*. That I propose is something still worth striving for in this *kairotic* time.

Endnotes

1. See http://thebulletin.org/content/mediacenter/announcements/2007/01/17/doomsday-clock-moves-two-minutes-closer-to-midnight
2. Alastair McIntosh*, Hell and High Water, Climate Change, Hope and the Human Condition,* Edinburgh: Birlinn, 2008, 191.
3. Donatella Meadows *et al*., *The Limits to Growth*, New York: Universe, 1972.

4. For example the, *Millennium Ecosystem Assessment Synthesis Report*, Washington DC: Island, 2005.
5. Clive Hamilton, *Requiem for a Species, Why We Resist the Truth about Climate Change*, London:Earthscan, 2010, for searing indictment.
6. See most recently the meta-analysis assessment by Ilya M. D. Maclean and Robert J. Wilson, 'Recent ecological responses to climate change support predictions of high extinction risk', *Proceedings of the National Academy of Science*, 11 July 2011, www.pnas.org/cgi/doi/10.1073/pnas.1017352108, which suggests an 11 per cent species' extinction by end of this century.
7. See Kevin Anderson and Alice Bows, 'Reframing the climate change challenge in light of post-2000 emission trends,' *Philosophical Transactions of the Royal Society*, 366:1882 (2008), 3863–3882.
8. From R.G. Collingwood, *An Autobiography*, quoted here in Paul Dukes*, Minutes to Midnight, History and the Anthropocene Era from 1763*, London: Anthem Press, 2011, 92.
9. Penelope J. Corfield, 'POST-Medievalism/Modernity/Postmodernity ?', *Rethinking History*, 14:3 (2010), 379-404, specifically here, 395.
10. Paul J. Crutzen, and Eugene F. Stoermer, "The 'Anthropocene,'" *Global Change Newsletter* 41(2000), 17-18.
11. Naomi Oreskes, 'The Scientific Consensus on Climate Change: How do we know we're not wrong? In Joseph F.C. Dimento and Pamel Doughman, eds*., Climate Change, What it Means for Us, Our Children, Our Grandchildren,* Cambridge MA. 2007, 93.
12. Oliver Smith, 'The Ecology of History, Russian Thought on the Future of the World', in Sigurd Bergmann and Heather Eaton, eds., *Exploring Religion, Ethics and Aesthetics*, Berlin and London: Lit Verlag, 2011, 125-26.
13. Dukes*, Minutes*, 7, 11-13.
14. Dipesh Chakrabarty 'The Climate of History: Four Theses,' *Critical Inquiry,* 35 (Winter 2009), 210.
15. William F. Ruddiman, *Plows, Plagues and Petroleum*, Princeton and Oxford: Princeton University Press, 2005, chapters 8-10.
16. Ibid., 150.
17. David Christian, 'World Environmental History,' in Jerry H. Bentley, ed*. The Oxford Handbook to World History*, Oxford: Oxford University Press, 2011, 132, 135.
18. See Fred Pearce, *Confessions of an Eco-Sinner, Travels to find where my stuff comes from,* London: Eden Project Books, 2008, chapter 31,' Close Shave: Why we are all children of Toba,' for an excellent synthesis.
19. Ibid., 329-330; Christian, 'World Environmental History, 129-30.
20. Quoted in Tom Griffiths, 'A humanist on thin ice,' *Griffith Review*, 29 (2010) http://www.griffithreview.com/edition-29-prosper-or-perish/a-humanist-on-thin-ice. Thanks to Marc Hudson for pointing me in the direction of this important article.
21. Corfield, 'POST-Medievalism', 381.
22. David Christian, *Maps of Time: An Introduction to Big History,* Berkeley CA: University of California Press, 2004.
23. See Jim Galloway, 'Unit 3, Climate Change as Harbinger of Disaster : Population, Famine and Disease in the 14th Century', in 'Past Actions: Present Woes, Future

