

The Anthropocene and the Global Environmental Crisis

Rethinking modernity in a new epoch

Edited by Clive Hamilton, Christophe Bonneuil and François Gemenne



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THE ANTHROPOCENE AND THE CONVERGENCE OF HISTORIES

Dipesh Chakrabarty

Anthropocene warming brings into view the collision – or the running up against one another – of three histories that, from the point of view of human history, are normally assumed to be working at such different and distinct paces that they are treated as processes separate from one another for all practical purposes: the history of the Earth system; the history of life including that of human evolution on the planet; and the more recent history of the industrial civilisation (for many, capitalism). Humans now unintentionally straddle these three histories that operate on different scales and at different speeds. The very language through which we speak of the climate crisis is shot through with this problem of human and in- or non-human scales of time.

Take the most ubiquitous distinction we make in our everyday prose between non-renewable sources of energy and the ‘renewables’. Fossil fuels we consider non-renewable on our terms but as Bryan Lovell, a geologist who worked as an advisor for BP and is an ex-president of the Geological Society of London, points out, fossil fuels are indeed renewable if only we think of them on a scale that is (in his terms) ‘inhuman’: ‘Two hundred million years from now, a form of life requiring abundant oil for some purpose should find that plenty has formed since our own times’ (Lovell 2010, 75).

Paleoclimatologists tell a very long history when it comes to explaining the significance of anthropogenic global warming. There is, first of all, the question of evidence. Ice core samples of ancient air – more than 800,000 years old – have been critical in establishing the anthropogenic nature of the current warming (Solomon et al. 2009, 446 Box 6.2). There are, in addition, palaeoclimatic records of the past in fossils and other geological materials. In his lucid book on the oil industry’s response – not always or uniformly negative – to the climate crisis, Bryan Lovell (2010) writes that those in the industry who supplied compelling evidence of the serious challenge that greenhouse gas emissions posed to the future

of humanity were geologists, they who could read deep climate histories buried in sedimentary rocks to see the effects of ‘a dramatic warming event that took place 55 million years ago’. In the literature, this event is known as the late Paleocene-Eocene Thermal Maximum (PETM).

How far the arc of the geological history explaining Anthropocene warming projects into the future may be quickly seen from the very subtitle of David Archer’s *The Long Thaw: How Humans are Changing the Next 100,000 Years of Earth’s Climate*. ‘Mankind is becoming a force in climate comparable to the orbital variations that drive glacial cycles,’ he writes.

The long lifetime of fossil fuel CO₂ creates a sense of fleeting folly about the use of fossil fuels as an energy source. Our fossil fuel deposits, 100 million years old, could be gone in a few centuries, leaving climate impacts that will last for hundreds of millennia. The lifetime of fossil fuel CO₂ in the atmosphere is a few centuries, plus 25% that lasts essentially forever.

(Archer 2009, 11)

The carbon cycle of the Earth will eventually clean up the excess carbon dioxide we put out in the atmosphere, but it works on an inhumanly long time scale.

Anthropocene warming thus produces problems that we ponder on very different and incompatible scales of time. Policy specialists think in terms of years or decades while politicians in democracies think primarily in terms of their electoral cycles. Understanding what anthropogenic climate change is and how long its effects may last calls for thinking on very large and small scales at once, including scales that defy the usual measures of time that inform human affairs. This is another reason that makes it difficult to develop a comprehensive politics of climate change. Archer goes to the heart of the problem here when he acknowledges that the million-year time-scale of the planet’s carbon cycle is ‘irrelevant for political considerations of climate change on human time scales’. Yet, he insists, it remains relevant to any understanding of anthropogenic climate change because ‘ultimately the global warming climate event will last for as long as it takes these slow processes to act’ (Archer 2009, 21).

Significant gaps between cognition and action thus open up in the existing literature on the climate problem, between what we scientifically know about it – the vastness of its non- or in-human scale, for instance – and how we think about it when we treat it as a problem to be handled by the human means at our disposal. The latter have been developed for addressing problems we face on familiar scales of time. I call these gaps or openings in the landscape of our thoughts ‘rifts’ because they are like fault lines on a seemingly continuous surface: we have to keep crossing or straddling them as we think or speak of climate change. They inject a certain degree of contradictoriness in our thinking for we are being asked to think on different scales at once.

I want to discuss here three such rifts: (1) the various regimes of probability that govern our everyday lives in modern economies, now having to be supplemented by our knowledge of the radical uncertainty (of the climate); (2) the story

of our necessarily divided human lives having to be supplemented by the story of our collective life as a species, a dominant species, on the planet; and (3) having to wrestle with our inevitably anthropocentric thinking in order to supplement it with forms of disposition towards the planet that do not put humans first. We have not yet overcome these dilemmas to settle decidedly on any one side of them. They remain as rifts.

In what follows, I elaborate on these rifts with a view to demonstrating that the analytics of capital (or of the market), while necessary, are insufficient instruments in helping us come to grips with the Anthropocene. I will go on to conclude by proposing that the climate crisis makes visible an emergent, but critical distinction between the global and the planetary that will need to be explored further in order to develop a perspective on the human meaning(s) of global warming.

Probability and radical uncertainty

Modern life is ruled by regimes of probabilistic thinking. From evaluating lives for actuarial ends to the working of money and stock markets, we manage our societies by calculating risks and assigning probability values to them. 'Economics,' writes Charles Pearson, 'often makes a distinction between risk, where probabilities of outcomes are known, and uncertainty, where probabilities are not known and perhaps unknowable' (Pearson 2011, 25 n6). This is surely one reason why economics as a discipline has emerged as the major art of social management today. There is, therefore, an understandable tendency in both climate-justice and climate-policy literature – the latter dominated by economists or law scholars who think like economists – to focus not so much on what palaeoclimatologists or geophysicists who study planetary climate historically have to say about climate change but rather on what we might call the physics of global warming that often presents a predictable, static set of relationships of probability and proportion: if the share of greenhouse gases in the atmosphere goes up by X, then the probability of the Earth's average surface temperature going up by so much is Y.

Such a way of thinking assumes a kind of stability or predictability – however probabilistic it may be – on the part of a warming atmosphere that palaeoclimatologists, who focus more on the greater danger of tipping points, often do not assume. This is not because policy thinkers are not concerned about the dangers of climate change; nor because they are ignorant of the profoundly nonlinear nature of the relationship between greenhouse gases and rise in the planet's average surface temperature. They clearly are. But their methods are such that they appear to hold or bracket climate change as a broadly known variable (converting its uncertainties into risks that have been acknowledged and evaluated) while working out options that humans can create for themselves striving together or even wrangling among themselves. The world climate system, in other words, has no significant capacity to be a wild card in their calculations in so far as they can make policy prescriptions; it is there in a relatively predictable form to be managed by human ingenuity and political mobilisation (Weitzman 2009, 26).

The rhetoric of the climate scientists, on the other hand, in what they write to persuade the public is often remarkably vitalist. In explaining the danger of anthropogenic climate change, they often resort to a language that portrays the climate system as a living organism. James Lovelock compares life on the planet to a single living organism. Archer describes the 'carbon cycle of the Earth' as 'alive' (Archer 2010, 1). The image of climate as a temperamental animal also inhabits the language of Wallace (Wally) Broecker who, with Robert Kunzig, thus describes his studies:

Every now and then . . . nature has decided to give a good swift kick to the climate beast. And the beast has responded, as beasts will – violently and a little unpredictably.

(Kunzig and Broecker 2008, 100)

The vitalism of this prose does not arise because climate scientists are less 'scientific' than economists and policy makers. The vitalist metaphors issue from climate scientists' anxiousness to communicate and underscore two points about Earth's climate: that its many uncertainties cannot ever be completely tamed by existing human knowledge and hence the inherent unpredictability of its exact 'tipping points'. As Archer puts it:

The IPCC forecast for climate change in the coming century is for a generally smooth increase in temperature. . . . However, actual climate changes in the past have tended to be abrupt. . . . [C]limate models . . . are for the most part unable to simulate the flip flops in the past climate record very well.

(Archer 2009, 95)

It is in fact this sense of a 'climate beast' that is missing from both the literature inspired by economics and that inspired by political commitments on the left. Climate uncertainties may not always be like measurable risks. 'Do we really need to know more than we know now about how much the Earth will warm? *Can we know more?*', asks Paul Edwards rhetorically. 'It is now virtually certain that CO₂ concentrations will reach 550 ppm (the doubling point) sometime in the middle of this century,' and the planet 'will almost certainly overshoot CO₂ doubling'. Climate scientists, he reports, are engaged in the speculation 'that *we will probably never get a more exact estimate than we already have*' (Edwards 2010, 438–9).

'Climate scientists are historians,' writes Edwards, and like historians 'every generation of climate scientists revisit the same data, the same events – digging through the archives to ferret out new evidence, correct some previous interpretation,' and so on. And 'just as with human history, we will never get a single, unshakable narrative of the global climate's past. Instead we get versions of the atmosphere, . . . convergent yet never identical' (Edwards 2010, 431). Moreover, 'all of today's analyses are based on the climate we have experienced in historical time'. Edwards quotes the scientists Myles Allen and David Frame: 'Once the world has warmed by 4°C, conditions will be so different from anything we can

observe today (and still more different from the last ice age) that it is inherently hard to say when the warming will stop.'

The first rift that I speak of thus organises itself around the question of the tipping point of the climate, a point beyond which global warming could be catastrophic for humans. That such a possibility exists is not in doubt. Paleoclimatologists know that the planet has undergone such warming in the geological past (as in the case of PETM event). But we cannot predict how quickly such a point could arrive. It remains an uncertainty that is not amenable to the usual cost-benefit analyses that are a necessary part of risk-management strategies. As Pearson explains, 'BC [benefit-cost analysis] is not well suited for making catastrophe policy' and he acknowledges that the 'special features that distinguish uncertainty in global warming are the presence of nonlinearities, thresholds and potential tipping points, irreversibilities, and the long time horizon' that make 'projections of technology, economic structure, preferences and a host of other variables 100 years from now increasingly questionable' (Pearson 2011, 31, 26). 'The implication of uncertainty, thresholds, tipping points,' he writes, 'is that we should take a precautionary approach,' that is, 'avoid taking steps today that lead to irreversible changes' (Pearson 2011, 30).