Potential: Rethinking History in the Light of Anthropogenic Climate Change: A Teaching Guide by Rescue!History', http://www2.warwick.ac.uk/fac/cross_fac/heahistory/elibrary/internal/co_levene_pastactions_20100731 -

24. See Brian Fagan, *The Long Summer, How Climate Changed Civilisation*, New York: Basic Books, 2004, for wider discussion of the entire Holocene sequence.
25. Chakrabarty 'The Climate,' 217-18.
26. Ibid, 217; Griffiths, 'A humanist'.
27. See Jared Diamond, *Collapse, How Societies Choose to Fail or Survive*, London: Penguin, 2005; Joseph A. Tainter, *The Collapse of Complex Societies*, Cambridge : Cambridge University Press, 1988.
28. McIntosh*, Hell*, chapter 5, 'Pride and Ecocide', esp., 112, 115.
29. See Paul Tillich, 'Nature, also, mourns for a lost good', in idem. *The Shaking of the Foundations,* New York: Scribner, 1948.
30. Tony Waterston, 'The Public Health Implications of Climate Change,' powerpoint presentation, Crisis Forum 'Climate Change and Violence' workshop 5, York St John University, 18 August 2011. http://www.crisisforum.org.uk/events/workshop5_resources.php
31. See George Monbiot, *Heat, How we can stop the planet burning* London: Penguin, 2006, 1-3, who describes this same relationship in terms of a Faustian Pact.
32. Waterston, ' Public Health Implications.'
33. Monbiot, *Heat,* 3.
34 Sigurd Bergmann and Heather Eaton, 'Awareness Matters, Introductory Remarks about the Interwoven Gifts of Life and Belief,' in Bergmann and Eaton, *Exploring Religion*, 3.
35 See Keith Olbermann, ' When Murdoch-gate met Climate-gate', ' Countdown', *Current TV*, 21 July 2011, http://current.com/shows/countdown/blog/when-murdoch-gate-met-climate-gate , for recent revelations suggesting that News International hacker, Neil Wallis played a critical role in the UEA climate-gate saga in November 2009, aimed at discrediting climate science just prior to the Copenhagen summit on climate change.
36 See Mark Levene, 'Afterword: From Past to Future: Prospects for Genocide and its Avoidance in the 21st Century', in Donald Bloxham and A. Dirk Moses, eds. *The Oxford Handbook of Genocide Studies*, Oxford: Oxford University Press, 2010, 638-59, for further development of this theme.
37 David Wasdell, 'Critical Issues in the Domain of. Climate Dynamics,' Paper presented to the Department of Land Economy, University of Cambridge, 3 November 2010, www.apollo-gaia.org/Climate%20Sensitivity.pdf
38 Griffiths, 'A humanist'.
39 Christopher Shaw, 'Dangerous Limits; Climate Change and Modernity,' in Mark Levene, Rob Johnson and Penny Roberts, eds*., History at the End of the World? History, Climate Change and the Possibility of Closure*, Penrith: Humanities Ebooks, 2010, 94.
40 Stefan Skrimshire, 'Seeing beyond the Tipping Point, Climate Risks, Faith and Political Action,' in Bergmann and Eaton, *Exploring Religion,* 102-105.