However, the precautionary principle, as Sunstein explains it, also involves cost-benefit analysis and some estimation of probability. But we simply don't know the probability of the tipping point being reached over the next several decades or by 2100, for the tipping point would be a function of the rise in global temperature and multiple, unpredictable amplifying feedback loops working together. Under the circumstances, the one principle that Hansen recommends to policy thinkers concerns the use of coal as a fuel. He writes: 'So, if we want to solve the climate problem, we must phase out coal emissions. Period' (Hansen 2009, 176). Not quite a precautionary principle but what in the literature on risks would be known as the maximin principle: 'choose the policy with the best worst-case outcome' (Sunstein 2002, 129).

Yet this would seem unacceptable to governments and business around the world, for without coal, which China and India are still dependent on to a large degree (around 70 per cent of their energy supply), how would the majority of the world's poor be lifted out of poverty in the next few decades and thus equipped to adapt to the impact of climate change? Or would the world, scrambling to avoid the tipping point of the climate, make the global economy itself tip over and cause untold human misery? Thus, would avoiding 'the harm' itself do more harm, especially as we do not know the probability of reaching the tipping point in the coming few decades? This is the dilemma that goes with the application here of the precautionary or the maximin principle.

At the heart of this rift is the question of scale. On the much more extended canvas on which they place the history of the planet, palaeoclimatologists see climatic tipping points and species extinction as perfectly repeatable phenomena, irrespective of whether or not we can model for them. Our strategies of risk management, however, arise from more human calculations of costs and their probabilities over

plausible human timescales. Anthropocene warming requires us to move back and forth between thinking on these different scales all at once.

Our divided lives as humans and our collective life as a dominant species

Human-induced climate change gives rise to large and diverse issues of justice: justice between generations, between small island-nations and the polluting countries (both past and prospective), between developed, industrialised nations (historically responsible for most emissions) and the newly industrialising ones, and so on. Peter Newell and Matthew Paterson thus express a sense of discomfiture about the use of the word *human* in the expression *human-induced climate change* (just as some, such as Alf Hornborg in this volume, are discomforted by the undifferentiated *anthropos* of the Anthropocene). 'Behind the cosy language used to describe climate change as a common threat to all humankind,' they write, 'it is clear that some people and countries contribute to it disproportionately, while others bear the brunt of its effects' (Newell and Paterson 2010). The climate crisis, write John Bellamy Foster, Brett Clark, and Richard York in their thoughtful book, *The Ecological Rift*, is 'at bottom, the product of a social rift: the domination of human being by human being. The driving force is a society based on class, inequality, and acquisition without end' (Foster et al. 2010, 27).

There are good reasons why questions of justice arise. Only a few nations (some 12 or 14 including China and India in the last decade or so) and a fragment of humanity (about one-fifth) are historically responsible for most of the emissions of greenhouse gases to date. This is true. But we would not be able to differentiate between humans as actors and the planet itself as an actor in this crisis if we did not realise that, leaving aside the question of intergenerational ethics that concerns the future, anthropogenic climate change is not inherently – or logically – a problem of past or accumulated intra-human injustice. Imagine the counterfactual reality of a more evenly prosperous and just world made up of the same number of people and based on exploitation of cheap energy sourced from fossil fuel. Such a world would have been more egalitarian and just – at least in terms of distribution of income and wealth – but the climate crisis would have been worse! Our collective carbon footprint would have only been larger – for the world's poor do not consume much and contribute little to the production of greenhouse gases – and the climate change crisis would have been on us much sooner and in a much more drastic way.

It is, ironically, thanks to the poor – that is, to the fact that development is uneven and unfair – that we do not put out even larger quantities of greenhouse gases into the biosphere than we actually do. Thus, logically speaking, the climate crisis is not *inherently* a result of economic inequalities – it is really a matter of the quantity of greenhouse gases we put out into the atmosphere. Those who connect climate change exclusively to historical origins/formations of income inequalities in the modern world raise valid questions about historical inequalities; but a reduction of the problem of climate change to that of capitalism (folded into the histories of modern European expansion and empires) only blinds us to the nature of our

present, a present defined by the coming together of the relatively short-term processes of human history and other much longer-term processes that belong to the history of the Earth system and of life on the planet.

Agarwal and Narain's insistence that the natural carbon sinks – such as the oceans – are part of the global commons and hence best distributed between nations by applying the principle of equal access on a per capita basis if the world were to 'aspire . . . to such lofty ideals like global justice, equity and sustainability,' raises, by implication a very important issue – the simultaneously acknowledged and disavowed problem of population (Agarwal and Narain 1991, 5, 9). Population is often the elephant in the room in discussions of climate change. The 'problem' of population – while due surely in part to modern medicine, public health measures, eradication of epidemics, the use of artificial fertilisers, and so on – cannot be attributed in any straightforward way to a logic of a predatory and capitalist West, for neither China nor India pursued unbridled capitalism while their populations exploded. If India had been more successful with population control or with economic development, its per capita emission figures would have been higher. (That the richer classes in India want to emulate western styles and standards of consumption is obvious to any observer.) Indeed, the Indian Minister in charge of the Environment and Forests, Jairam Ramesh, said as much in an address to the Indian Parliament in 2009: 'per-capita is an accident of history. It so happened that we could not control our population' (Ramesh 2012, 238).

Population remains a very important factor in how the climate crisis plays out. For without their having such large populations that the Chinese and Indian governments legitimately desire to 'pull out of poverty', they would not be building so many coal-fired power stations every year. The Indian government is fond of quoting Gandhi on the present environmental crisis: 'Earth [*prithvi*] provides enough to satisfy every man's need but not enough for every man's greed.' Yet 'greed' and 'need' become indistinguishable in arguments in defence of continued use of coal, the worst offender among fossil fuels. India and China want coal; Australia and other countries want to export it. It is still the cheapest variety of fossil fuel. Coal represents around 30 per cent of world energy, a share that is growing. Coal companies in the United States, Australia and elsewhere see enormous export opportunities in India and China, which defend the use of coal by referring to the needs of their poor.

Population is also a problem because both the total size and distribution of humanity matter in how the climate crisis unfolds, particularly with regards to species extinction. Humans have been putting pressure on other species for quite some time now, a fact I do not need to belabour. Indeed, the war between humans and wild animals such as rhinoceroses, elephants, monkeys and big cats may be seen everyday in many Indian cities and villages. That we have consumed many varieties of marine life out of existence is also generally accepted. Ocean acidification threatens the lives of many species (see Hansen 2009). And, clearly, as many have pointed out, the exponential growth of human population in the twentieth century has itself had much to do with fossil fuels through the use of artificial fertilisers, pesticides and pumps for irrigation (Smil 2013, 11–12).

But there is another reason why the history of human evolution and the total number of human beings today matter when we get to the question of species survival as the planet warms. One way that species threatened by global warming will try to survive is by migrating to areas more conducive to their existence. This is how they have survived past changes in the climatic conditions of the planet. But now there are so many of us, and we are so widespread on this planet, that we stand in the way. Curt Stager puts it clearly:

As Anthropocene warming rises toward its as yet unspecified peak, our long-suffering biotic neighbors face a situation that they have never encountered before in the long, dramatic history of ice ages and interglacials. They can't move because we're standing in their way.

(Stager 2011, 66)

The irony of the point runs deeper. The spread of human groups throughout the world and their growth in the age of industrial civilisation now make it difficult for human climate refugees to move to safer and more inhabitable climes (Denny and Matisoo-Smith 2011). Other humans will stand in their way. Burton Richter puts the point thus: 'The population now is too big to move *en masse*, so we had better do our best to limit the damage that we are causing' (Richter 2010, 2).

The history of population thus belongs to two histories at once: the very short term history of the industrial way of life – of modern medicine, technology, and fossil fuels as well as of fertilisers, pesticides and irrigation – that accompanied and enabled the growth in our numbers and the much, much longer-term evolutionary or deep history of our species, the history through which we have evolved to be the dominant species of the planet, spreading all over it and now threatening the existence of many other life-forms. The poor participate in that shared history of human evolution just as much as the rich do. In a recent paper the Duke University geologist, Peter Haff, has convincingly argued that it would not be possible to sustain the lives of seven – soon to be nine – billion people on the planet without modern forms of energy and communications technology touching all our lives in some significant ways. Without this network of connections, he argues, the total human population on Earth will collapse to about 10 million. The 'technosphere', he argues, has become the condition of possibility enabling so many of us, both rich and poor, to live on this planet and act as its dominant species (Haff 2013).

Per capita emission figures, while useful in making a necessary and corrective polemical point in the political economy of climate change, hide the larger history of the species in which both the rich and the poor participate. *Population* is clearly a category that conjoins the two histories.

Are humans special? The moral rift of the Anthropocene

Anthropocene warming reveals the sudden coming together of the usually separated syntactic orders of recorded and deep histories of humankind, of species history and the history of the Earth system, revealing the deep connections through

which the planet's carbon cycle and life interact with each other and so on. It does not mean that this knowledge will stop humans from pursuing, with vigour and vengeance, our all too human ambitions and squabbles that unite and divide us at the same time.

In their fascinating paper on the Anthropocene, Will Steffen, Paul Crutzen, and John McNeill have drawn our attention to what they call – after Polanyi, I assume – the period of the 'Great Acceleration' in human history, from 1945 to the present, when global figures for population, real GDP, foreign direct investment, damming of rivers, water use, fertiliser consumption, urban population, paper consumption, transport motor vehicles, telephones, international tourism, and McDonald's restaurants (yes!) all began to increase dramatically in an exponential fashion (Steffen et al. 2007).

The year 1945, they suggest, could be a strong candidate for an answer to the question, When did the Anthropocene begin? While the Anthropocene may stand for all the climate problems we face today collectively, as a historian of human affairs it is impossible for me not to notice that this period of so-called Great Acceleration is also the period of great decolonisation in countries that had been dominated by European imperial powers and that made a move towards modernisation (the damming of rivers, for instance) over the ensuing decades and, with the globalisation of the last twenty years, towards a certain degree of democratisation of consumption as well.

I cannot ignore the fact that 'the Great Acceleration' included the production and consumption of consumer durables – such as the refrigerator and the washing machine – in western households that were touted as 'emancipatory' for women. Nor can I forget the pride with which today the most ordinary and poor Indian citizen now possesses his or her smart phone or a fake and cheap substitute. The lurch into the Anthropocene has also been globally the story of some long-anticipated social justice as well, at least in the sphere of consumption.

This justice between humans, however, comes at a price. The result of growing human consumption has been a near-complete human appropriation of the biosphere.

This raises a question that bears striking similarity to the question that Europeans often asked themselves when they forcibly or otherwise took over other peoples' lands: by what right or on what grounds do we arrogate to ourselves the almost exclusive claims to appropriate for human needs the biosphere of the planet?

The idea that humans are special has, of course, a long history. We should perhaps speak of anthropocentrism in the plural here. There is, for instance, a long line of thinking – from religions that came long after humans established the first urban centres of civilisation and created the idea of a transcendental God through to the modern social sciences – that has humans positioned as facing the rest of the world, as nature. These later religions are in strong contrast, it seems, with the much more ancient religions of hunting-gathering peoples (I think here of Australian Aborigines and their stories) that often saw humans as part of animal life. The humans were not necessarily special in these ancient religions. They ate

and were eaten in the same way that other animals did. They were part of life. Recall Durkheim's position on totemism. In determining 'the place of man' in the scheme of totemistic beliefs, Durkheim was clear that totemism pointed to a doubly conceived human, or what he called the 'double nature' of man: 'Two beings co-exist within him: a man and an animal.' And again: 'we must be careful not to consider totemism a sort of animal worship. . . . Their [men and their totems] relations are rather those of two things who are on the same level and of equal value' (Durkheim 1982 [1915], 134, 139). The very idea of a transcendental God puts humans in a special relationship to the Creator and to His creation, the world.

The literature on climate change thus reconfigures an older debate on anthropocentrism and so-called non-anthropocentrism that has long exercised philosophers and scholars interested in environmental ethics: do we value the non-human for its own sake or because it is good for us? (see Buell 2001, 224–42). Non-anthropocentrism, however, may indeed be a chimera for, as the Chinese scholar Feng Han points out in a different context, 'human values will always be from a human (or anthropocentric) point of view' (Feng Han 2008). Ecologically-minded philosophers in the 1980s made a distinction between 'weak' and 'strong' versions of anthropocentrism. Strong anthropocentrism had to do with unreflexive and instinctive use or exploitation of nature for purely human preferences; weak anthropocentrism was seen as a position arrived at through rational reflections on why the nonhuman was important for human flourishing (Norton 1984, 131–48).

Lovelock's work on Anthropocene warming, however, produces a radically different position, on the other side of the rift as it were. He packs it into a pithy proposition that works almost as the motto of his book, *The Vanishing Face of Gaia*: 'to consider the health of the Earth without the constraint that the welfare of humankind comes first' (Lovelock 2009, 35–6). He emphasises: 'I see the health of the Earth as primary, for we are utterly dependent upon a healthy planet for survival.' What does it mean for humans, given their inescapable anthropocentrism, to consider 'the Earth as primary' or to contemplate the implications of Archer's statement that the world was not 'created specially for us'? I will consider this question in the following and concluding section of this essay.

Climate and capital, the global and the planetary

In his book, *Living in the End Times*, Slavoj Žižek made some interesting criticism of my essay 'The Climate of History: Four Theses' (Chakrabarty 2009). Responding to my points that there were 'natural parameters' to our existence as a species that were relatively independent of our choices between capitalism and socialism and that we therefore needed to think deep history of the species and the much shorter history of capital together, Žižek remarked:

Of course, the natural parameters of our environment are 'independent of capitalism or socialism' – they harbor a potential threat to all of us, independently of economic development, political system, etc. However, the fact that their

stability has been threatened by the dynamic of global capitalism nonetheless has a stronger implication that the one allowed by Chakrabarty: in a way, we have to admit that *the Whole is contained by its Part*, that the fate of the Whole (life on earth) hinges on what goes on in what was formerly one of its parts (the socio-economic mode of production of one of the species on earth).

(Žižek 2010, 333)

Given this premise, his conclusion followed: we also 'have to accept the paradox that . . . the key struggle is the particular one: one can solve the universal problem (of the survival of human species) only by first resolving the particular deadlock of the capitalist mode of production. . . . [T]he key to the ecological crisis does not reside in ecology as such' (Žižek 2010, 333–4).

That the capitalist or industrial civilisation, dependent on the large-scale availability of cheap fossil-fuel energy, is a proximate or efficient cause of the climate crisis is not in doubt. But Žižek puts capitalism in the driver's seat; it is the 'part' that now determines 'the whole'. My position is different: to say that the history and logic of particular human institutions have become caught up in the much larger processes of the Earth system and evolutionary history (stressing the lives of several species, including ourselves) is not to say that human history is the driver of these large-scale processes.

These latter processes continue over scales of space and time that are much larger than those of capitalism; hence the rifts we have discussed. As Stager and Archer point out, however much the 'excess' carbon dioxide we put out today, the long-term processes of the Earth system, its million-year carbon cycle, for instance, will most likely 'clean it up' one day, humans or no humans (Solomon et al. 2009, 20; Stager 2011, Chapter 2). Which is why it seems more consistent to see these long-term Earth system processes as co-actors in the drama of global warming. This is also suggested by the fact that, unlike the problems of wealth accumulation or income inequalities, or the questions posed by globalisation, the problem of Anthropocene warming could not have been predicted from within the usual frameworks deployed to study the logics of capital. The methods of political economic investigation and analyses do not usually entail digging up 800,000-year-old ice-core samples or making satellite observations of changes in the mean temperature of the planet's surface. Climate change is a problem defined and constructed by climate scientists whose research methods, analytical strategies and skill-sets are different from those possessed by students of political economy.

Once we grant processes belonging to the deeper history of Earth and life, the role of co-actors in the current crisis (playing themselves out on scales both human and non-human) highlights Gayatri Chakravorty Spivak's observation that 'The planet is the species of alterity, belonging to another system; and yet we inhabit it' (Spivak 2012, 338). Spivak was on to something here. Her formulation takes a step towards pondering the human implications of the kind of planetary studies that inform and underpin the science of climate change.

This science drives a clear wedge between an emergent conception of the planetary and existing ideas regarding the global. For even though the current phase of warming of the Earth's atmosphere is indeed anthropogenic, it is only contingently so; humans have no intrinsic role to play in the science of planetary warming as such. The science is not even specific to this planet – it is part of what is called planetary science. It does not belong to an Earth-bound imagination. Our current warming is an instance of planetary warming that has happened both on this planet and on other planets, humans or no humans, and with different consequences. It just so happens that the current warming of the Earth is of human doing. The 'global' of globalisation literature, on the other hand, cannot be thought without humans directly and necessarily placed at the very centre of the narrative.

The scientific problem of climate change thus emerges from what may be called 'comparative planetary studies' and entails a degree of interplanetary research and thinking. The imagination at work here is not human-centred. It speaks to a growing divergence in our consciousness between the global – a singularly human story – and the planetary, a perspective to which humans are incidental. The Anthropocene is about waking up to the rude of shock of the recognition of the otherness of the planet. The planet, to speak with Spivak again, 'is the species of alterity, belonging to another system'. And 'yet,' as she puts it, 'we live on it.' If there is to be a comprehensive politics of climate change, it has to begin from this perspective. The realisation that humans – all humans, rich or poor – come late in the planet's life and dwell more in the position of passing guests than possessive hosts, has to be an integral part of the perspective from which we pursue our all-too-human but legitimate quest for justice on issues to do with the iniquitous impact of anthropogenic climate change.

This chapter was first published in a longer form as Dipesh Chakrabarty, *Climate and Capital: On Conjoined Histories*, *Critical Inquiry* 41 (Autumn 2014) 2014. © 2014 by The University of Chicago. All rights reserved.

Note: In the interest of editorial consistency, the author's expression 'global warming' has at times been replaced by 'Anthropocene warming' in this essay.

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5

THE POLITICAL ECOLOGY OF THE TECHNOCENE

Uncovering ecologically unequal exchange in the world-system

Alf Hornborg

Introduction

The currently unfolding discourse on the Anthropocene represents a convergence of Earth system natural science and what I will refer to as post-Cartesian social science. Both fields suggest that the Enlightenment distinction between Nature and Society is obsolete. Now that humanity is recognised as a geological force, the story goes, we must rethink not only the relations between natural and social sciences but also history, modernity, and the very idea of the human. Indeed, the increasingly inextricable interfusion of nature and human society is incontrovertible, as evidenced not only by climate change but also by several other kinds of anthropogenic transformations of ecosystems.

For decades having believed these circumstances to be self-evident, however, I am surprised by the intensity and also the character of the philosophical import that is currently attributed to them. The theoretical implications of the interfusion of Nature and Society, and the imperative of transdisciplinary approaches to human–environmental relations, were prominent in social-science agendas already in the 1990s (for example, Narain and Agarwal 1991; Haraway 1991; Croll and Parkin 1992; Latour 1993; Descola and Pálsson 1996; Peet and Watts 1996; Escobar 1999). Fields such as environmental anthropology, political ecology, development studies, and science-and-technology studies (STS) were attempting to deconstruct the Nature/Society distinction more than twenty years ago.¹ Rather than embroil ourselves in increasingly obscure deliberations on the possible philosophical implications of this shift, it should now be incumbent on social scientists to try to be as clear as possible about the societal and not least political issues that it raises.

The questions I wish to address in this chapter are: In what sense should the idea of the Anthropocene change our understanding of human–environmental relations, history, and modernity? If post-Cartesian perspectives can help us grasp

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ACCEPTING THE REALITY OF GAIA

A fundamental shift?

Isabelle Stengers

At the origin of this text was the *Thinking the Anthropocene* conference held in Paris, 14–15 November 2013, the aim of which was to gather social sciences and humanities scholars ‘with an intuition that something fundamental has shifted’, meaning that their disciplines, as they rested on the ‘social only’ conceptions that define modernity, need rethinking. ‘Gaia’, it was written in the invitation circular, ‘has reawakened’. While ‘Anthropos’, now defined as a ‘geological force’, has met a remarkable academic success, the name Gaia is liable to provoke a ‘you can’t be serious’ reaction, asking for an ‘it is only a metaphor’ reassuring answer. For those who share ‘the intuition that something fundamental has shifted’, I will claim that the contrast between the ‘Anthropocene’ and the ‘reawakening of Gaia’ is significant and may indicate that the articulation between diverging conceptions of ‘reality’ is part of the shift.