41 Mark Lynas, *Six Degrees, Our Future on a Hotter Planet*, London and New York: Harper Perennial, 2007, chapter 6, 'Six Degrees,' esp. 226-34.
42 Dan Krotz, ' As Climate Changes, Methane Trapped under Arctic Ocean could Bubble to the Surface,' 4 May 2011, http://newscenter.lbl.gov/feature-stories/2011/05/04/methane-arctic/
43 Paul Kingsnorth and Dougald Hine, *Uncivilisation, The Dark Mountain Manifesto*, 2009, www.dark-mountain.net/join.../uncivilisation/manifesto1-194x3001/
44 McIntosh, *Hell,* 191. See also idem., 'Popping the Gygian Question', *Dark Mountain*, 1(summer 2010), 101-107, for engaged dissent with the *Uncivilisation* project.
45 Oliver Smith, 'Living the pathos of the end,' and Sarah S. Amsler, 'Bringing hope to crisis: Crisis Thinking, Ethical Action and Social Change,' were the titles of two of the papers among the many presented in a remarkable trio of interconnected workshops entitled 'Future Ethics', organised by Stefan Skrimshire, then of the Lincoln Theological Institute, at the University of Manchester, through 2008-9. Many of the papers in revised form appear in Stefan Skrimshire ed. *Future Ethics, Climate Change and Apocalyptic Imagination,* London and New York: Continuum, 2010.
46 Arnold Toynbee, *Mankind and Mother Earth, A Narrative History of the World*, New York and Oxford : Oxford University Press, 1976, 18.
47 Ibid., chapter 2, 'The Biosphere'; chapter 82, ' A Retrospect in 1973.'
48 Mark Levene and David Cromwell, ‘ Introduction: Survival Means Renewal', in Cromwell and Levene, *Surviving Climate Change: The Struggle to Avert Global Catastrophe*, London, Pluto Press, 2007, 10.
49 Diamond, *Collapse*, 432.
50 Dean Bavington, 'Environmental History during the Anthropocene, Critical Reflections on the pursuit of policy-orientated history in the man-age,' *EH+,* 27 March 2011, http://niche-canada.org/node/9933, for a searing critique.
51 See Royal Society discussion meeting, 'Geoengineering - Taking Control of our Planet's Climate', 8-9 November 2010, http://royalsociety.org/Geoengineering-taking-control-of-our-planets-climate/speakers/
52 See Dougald Hine, 'Death and the Mountain, John Berger's enduring sense of hope,' *Dark Mountain*, 1(summer 2010), 94, referring to John Berger, *Pig Earth* (1979).
53 Sophie Mihailovic, ‘Discuss the ways in which the value of water is portrayed through the culture of Australian Aboriginals. How do these compare with how the wider world values water ?' HIST 2054, 'In the Face of Humanity' course, University of Southampton assessed essay (2010).
54 Hine, 'Death', 90. Hine also refers here to the writing of Hugh Brody. See especially Brody's *The Other Side of Eden*, *Hunters, Farmers and the Shaping of the World*, North Point Press, 2001, for further revelatory insight.
55 Griffiths, 'A humanist'.
56 Fermand Braudel, *Civilisation and Capitalism: 15th-18th Century*, 3 volumes, trans. Sian Reynold, Berkeley CA: University of California Press 1979.
57 Oswald Spengler, *The Decline of the West,* Arthur Helps, and Helmut Werner, eds., trans. Charles F. Atkinson, New York: Oxford University Press, 1991.
58 Smith, ' Ecology, 114.

59 See Michael Lowy, *Redemption and Utopia, Jewish Libertarian Thought in Central Europe, A Study in Elective Affinity*, trans. Hope Heaney, London: The Athlone Press, 1992., 205-207.
60 Diana Shelley, personal comment on IHR debate, 1 April 2011.
61 Lowy, *Redemption,* 204.
62 Ibid., 19.
63 Alastair McIntosh, 'Foreward', in Skrimshire,.*Future Ethics*, ix.
64 Walter Benjamin, 'On the Concept of History, 1940', http://www.marxists.org/reference/archive/benjamin/1940/history.htm
65 Stefan Skrimshire, *Politics of Fear, Practices of Hope, Depoliticisation and Resistance in a Time of Terror*, London and New York: Continuum, 2008, 107.
66 Ibid., 134-36.
67 See Norman Cohn, *Cosmos, Chaos and the World to Come, The Ancient Roots of Apocalyptic Faith*, New Haven and London: Yale University Press, 1993.
68 See Aubrey Meyer, 'The Case for Contraction and Convergence,' in Cromwell and Levene*, Surviving Climate Change,* 29-56.