In a way, the association between Gaia, a bastard child of climate sciences and ancient paganism, and the proposition to ‘think the Anthropocene’ seems unproblematic. Both are pointing to the very uncertain times we are entering. The Holocene, which would belong to the past, marked the end of the last glacial period, the beginning of a semi-stable climate regime, propitious to the development of what would be ‘entirely new’, including modern sciences. The geologists are proudly able to situate this novelty in Earth’s timeline. Anthropocene would mean something new again, but the novelty would be that ‘Anthropos’ must now be considered as a ‘geological force’ in its own right, leaving all over the world the incontrovertible mark that something ‘new’ has happened. But just as with the looming climate disorder, those marks give no reason for pride to the one who would be responsible for them. They tell, and will go on telling in a far away future measured in geological time, about erosion, pollution, radioactive contamination, a monstrous accumulation of garbage, and, of course, a massive loss in biodiversity.

When I first heard about the Anthropocene proposal, I had mixed feelings, as felt it was smoothing down a distinction that, I thought, should rather be dramatised. The damage, even injury, caused to the Earth is not something we ‘discover’. The lasting character of it is certainly impressive but depredation, exploitation, rape, loss are words we are used to, and they may concern both ‘ecosystems’ (not to use the now ritually criticised term ‘nature’) and the many peoples on this Earth who were not aware that they did belong to the species called ‘Man’, or *homo sapiens* or Anthropos. In contrast, what we have learned about the speed and possible irreversibility of the coming climate change creates a novel situation. ‘Man’, we realise, has not only been abusive but has also played the sorcerer’s apprentice and may well provoke an awesome answer from something which can no longer be figured as a ‘victim’, something which gives a new meaning to the powerful being whom James Lovelock and Lynn Margulis baptised Gaia.

For the ‘climate change’ community, and in particular for one of its most central figures, Stephen Schneider, Gaia was never a simple metaphor; rather it was the questioning figure this community had to decipher (Schneider 1984). It is Schneider who in 1988, organised the first Chapman Conference on the Gaia Hypothesis, which did much to get the issue discussed seriously by scientists. And right from the beginning the ethos of Gaia was at stake for him. Is Gaia the name for a living organism, or, at least, a homeostatic coevolutionary system, ensuring the optimal condition for the flourishing of life on the Earth? It was Lovelock’s thesis, but Schneider had a rather different idea. For him, the 1980 Alvarez hypothesis, which had linked the famous extinction of the dinosaurs some 65 million years ago to the Earth being struck by a giant asteroid and the consequent global cooling due to a dust cloud enveloping the Earth, gave a taste of Gaia’s capacity to destroy what she had previously sustained. The stability and stabilising power of Gaia could not be taken for granted.

The possibility of brutal extinction staged by the Alvarez hypothesis has been the starting point for a community of ‘climate change’ modellers with an inseparably political and scientific agenda. The ‘nuclear winter’ hypothesis of the 1980s, a time when there was perceived to be an increased possibility of a nuclear confrontation, was brought to public attention by alarm-bell ringers Paul Crutzen, Stephen Schneider and many others. They organised international cooperation, including Soviet scientific partners, in order to run computer simulations of the possible ‘global’ effect of even a ‘limited’ nuclear war, and called publicly for a ban on the use of nuclear weapons.

It is worth emphasising the difference between this new alarm-sounding role and the post-war movement of physicists against the prospect of a nuclear war and the famous mutually assured destruction (MAD) strategy. Physicists went public as those who bore responsibility for their science having produced the awesome possibility of destroying humanity, but they could also be heard as giving voice to human consciousness in general – physics had given the means but the decision to use them was in purely human hands. In contrast, during the ‘nuclear winter’ episode, computers (very, very slow by today’s standards) were running very simplified models, insufficient data were gathered and worst-case scenarios were

envisaged. Which means that the point was no longer the classical one, that of 'the power science gave to humanity'. The point was the *creation* of a knowledge the very sense of which was its relevance for – or intrusive interference with – political matters. The decision to go public with admittedly uncertain results – results, it must be emphasised, that could only be uncertain, whatever the power of the computers and the progress in modelling – meant that the concerned scientists were breaking with the traditional position of science of putting the weight of the facts' authority against the passions of sociopolitical conflicts and irrational public fears.

As humanities and social sciences specialists, we should be able to measure the very unusual position of our so-called hard science colleagues as they cast their lot with an alarming message that challenges the idea that a science which is not able to prove what it claims should wait for the proof before addressing public issues. This may put us in a rather unusual position ourselves. Concerned by the message, do we risk accepting that we are 'simply' part of the public, worrying like everybody else about the prospects of climate change? Or do we critically address this new figure of 'scientific power', unwittingly joining another part of the public, the deniers, like the readers of Michael Crichton's *State of Fear*? Merchants of fear or merchants of doubt: we are in the very uncomfortable position of having to choose.

The name Gaia clearly marks the refusal of the 'we need more research' refrain intoned by the merchants of doubt and we may share this refusal with arguments of our own, questioning, for instance, the number of accepted so-called scientific proofs that have for their first authority the agreement of stakeholders and public authorities. Clearly the evaluation of what counts as a proof has nothing neutral about it. Also, why not accept that Gaia 'exists' for her own sake at a time when the Market is accepted as such? This, however, protects our traditional critical or agnostic stance, claiming that 'true demonstrations' are not of this world, against the intuition that 'something fundamental has shifted'.

Going further I would insist on the difference between those two 'global' objects – Gaia and the Market – and the corresponding models they rest upon. The dynamics of climate modelling and of the gathering of empirical data presupposes that with better and more detailed models, more powerful computers, and more empirical observations, it is possible to learn about the ethos of Gaia. In a way, the original Lovelock's Gaia had some analogy with the Market – she was defined by the hypothetical role she was to endorse (Lovelock 1979). Learning about Gaia's ethos does not rest any longer on selected examples of couplings between processes that would illustrate Gaia's stabilising, homeostatic power. In climate models all couplings are potentially relevant and most are ambiguous, seemingly participating in the overall stability in some conditions but liable to amplify the temperature change if a tipping point, the nightmare of climate specialists, is passed.

The possibility of such a nightmare is the signature of a 'realist' science, a science the truth-value of which depends on successfully giving the reality it addresses the power to make a significant difference in the way it would be characterised. In contrast with experimental sciences, however, in climate science the power to make a difference is not aimed at turning this reality into a well-defined object, whatever the

improved relevance and reliability of the models. Calling it Gaia is signifying that it is, and will remain, what can be called a 'being', existing in its own terms, not in the terms crafted to reliably characterise it. It is not a living being, and not a cybernetic one either; rather it is a being demanding that we complicate the divide between life and non-life, for Gaia is gifted with its own particular way of holding together and of answering to changes forced on it (here the charge of greenhouse gas in the atmosphere), thus breaking the general linear relation between causes and effects.¹

In this sense, Gaia may be typical of a new kind of scientific being. As computer modelling makes it now possible to escape the ideal of 'linearisation' and to explore situations with strong nonlinear couplings (positive and negative feedbacks), such beings are bound to multiply, and the strong differentiation may dissolve between the language of compulsion or 'make do' (used for Baconian Nature) and the language of 'obtain from' (used by seducers, trainers and teachers for instance). Rather than fulfilling the engineering dream of synthetic biology, this perspective may communicate with a new kind of eco-ethology addressing what each such beings require, be it in order to maintain their existence or to 'behave' or to modify their behaviour. This would not be an 'innocent' or respectful concern, to say the least, but a new style of concern, demanding that the dream of control or mastery be given up, replaced by the need to pay attention to, to care about and to learn from what we are bound to coexist with.

Gaia is thus not the Earth, a resource to be exploited (hopefully in a sustainable way) or a vulnerable and unique wonder to be respected and protected. She is 'global', not in the sense of the famous 'blue planet' picture but because global computer models are required to grasp the intricate processual couplings which human activity has interfered with. As I underlined six years ago, writing about the 'intrusion of Gaia' (Stengers 2009), Gaia's reawakening is not to be associated with a 'crisis', such as a nuclear war would have brought with a transitory 'winter' or 'autumn', but with the need to take into account a protagonist that will never recede into the background, and whose the stability 'we' will never again be able to take for granted. In this sense Gaia is intruding not in general but in our 'human only' story-making. As a scientific being, furthermore, she conveys neither demands nor messages. Scientific models can only capture the indifferent relentlessness of the answer given to inconsiderate interferences. But the challenge of this answer has direct political implications because we are situated, scientists tell us, in the very short time period that is left before her full, irreversible awakening.

It was at the time when climatologists were becoming more and more impressed by the threatening speed of the awakening, and frustrated by the inertia of the political powers to whom they were relaying the threat, that Paul Crutzen launched the 'Anthropocene' motto, which has since invaded the whole scene. It has been loudly endorsed by many academics who, welcoming its geological credentials, used it to defend against what may well have been for them the *real* threat of Gaia, the opening of the door to hordes of irrational, catastrophists 'believers'. I do not think it is useful to criticise Crutzen's initiative. After having given the many reasons why the name is a highly disputable one, and emphasising that etymologically 'Anthropos'

may derive from the 'upward-looking ones' (those who are fascinated by abstract ideals and pay no attention to earthly muddles), Donna Haraway (2014a) generously remarked: 'Eugene Stoermer and Paul Crutzen were not vexed by these ambiguities. Looking up, their human eyes were on the Earth's atmospheric carbon burden. But also, swimming in hot seas with the tentacular ones, they saw with the optic-haptic fingery eyes of marine critters the dying of coral symbioses.'

Gaia, as a scientific being, does not ignore earthly muddles. Rather those muddles are framed by the open, ceaselessly reworked question of how and to what extent they affect Gaia. Not so with Anthropos, who claims as his right and greatness not to pay attention. It may well be that Crutzen never really wondered about this petty distinction. For him and his colleagues the point was 'anthropogenic'. Obviously the hypothetical nuclear winter would be an anthropogenic event, while Alvarez's extinction was not. The claim that the already observable average temperature variation was to be related to 'human activity' was the crucial point to convey. Allying this point with the indisputable consequences of human activity irreversibly marking the Earth at a geological scale was a way to hammer it in, to impress on imaginations the novelty of the situation. But the paradox of this rhetorical move is that it allied two scientific communities – geologists and climatologists – that have a rather different relation with this novelty.

The great 'ages of the Earth' dating enterprise is part of the grand geopolitical-scientific-economic story of the conquest of the Earth and its resources. The geological time scale is the one part that may exhibit the prestigious 'universal-disinterested-knowledge-vanquishing-irrational-beliefs' stamp. I intend no easy irony here, no intention to debunk the achievement. As Stephen J. Gould (1990) once remarked, whatever its historical complication, the closure of the great Devonian controversy is pure joy in the collective memory of the geologists' community, a joy unadulterated by geopolitical concerns. It is a joy that must remain so; the time taken by the International Stratigraphy Commission to decide whether we are indeed living in the 'Anthropocene' may serve the geologists' wish not to follow their climatologist colleagues in their urgent alarm-sounding strategy. Further, the two communities do not share the same view of 'change'. The 'catastrophist' Alvarez hypothesis was first ferociously resisted by geologists, for whom the uniformitarian doctrine was synonymous with their own version of the victory of scientific rationality over belief. Certainly the situation has changed and the evidence testifying for a history punctuated by great extinction episodes is now accepted, together with hypotheses about the turn of events that brought them about. But the long-view story is still about a recovering Earth, and indeed naming our epoch is centre-staging virtual geologists of an unknown (recovered?) future who would gather and contemplate data from all over the Earth testifying for a change deserving a name, and who would come to the conclusion that this change was not, this time, caused by 'natural forces'. That those responsible for this change may or may not have survived in this future is not the geologists' business. Their business is to ensure that their virtual colleagues will confirm the verdict still under discussion – whether 'our' epoch indeed 'deserves' a proper name; whatever it may be, *it will have marked* a new age.

This 'future perfect continuous tense' is swallowing the time that remains 'now' a time that is not merely wasted but under attack because, far from diminishing there is a rapid acceleration in the production of greenhouse gases. It is swallowing the question of 'what will happen', of how the virtual geologists will characterise this new 'age'. This is beyond the geologists' responsibility, which is precisely to keep their decision disinterested, protected from today's 'burning' concerns (which their colleagues in the field are busily stoking as they find promising new sources of so-called unconventional fossil fuels).

Anthropocene, for geologists, may well be 'just a name', but names have a power of their own. Today, witnessing the very success of this name, not only in the media but also in academic circles, we may hypothesise that this success is not unrelated to the comfort of the geologists' future perfect continuous tense, which frees up room for academic reflexive pondering and new theoretical turns. We even hear new voices 'celebrating' Anthropos as the one who will not only successfully find the way to neutralise the climatic threat (via geoengineering), but will go on, as a now self-conscious geological force reconfiguring the Earth and turning the Anthropocene into a 'good Anthropocene', so fulfilling its godlike destiny. We may be grateful for the vigorous alarm sounded by Clive Hamilton (2013) against the temptation to consider that we are only dealing with a ridiculous remake of an old refrain; the remake may well be the early announcement of the rhetoric that will flourish when the strategy of climate disorder denial will have done its time and 'we' will have to face the failure of what is officially 'plan A', the promised reduction of greenhouse gas emission. The apprentice sorcerer will claim there is no choice but to try and tame Gaia, and its minions will turn the attempt to do so into a logical accomplishment of human emancipation and mastery. There is no reason why we would submissively depend on mere 'natural forces'.²

I was a witness to a rather ominous scene in Brussels showing how easily the path towards this future may be initiated. Clive Hamilton was addressing an academic public about geoengineering as the looming plan B, already sustained by those whose money previously fed the 'merchants of doubt'. Following his talk, the only questions that broke the silence came from engineers and scientists emphasising that surely our fate should not be left in the hands of private companies, and calling for public research, if only to assess objectively (and with the sole general interest in mind) the feasibility and risks of the diverse possibilities. To them, working on such fascinating questions was clearly the rational answer, maintaining science in its usual position as the solution provider. I will not begin to enumerate what they abstracted away – from the rules of present-day knowledge economy to the insuperable tendency of the work 'on' a possibility turning into 'for' a possibility. Nor will I analyse what contradicts the 'rational answer' in terms of the obstacles to be downplayed or the dangers of putting it into the perspective of a cost-benefit analysis – the case of genetically modified organisms (GMOs) is eloquent, and we can be sure the benefits of geoengineering would appear to be overwhelming. In Brussels the dream was alive and well, and a scientist even remarked that the acquired knowledge would be quite useful if, as Steven Hawking claimed, 'we' had

to leave an irreversibly messed-up Earth and terraform another planet. Hamilton's answer, however strong, was, I am afraid, unable to banish from the room haunting speculations about promising research projects. The ominous silence was rather a 'Yes, I know, but nevertheless ...'

This scene will not astonish those of us who practise historico-critical studies. Have we not published enough about the political, ideological nature of scientists' claims that they produce 'disinterested' knowledge, transcending particular interests, political conflicts and ideological commitments? Nothing fundamental seems to have shifted here. And this may well be the point. Would we not also be ready to critically analyse the way climatologists insist theirs is a 'true' science, with the legitimate objective authority any science claims to impose? Do we not deal with the very example of big calculation centres scaling an abstract question that will be imposed on every people on this Earth, regardless of what may again be disqualified as 'matters of belief'? Here is the shifting ground: what if we accept Gaia's 'reality'?

Ten years ago, when Bruno Latour asked 'Why has critique run out of steam?', he invoked the example of the deconstructivist argument being hijacked by those whom we now call 'merchants of doubt'. He wondered: 'Can we devise another powerful descriptive tool that deals this time with matters of concern and whose import then will no longer be to debunk but to protect and care, as Donna Haraway would put it? Is it really possible to transform the critical urge in the ethos of someone who *adds* reality to matters of fact and not *subtract* reality from it?' (Latour 2004, 232). This proposition implies that matters of fact, such as the ones climatologists claim to obtain, are not as such something to be 'afraid of', as if some 'global' matter of concern could be derived from it. It should be sufficient to note that the leading and very specific concern of the specialists gathered in IPCC Working Group I is about the reliability of their working abstractions. Their models may well conclude that Gaia is a global threat, but in their case 'global' is no triumph over earthly local, frictional muddles. Gaia has no unifying power other than that of a 'real' claim to authorise sounding the alarm. It is 'mute' as to the answers to be given to the threat.

Latour's point implies giving up critique as an end in itself, but not critical *concerns*. And we may indeed be concerned at this point: Gaia, as defined by climate scientists, may well have no unifying power *but only as long as none is added* – if not by the 'upward-looking' Anthropos, certainly by those who refer to science in order to define what 'really matters'. If there must be critical attention, a need to protect and care, it is not a matter of debunking the illusions of objectivity and realism of what I will call globally 'group I' specialists. There are three working groups in the IPCC, and the third one is busy converting Gaia's question into a problem formulated for policy makers, that is, in terms that conform to the socio-economic parameters they consider relevant. Between groups I and III the definitions of 'abstraction' and 'realism' have almost nothing in common. While group I experts get nightmares when they obtain a new understanding of the intricate dynamics of the ice sheets, group III experts tell no such stories about the protagonists of their scenarios. They may 'neutrally' take note that greenhouse gas emissions are

accelerating rather than slowing down, but they will not enter too much into the (politically explosive) reasons for why they are bound to continue doing so. If the motto of a 'good' Anthropocene is to worm itself into and gain credibility in the public debate, it will be through the 'make-believe' formulations of group III – not 'adding' inconvenient reality to matter-of-fact Gaia but postulating that nothing is real but the (global) business-as-usual approach of policy makers.

I am not proposing that group I specialists are innocent, disinterested scientists. I am just emphasising that references to objectivity and reality in no way constitute the common denominator of the three groups but crucially depend on their respective specific matter of concern. As for the alarm-sounders' own conception of their role, it may well be that many trusted the fable that when scientists have shown the 'facts', consequences should follow, forgetting that this only applies when facts authorise new possibilities for what is called development. Others may have trusted democracy, or even the market. Some have maintained their 'we give the facts' neutrality façade because they were aware that their enemies were just waiting for any fissure in this façade to appear – as in the French child's play song '*I hold you, you hold me by our little goatee. The first one of us two who will laugh will get a wee slap!*' But some others are now bluntly (that is realistically) heralding their (objective) conclusion. When, in December 2012, geophysicist and complex systems specialist Brad Werner crossed the abyss between the 'realities' of groups I and III, it resulted in a talk titled 'Is Earth F**ked? Dynamical Futility of Global Environmental Management and Possibilities for Sustainability via Direct Action Activism' (Werner 2012).

Werner insists he is speaking as a geophysicist, in the name of a model he is constructing. The problem, he says, 'cannot be left just to the social scientists or the humanities'. As a matter of fact, they play no role in his model, while the influence of 'Direct Action Activism' – through 'indigenous peoples, workers, anarchists and other activist groups' who demonstrate to others that it is possible to resist 'capitalist culture' – appears as the only chance for a future. We in the social sciences or humanities may feel it is a typical example of 'objective science' imperialism. But let us now imagine Werner suddenly turning towards critical thinkers with a 'Hey guys, the situation is *really, objectively*, a fucked up mess. Can you help?' Here we may feel that 'something fundamental' is indeed shifting. What Werner calls 'capitalist' or 'dominant' culture we know well, and we are quite ready to discuss it and dispute each other's definitions. But is this knowledge liable to add rather than subtract reality from other people's concerns, including those of climatologists? Is it liable to sustain or help or delay activism? Or is it rather activism? Or is the critique of illusions more important so that it deciphers the hold of capitalist culture over us in such a way that imagining the end of humankind on this Earth is easier (or academically safer) than imagining that it can be defeated?

In his *Inquiry into Modes of Existence*, Bruno Latour demands that we resist the temptation to 'attribute too much power to this monster' (Latour 2013, 384), that is, that we do not attribute to Capitalism the unifying power that is denied to Gaia. In other words, Capitalism should not be ceded the power to authorise the formulation of the 'one' problem to which every other matter of concern must be subordinated (It's Capitalism, stupid!). Today, both Jason Moore (2013) and Donna

Haraway (2014b) nevertheless claim that if our geological epoch were to acquire a name of its own, this name should be the Capitalocene, not the Anthropocene. Perhaps many frustrated climatologists would now agree. The challenge for us may then be to use descriptive tools that do not give to Capitalocene the power to explain away the entanglement of earthly, resilient matters of concern, while adding that no Capitalocene story, starting with the 'long sixteenth century', can go very far without being entangled with the on-going invention/production/appropriation/exploitation of what Jason Moore calls 'cheap nature'.³ In other words, we should not indulge in the very Capitalocene gesture of appropriation, of giving to an abstraction the power to define as 'cheap' – an inexhaustible resource that may be dismembered or debunked at will and reduced to illusory beliefs – whatever escapes its grasp as we do with theoretical abstractions.

The common point between those groups practising what Brad Werner characterises as 'Direct Action Activism' is that they do not act in the name of a theory. They experiment with practices that refuse theoretical abstractions authorising to define as 'cheap' their collateral damage (whether they be ecological or social, a distinction which is itself a Capitalocene one).⁴ This requires the reclaiming and cultivation of cooperative collective intelligence, the art of giving voice to powers, human and non-human, that must be addressed if they are not to turn into destructive ones, the art of caring for the unfolding of the matter of concern that gathers them. Such activist groups do not need to become a new general model for academics to ponder. There is no collective intelligence in general (*pace* Negri). The experimental, reclaiming practices called for (re)generating what Capitalocene has systematically eradicated are always situated and precarious. The only generalities are about what inhibits, poisons or destroys such practices and academic critical pondering may well be part of the poison, debunking as mere beliefs what does not conform to their standards, subtracting reality from the experimental assemblages which sustain the never to be taken for granted creation of collective intelligence.

'Can you help?' I have imagined Brad Werner could ask us this question in order to trouble us, to make us think, to turn the question into an arrow maybe hitting its target. If we look at academic production we must admit that none of our sophisticated critical and analytical tools have produced knowledge that helps others, those 'activist' groups who need to cultivate cooperative, ongoing collective intelligence. Rather we have been critically dismembering as illusory fictions that which they have learned empowers them to think and act.⁵

Curiously enough, what could be demanded from us, humanities and social sciences academics, as from many others, may be to enact what Bruno Latour rather daringly called the 'admirable injunction' of liberalism – 'Don't let anything go, don't let anything pass!' (*Ne pas se laisser faire, ne rien laisser passer!*) (Latour 2013, 471–2). A formidable injunction indeed, which may well go to the core of the question that Gaia imposes on the Capitalocene, and which has nothing to do with the mythic Anthropos. It rather cruelly emphasises the despondency we may feel regarding all that we academics have let go and let pass in our own institutions. What is clear is that this injunction can be addressed neither to the

anonymous 'subject', be he (rather than she) knowing or critical, nor to any of the self-sustaining 'homos' who populate modern pseudo-sciences.

What is also clear is that any confusion between this injunction and the demand for 'reflexivity' would be as gross a misunderstanding as the idea that critical 'deconstruction' is a way not to let anything go or anything pass. Becoming able not to let anything go or anything pass is not playing the princess and the pea; it implies rather the reverse, tolerating no mattress of abstraction allowing a comfortable escape from the messiness of a situation. Rather, the injunction gives to the trouble the power to trouble us, as what we have to live and think with. This may be a meaning for those 'earthly' sciences Latour occasionally alludes to, sciences that would fully accept the need to protect and care for the situations they are concerned with, learning how to betray the Capitalocene regime of appropriation.

In brief, if 'something fundamental has shifted' for us, if we have to accept thinking and feeling and imagining with the question Gaia imposes on us, it might well demand that we dare to be 'realists', no more and no less than climatologists but in our own ways. Not letting go but actively discarding the norms of distance and detachment that act as mattresses protecting us against what Donna Haraway calls response-ability, the need to become able to respond to what our work adds to the world, for the way we, as we propose it, are casting our lot for some ways of living and dying and not others. Not letting pass what we consider matters of critical concern, but doing it in such a way that the matters are liable to be shared with the concerned people, liable maybe to add new dimensions to the issues they struggle for.

Those issues are *real*, and we have to protect this reality against 'our' enemies. Not the enemies of climatologists but our own. It may well be that the time has come to not let pass the role playing of academic civility, the indifference regarding the poisons so many among our dear colleagues add to the world, not just politely stating our intellectual disagreement, as if they were in need of enlightenment, but politically and publically analysing the way the poison is working, the way it participates in the Capitalocene regime of appropriation.

Notes

- 1 Another model to be resisted is that of 'autopoietic beings', whose 'own terms' and 'own particular way' indicate an 'owner', a being maintaining its formal identity through its exchanges with its outside, unilaterally assigning its meaning to what affects it. Donna Haraway proposes to speak about 'sympoiesis', which escapes the face-to-face opposition between heteropoiesis and autopoiesis, a bit like the way an enlightening conversation escapes the two extremes of a 'command/obey' relation and a 'dialogue of the deaf'.
- 2 Suddenly the seemingly delirious ravings of accelerationist Reza Negarestani speculating about our ultimate task, 'to evade the limits posed by the solar economy' rings prophetic (Negarestani 2011, 201).
- 3 "'Cheap nature" in the modern sense encompasses the diversity of human and extra-human activity necessary to capitalist development but not directly valorised ("paid") through the money economy. The decisive historical expression of Cheap Nature in the

modern era is the Four Cheaps of labor-power, food, energy, and raw materials' (Moore 2013, part I 21). As Moore emphasises, appropriation (enclosure, destructive exploitation and colonisation) is then part and parcel of the Capitalocene, well before the celebrated steam engine. See Linebaugh on the destruction of the commons in England and then all over the world (Linebaugh 2008) and Starhawk's telling of the burning of the witches as part of the destruction of the peasant communities (Starhawk 1997).

- 4 The principle of non-separation between social and ecological concerns is at the very basis of what is now called 'commoning'. 'No commons without commoning', it is said, no common good or resource without the social creation needed to 'make it common'. Thinking 'like a commoner' (Bollier 2014) is no innocent thinking, no dreaming of an unspoilt wilderness. It is rather consequential thinking, with the fragility and need for ongoing maintenance of the social, cultural and ecological interdependence.
- 5 I am thinking among others of 'pagan' versions of Gaia and of the fate of eco-feminism, the academic branch of which turned against the 'spiritualist' or 'essentialist' activism of those who went so far as to create rites empowering them to 'do the work of the Goddess' (Starhawk 1997).

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12

TELLING FRIENDS FROM FOES IN THE TIME OF THE ANTHROPOCENE

Bruno Latour

To Clive Hamilton

Those among you who have seen *Gravity*, the film directed by Alfonso Cuarón, will have noticed, I am sure, that once again a blockbuster's special effects offer a powerful symbol of a drastic change of mental state. For the human race there is no space anymore, at least no durable occupation of outer space. That is, there is no way to escape from the Earth. The main character, Dr Ryan Stone, confesses it at one point: 'I hate space,' she says while trying to run from one destroyed space station to the next. Even more forcefully than in Cameron's *Avatar*, the characters, and with them the spectators, realise that there is no longer any Frontier; no escape route except back to Earth. The direction is not forward, *Plus ultra*, but inward, *Plus intra*, back home. When Ryan, the sole survivor of the space adventure, reaches the shore of the lake where she has finally landed and grabs a handful of dirt and mud, she has, literally, been metamorphosed from a human to an Earthbound, while the old-fashioned American hero played rather clownishly by her teammate George Clooney has vanished forever in outer space, debris among the debris of the European and Chinese space stations. Much as in von Trier's *Melancholia*, in *Gravity* we witness the step-by-step destruction of the old Galilean idea of the Earth as one body among other spatial bodies. We are forced to turn our gaze back to sub-lunar Gaia, so actively modified by human action that it has entered a new period that geologists-turned-philosophers propose to label the Anthropocene.

In spite of its pitfalls (Bonneuil and Fressoz 2013), the concept of the Anthropocene offers a powerful way, if used wisely, to avoid the danger of naturalisation while ensuring that the former domain of the social, or that of the 'human', is reconfigured as being the land of the Earthlings or of the Earthbound. Like Aesop's tongue, it might deliver the worst – or worse still, much of the same; that is, the back-and-forth movement between, on the one hand, the 'social construction

of nature' and, on the other, the reductionist view of humans made of carbon and water, geological forces among other geological forces, or rather mud and dust above mud and dust. But it might also direct our attention toward the end of what Whitehead (1920) called 'the bifurcation of nature', or the final rejection of the separation between Nature and Human that has paralysed science and politics since the dawn of modernism.

The jury is still out on the staying power of this concept of the Anthropocene (its half-life might be much shorter than I think). Right now, however, it is the best alternative we have to usher us away from the notion of modernisation. Like the concept of Gaia, the risk of using such an unstable notion is worth taking. Especially if we wish, as we do in this book, to probe the philosophy and theology of such a novel concept. The dreams that could be nurtured at the time of the Holocene cannot last in the time of the Anthropocene. We might say of those old dreams of space travel not 'Oh, that is sooo twentieth century,' but rather 'Oh, that is sooo Holocene!' In this sense, the use of this hybrid term combining geology, philosophy, theology and social science is a wake-up call. What I want to do here is to probe in what sort of time and in what sort of space we do find ourselves when we accept the idea of living in the Anthropocene.

But, just as it was for Dr Ryan Stone, the problem is that it is difficult for those who have been moderns (that is, for those who have *never* been modern) to find their ways back to Earth! Just like Dr Ryan, they *miss* and they *lack* gravity. . . Especially because most of our ways to map where we are, where we are heading and what we should do, have been defined by a division of labour between science and politics – what I have called the unwritten Constitution (Latour 2014). This Constitution is totally ill-equipped to handle the conflicts we have to navigate. In fact, it is so ill-adapted that even the notion of conflict, or rather, to call a cat a cat, the *state of war*, that is the defining trait of the Anthropocene, is constantly downplayed or euphemised. In such an epoch, both science and politics assume a totally different shape.

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The spurious debate about climate science is a good indicator of that new shape. On the one hand, there is no debate whatsoever, and no question of natural history has been better settled than the anthropic origin of climate change. With the last IPCC report, all nations, it appears, are bracing themselves for a world 4°C warmer by perhaps 2070 (and that might be the optimistic scenario!). And yet, it is useless to keep saying that 'there is no discussion'. No matter how spurious a controversy, it remains that for a large part of the population, there *is* a controversy, the effect of which we may witness everyday through the total inertia – I might use the word 'quietism' only to reassure myself – of governments as well as of civil societies that are supposed to exert a pressure on their elected proxies.

You will not find a single bookshop in France that would put a book by Claude Lanzmann on the Shoah side by side on a table with a book by an arch *negationnist*

like Faurisson. A few days ago, however, my friend Clive Hamilton was horrified to see his book, *Requiem for a Species* (Hamilton 2013), together with one of the newest pamphlets (Gervais 2013) by a climate denier 'L'innocence du carbone' (amaz-ing title, I will come back to that). And the worst is that Clive would have appeared unfair and dogmatic if he had taken the manager to task for keeping such an absurd and scandalous balance. If he had protested, no doubt the manager would have answered that this is a 'rational debate' and that 'both sides' have to be heard. There is a law (in France) against Faurisson, but not against climate *negationnism*.

And that is one of the problems that paralyse politics in the Anthropocene. This is not a rational debate. Or rather, it is a debate in which the climatologists of the IPCC who *would have been considered* rational in another climate are being rendered powerless. They are portrayed as irrational by those who use the power of reason and appeal to the freedom of scientific inquiry to pollute not only the atmosphere but also the public sphere, to use James Hoggan's expression (Hoggan 2009). Why? Because both sides – and this is what produces the idea that there are two sides – use the *same science-versus-politics repertoire*.

This repertoire has two parts. First, both sides imply that Science is about distant, dispassionate facts of nature while politics is about ideology, passions and interests whose intrusion into Science cannot do anything but *distort* the plain facts. Second, both sides agree that policy should *follow* scientific expertise and that we cannot make decisions based on uncertain science. Part one: science is about incontrovertible and indisputable facts; part two: policy follows science. The difficulty is that this repertoire (disproved by fifty years of historical case studies) is shared by most of the public as well. It means that if any lobbyist paid by the mining or oil industry, or any physicist with his own pet version of what the laws of nature tell him, manages to introduce the smallest grain of doubt into the expertise, the whole policy train stops. Since this is what all politicians, as well as every onlooker believe, and since it is also the way TV shows organise debates as if they were judges in a courtroom, it is incredibly easy to make *two sides* emerge even when there is only one.

To give credit where credit is due, this should be called the Luntz strategy to honour Frank Luntz's infamous memo to the Republican Party: 'Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly. Therefore, you need to continue to make the lack of scientific certainty a primary issue.' His success speaks volumes about the mass of money spent to foster climate deniers but it also speaks to the fragility of the immunological system of those who use the science-*versus*-politics repertoire. It appears that the slightest virus is enough to make them doubt and stop policy in its tracks. Because of this weird – though common-sensical – vision of science *versus* politics, there is no way to immunise the public against such an infectious form of 'scepticism' – a grand adjective that has been most maliciously appropriated.

Of course, it would be welcome if we could imagine that at some point, because of the many public debates about the issue, the two sides would become one. Case settled, let's now move on to the policy. The apparently innocuous term

'scepticism', used so intently by deniers, might seem to lead in such a direction. Let us have a 'fair and balanced' debate, as they say on Fox News. But there is not the slightest chance that this closure will ever occur, since the deniers' success is not to win any argument, but simply to make sure that the rest of the public is convinced that there *is* an argument. How could the poor, helpless climatologists ever win in such a kangaroo court where the point is not to reach a verdict (the verdict has been reached in the IPCC report already anyway). The new discipline of 'agnotology', to use James Proctor's expression (Proctor and Schiebinger 2008), is the willful production of ignorance that has functioned marvelously for cigarettes as well as for asbestos, and, with more resistance, for extermination camps. It will work much better, and for much longer, for climate science, and for one additional reason: it is about the daily life of billions of people. The chance to ever reach closure is nil. And yet waiting for closure before drafting policy is not an option either.

This is the Achilles' heel of Mr Luntz's strategy. Not in trying to achieve closure by reasonable debate – the dice are loaded as long as there appear to be two sides – but in opposing the science-*versus*-politics repertoire with a much more reasonable, and on the whole much more rational, alternative repertoire. There are two sides, it is true, but the dispute is not between climatologists and climate deniers. There are two sides: those who stick to a traditional science-*versus*-politics version and those who have understood that this older *political epistemology* (to give it the more accurate label (Latour 2004)) is what renders both politics and science weak when the issues at stake are too large for too many interested people directly affected by their decisions. This is where there is a real distinction to be made between a Holocene and an Anthropocene settlement. What might have been good for Humans (and I doubt it ever was the case) has lost any sense for the Earthbound.

The great limit of the old settlement was to make impossible any connection of science *with* politics and not *versus* politics. For this, of course, one has to abandon the idea that the only thing politics may do is to distort facts! Although this version of politics is as old as Socrates fighting against Calicles, it flies in the face of everything we expect from politics: building a collective polity on a precisely defined soil or land – now, more precisely and more extensively, a polity that has an Earth under its feet, so to speak. Politics has gravity when it has a territory to defend.

But one should also abandon the idea that science is about incontrovertible and indisputable facts. Science, always with a small *s*, is about producing, through the institutions of many disciplines and the monitoring of many instruments, robust access to a great number of entities with which the polity has to be built. In this view both science and politics are mundane, rather humble, frail and pedestrian activities, open to doubt, revision, and prone to mistakes as soon as their delicate operations are not constantly supported.

As I have shown in *Politics of Nature* (Latour 2004), the only thing *they cannot afford to do is to work separately*. Their skills are obviously and fortunately totally distinct, but they have to exercise themselves on the same new entities whose

disturbing novelty they have to learn in common how to handle. Without the instruments of science, the body politic will never know how many strange entities it has to take into account. And without politics, the same body politic will never know how to array, grade, and rank those bewildering number of agencies with which it has to progressively compose a common world – which is the definition I proposed for politics-with-science. The great paradox of the Moderns is to have granted, to the absolute distinction of Science and Politics, the task of maintaining facts and values as clearly separated as possible. Unfortunately, the common-sense opposition between facts and values is everything but common sense since the notion of 'facts' covers what is still uncertain just as well as what is undisputable (what triggers *perplexity* and what has been well *instituted*) while the notion of 'values' is supposed to designate who should allocate the dispute as well as the order in which all the objects of values should be ordered (what requires a *consultation* as well as what demands to be put into a *hierarchy*). To be sure there is a difference, but it runs along an exactly orthogonal direction to the calamitous one between facts and values. It should bring science and politics (plus many other trades) to bear on the two essential tasks: defining *how many entities* have to be taken into account (namely perplexity and consultation); and *how they can stand together* in a livable form (that is hierarchy and institution).

There is perhaps one comforting thing to say about the Anthropocene. It has demonstrated that the ancient settlement was rendered useless as soon as issues became too touchy or concerned too many people. The old settlement worked – if it ever did – only in the rarefied air of outer space, for distant problems that interested only a few people and had indirect, remote consequences. This ancient settlement has certainly not worked for what concerns us in the present – or worse, concerned us in the past – where the background and foreground have merged. This is exactly what the word Anthropocene underlines so well. When action modifies the very framework in which history is supposed to unfold, the idea of distant, disinterested facts becomes less relevant than that of highly disputed matters of concern.

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To shift from a science-*versus*-politics to a science-with-politics is, of course, not without its dangers. At first glance, climate deniers will have a field day, clamouring that their adversaries have finally confessed what they, the deniers, have always said: *climate science is politics*. To which the only reasonable answer is: 'Yes, of course, where have you been? And what are you doing yourself?' After a minute of hesitation because of the loss of the old settlement – it is not easy to lose confidence in the Maginot line of fact-*versus*-value! – those who fight against the deniers should quickly grasp how to redraw the lines of conflict. Not between two sides of an epistemological debate (on one side the climate science and, on the other, the climate sceptics), but between two sides – and they will be soon more than two – with a completely different view of what you may expect from science as well as from politics. There is no conflict between science

and politics. But there is a conflict between two radically opposite political epistemologies, each with its own definition of what science and politics are, and how they could collaborate.

Of course, there exist plenty of reasons for imitating what feminists call 'strategic essentialism' and to employ, whenever necessary, a form of 'strategic positivism' as if we could confine to a settled science of the climate the task of serving as an incontrovertible premise for policy. But even if this strategy could succeed (and the weak response to the last IPCC report indicates that it has failed this just the same as all previous attempts to 'convince' the public), it would not solve the question because it would remain a *pedagogical* gain – not a *political* one. More people would know for sure, which is always good, but they will not be moved an inch out of the situation of just knowing. We are not dealing here with indisputable 'matters of fact', but with 'matters of concern' to be disputed. It is a question of knowing 'uncomfortable facts' about pressing issues that concern the very soil on which every body resides.

It should have become clear that expressions such as 'the innocence of carbon' as well as 'uncomfortable facts' straddle the distinction between facts and values. How could it be otherwise since we are talking here about conflicts that pit against one another different definitions of the land to which the various polities are attached? How could anyone, I beg you, defend one's territory quietly and dispassionately when it is under attack? The only result of the older settlement of fact-*versus*-politics is that, in such a conflict, one side fights with all the forces at its power while the other side, the rational and reasonable climatologists, must fight with their hands tied behind their backs by the injunction that they, and they alone, should protect the sanctity of Science (capital S) against any encroachment of ideology and interest.

In the old days, such an alternative political epistemology could have smacked of 'relativism'. But today it is much clearer that when opponents reach for their guns and mention the 'science wars' it is much fairer, and, once again, more rational to say: 'Not a science war, but for sure, a *war of the worlds*.' Or rather, a war for the occupation and definition and composition of what the world, at least this sublunary planet, Gaia, is like. How could we agree on this composition since, depending on the answer, each of us has to move literally to another place? How could we settle the issue when, depending on the response given, we ally with other people and break sides with others? Paradoxically, capitalists seem to know what it is to grab, to possess and to defend a land more than their space-less adversaries who have to defend Science and its View-from-Nowhere for inhabitants of no place. At least they know to which soil they pertain better than those who keep defending themselves by an appeal to the extraterritorial authority of Science. Remember the Bushist's war cry: 'Americans are from Mars, Europeans are from Venus'? Well, it seems that those traditionally defined nations are neither from Mars nor from Venus, but some are from an Earth which has a specific shape and some are from *another Earth*, or, perhaps, from a land of no land called 'utopia', the utopia that the Moderns have imagined as their only future (Danowski and de Castro 2014). A future that now looks just like the destroyed space stations from which Ryan Stone tries to escape in *Gravity*.

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In addition to 'strategic positivism', there is fortunately another resource we could use to clarify the conflicts we must confront living in the Anthropocene. It is not true that the general public, the one that is so easily contaminated by Luntz's viral infection (a dangerous metaphor, I agree), is endowed with the sole repertoire of science-*versus*-politics. Most of them are ordinary people who act most of the time in a universe made of uncertain facts that concern them a lot. Before investing in a company or having children or buying travel insurance, they don't wait for completely incontrovertible evidences and only *then* leap into action. If there is one thing everybody can understand, it is that when their life is put into question, when the territory on which they live is threatened, when they are attacked by other people who want their place, their land, their soil, their cherished plot of earth, what used to be called their 'mother land', they certainly don't wait for experts to agree. They need to quickly identify those who can help and those – is there another word for it? – who risk *betraying* them. Making decisions amongst contradictory evidence about pressing issues, this attitude is common to scientists, politicians and ordinary members of the public. Such a common-sense attitude takes full force when their territory is under threat. What could be called *mobilisation* is an uneasy, worrisome, dangerous feeling, a source of ill-defined consequences, but one thing is certain: in case of war, the attitude is not of complacency, appeasement and delegation to the experts.

It is bizarre that militants as well as 'concerned scientists' (a venerable label from the former fights around the virtual nuclear holocaust) could simultaneously complain about the lack of mobilisation of the public and of their elected representatives, while trying to euphemise the conflict by shying away from the word 'war'. Their adversaries have no such qualms. For them, it is a forceful *land grab*: the land is theirs and they hold to it fast. That they try to hide behind the mantle of Science is a simple ploy (they are actually the ones playing the game of strategic positivism! And they do it to its limit). We should not be surprised by this appeal to Science. That 'Gott Mitt Uns' has always been embroidered on the banners of earlier war parties, does not mean that God ever sided with any of the warring factions. Even though it might be perilous to speak of war – when there is a state of peace – it is even more dangerous to *deny* that there is a war when you are under attack. Appeasers would end up being the deniers – not by denying climate science, this time – but by denying that there is a war for the definition and control of the world we collectively inhabit.

There is indeed a war for the definition and control of the Earth: a war that pits – to be a little dramatic – Humans living in the Holocene against Earthbounds living in the Anthropocene. What I take to be the clarifying effect of stating this, is that it makes possible for the various camps to fly 'under their own colors' (to use Walter Lippmann's expression (Lippmann 1925 [1933])), and not under the flag of 'Gott' or, rather, 'Natur Mitt Uns'. When you meet climatologists who have the nerve to call the IPCC 'a lobby', it would be much more powerful to answer: 'Of

course it is a lobby, now let us see how many are you, where does your money come from. And, since we are at it, since you are accusing us of being biased by “an ideology”, let’s put everything on the table: in what world do you live, where, with what resources, for how long, what future do you envision for your kids, what sort of education do you wish to give them, in which landscape do you wish them to live.’ And, step by step, the whole set of differentiated power relations that are so blatantly missing from the common notion of the Anthropocene would be brought back. Such a counter-attack is exactly the opposite of retreating behind the Maginot line of a Science unpolluted by politics.

Of course, this geo-graphy or, rather, this *Gaia-graphy* requires a description of the front lines. For such delineation, we need to draw on all the resources of all the disciplines, be they social or natural. ‘Please, delineate what you are defending, what do you think the land is worth, with what other organisms, what sort of soil, what sort of landscape, what sort of industry, what sort of commerce you wish to survive with.’ For instance, let us pit ‘Innocent carbon’ against ‘Carbon democracy’, the title of Timothy Mitchell’s crucial book (Mitchell 2011), since both straddle the fact/value distinction. In both accounts, carbon does not play the same role, does not receive the same qualifications, and does not have the same properties. Fine. This does not prove any distortion of scientific facts. It means that there are many ways for carbon to be composed into a common word. If the same atoms can generate materials as different as graphite and diamond, should we be surprised that the same carbon in the hands of a climate denier has different arrangement and virtues, that is, different agencies, than in those of an historian of the Middle East? ‘Innocence’ and ‘guilt’ are properties of atoms that, very exactly, very literally, depend on their composition.

All those connections, what John Tresch calls ‘cosmograms’ (Tresch 2012), can be made explicit only if we don’t break them according to the science-versus-politics divide. Of course, such geopolitics, or rather such *Gaia-politics*, does not correspond to the old coloured maps over which so many wars have been waged (Elden 2014). The borderlines are difficult to detect, but it does not mean that it is not about territories, that those new maps don’t have to be drawn and that it is not about conflicts. How could we introduce the concept of the Anthropocene and not draw the consequences in terms of politics of the Earth? Mines, rivers, pollution, oceans, fish, fowl, grass, insects, clouds, rain and floods, they are all there.

What is a *territory* if not that without which you would not be able to live? Well, list all those beings, those agencies you say you can do without. We will do ours. Then we will draw the territories that are under attack, those that are worth defending, and those that could be abandoned. Once this is done, we might compare our chances of losing or of winning. Since appeals to Nature known by Science and its Laws – the older *State of Nature* – does not bring peace even in the case of such a hardened fact as that of the anthropic origin of climate change, then we should accept living in a declared state of war. And anyway, our opponents are more attuned to what is at stake, better versed in what the words ‘possession’ and ‘defense of one’s possessions’ mean. They, our adversaries, mobilised long ago.

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The real advantage of making the state of war explicit instead of undeclared is that it might be the only way to begin to envisage *peace*. Not a *pedagogical* peace obtained through the older science-versus-politics repertoire – as if we could begin to discuss policy now that we have all learned the natural sciences so that we necessarily agree with one another about what makes up the world. But instead a *political* peace. One negotiated by the camps who, having exhausted all other options, and knowing that neither the ‘God’ nor the ‘Nature’ embroidered on their banners are really behind them, attempt a settlement as if there was *no arbiter* above their heads. The main difference between the two forms of peace is that the pedagogical one comes *before* any war. Then war is simply the irrational mistake of those who have not understood the laws of nature or of economics; peace will be restored once everyone has learned the truth about what things are and always have been. Pedagogical peace is akin to police intervention or to what is today called ‘governance’. By contrast, political peace comes *after* the war has exhausted the warring parties, who end up composing what is exactly named a *modus vivendi* – that is, an entangled set of makeshift arrangements to survive.

It is because the political peace is not dictated by what is already there but by what should be progressively realised that there is no way to *delay* it any longer. Delay is part of the Modernist dream. Actually, it is their definition of the future. A future made of nothing but a flight from the past and ‘eyes wide shut’ to what is coming. This is where the concept of the Anthropocene meets not only a philosophy of science – the politics-with-science repertoire instead of politics-versus-science, not only a definition of the ground on which politics are built – but also a ‘Gaia-politics’ of highly contested grounds. And, so important theologically: the Anthropocene meets another *time*, as different from the modernist one as its spatial rooting. This inclusion of theology into ecology is formulated in many ways, from the more secular version offered by Jean-Pierre Dupuy – ‘enlightened catastrophism’ (Dupuy 2003) – to the more spiritual version proposed by Michael Northcott (Northcott 2013) – what I have called a ‘carbon theology’!

What they have in common is that, in the same way as they propose a different *spatial* grounding for each warring camp, they offer another *temporal* rhythm for action. Action cannot be delayed because time does not flow from the present to the future – as if we had to choose between scenarios, hoping for the best – but rather from what is coming (*‘l’avenir’* as we say in French to differentiate from *‘le futur’*) to the present. Which is another way to consider the times in which we should live as ‘apocalyptic’. Not in the sense of the catastrophic (although it might be that also), but in the sense of the revelation of things that are coming *toward* us. This odd situation of living ‘at the end of time’ in a different type of hope, the hope that has been made one of the three theological virtues and that the French, once again richer than English, calls *‘espérance’* to make sure it is not confused with *‘espoir’*. Clive Hamilton has wisely advised us to jettison this *‘espoir’*, this hope, because, as long as we rely on hope, we still expect to escape from the

consequences of our action. It is only once we have radically changed our relation to time – what is called living in ‘apocalyptic times’ – that we might be spurred into action without delay (Anders 2007). ‘The times are fulfilled.’

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Historians of ecology are right to say that there is probably nothing completely new in the concept of the Anthropocene since conflicts about territories and their resources are as old as the human race and since warnings about the consequences those ‘land grabs’ have on the environment are as old as the industrial revolution (Bonneuil and Jouvaucourt 2014). What I take to be really new in this Anthropocene label (apart from the unusual collaboration between geology, history – or rather geo-story – politics and philosophy) is that it modifies simultaneously the spatial and temporal frames in which action is being situated; and, moreover, that this frame has modified the two main pillars on which the metaphysics of Science has been established since the ‘bifurcation of nature’, to use Whitehead’s famous description.

How odd it has been for the Moderns to imagine that their materiality could be made of atomic points without spatial extension and of instants without duration. It is this most idealistic definition of matter that is now showing its utopian and toxic character. It is such an odd conception that has been so constantly at odds with the experience of space and of time. It has rejected every impulse that insisted on being ‘from a place and having duration’ as being nothing but mere subjectivity, poetry, theology or philosophy.

To the point that the Modernist dream may be defined as a constant fight to replace the ‘subjective’ space and time by a really rational view of a space belonging to no space and a time made of timeless instants. It is fair to say that civilisation has been a long fight, mainly lost, of resisting, for good and bad reasons, such a definition of the modernising frontier. Well, now, through a completely unexpected inversion of the respective positions of every field of inquiry, the many disciplines of natural history are calling for a return to the spatial conditions of the Earth and for an urgent sense that ‘times are fulfilled’. Gaia is not nature; and it is not a polity either. Scientists are fighting many other battles. They discover totally different friends and foes. And so do we all. There is no modernising frontier any more. Instead there are so many new lines of conflicts that a totally different Gaia-politics is now redrawing all the maps (Stengers 2009 and this volume). So by remixing all the ingredients of what used to be distinct domains of subjectivity and objectivity, the very notion of the Anthropocene is indeed an enormous source of confusion – but a welcome source. Like that of Dr Ryan Stone, our collective return to Earth is a rather traumatic one. But at last we know where we are and what we should fight for. Ah! But should we not have known that all along? ‘Memento, homo, quia pulvis es, et in pulverem revertéris’; ‘Remember, man, that thou art dust, and unto dust thou shalt return.’

Note

- 1 In a 2002 memo to President George W. Bush titled ‘The Environment: A Cleaner, Safer, Healthier America’, obtained by the Environmental Working Group http://en.wikipedia.org/wiki/Frank_Luntz#Global_warming (accessed 4 July 2014).

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