

Governing the anthropocene: agency, governance, knowledge

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20th Anniversary Special Issue, 'Agency and Time: Social Theory in the Age of the Anthropocene'

Introductory Article to the Special Issue

Governing the Anthropocene: agency, governance, knowledge,

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Abstract

The growing body of literature on the idea of the Anthropocene has opened serious questions that go to the heart of the social and human sciences. There has been as yet no satisfactory theoretical framework for the analysis of the Anthropocene debate in the social and human sciences. The notion of the Anthropocene is not only a condition in which humans have become geologic agents and thus signalling a temporal shift in earth history: it can be seen as a new object of knowledge and an order of governance. A promising direction for theorising in the social and human science is to approach the notion of the Anthropocene as exemplified in new knowledge practices that have implications for governance. It invokes new conceptions of time, agency, knowledge and governance. The Anthropocene has become a way in which the human world is re-imagined culturally and politically in terms of its relation with the Earth. It entails a cultural model, that is an interpretative category by which contemporary societies make sense of the world as embedded in the earth and articulate a new kind of historical self-understanding, by which an alternative order of governance is projected. This points in the direction of cosmopolitics – and thus of a 'Cosmopolocene' – rather than a geologisation of the social or in the post-humanist philosophy, the end of the human condition as one marked by agency.

Keywords

Agency, Anthropocene, cosmopolitics, deep history, governance, modernity, time,

Whether or not there can be a social theory of the Anthropocene is far from self-evident.ⁱ The notion is now well established in the disciplines that comprise Earth science and has entered into the languages of the social and human sciences, in particular in those areas which have the most affinity with Earth science, such as geography and environmental science. The response from the human sciences in recent years has been considerable with a wide range of publications that include contributions from anthropologists, historians, political philosophers and sociologists.ⁱⁱ The time would appear ripe for a fuller theoretical development of the concept beyond the particular and contested rendering of the term in Earth science.

The proposal that inspires this paper and special issue is that the notion of the Anthropocene has opened up new avenues of inquiry that since the growing acceptance of post-positivist science for the first time bring the natural sciences and the human and social sciences closer. In that sense the Anthropocene is more than a concept, but while it would be tempting to call it an emerging paradigm, it amounts to a transdisciplinary interpretative framework that has major ontological and epistemological implications for all the sciences. For this reason, it is not be simply a case of the human and social sciences responding to a development within the natural sciences, but a challenge for all the sciences to address. In any case, there is considerable variation on the ramifications of the notion of the Anthropocene, including within geology, where it first arose.ⁱⁱⁱ The social and human sciences have much to contribute to the advancement of a theoretical approach to the Anthropocene, but they also have much to learn from the natural sciences. As part of that endeavour, greater theoretical clarification is needed. A possible outcome may be an integrated history of the Earth system and the human world, since one of the obvious directions of the emerging paradigm – at least within Earth science – is that the human societies and the earth have now forged a tenuous unity as well as a consciousness of that unity. The presuppositions of modernity are now once again called into question with the emergence of an entangled conception of nature and society, earth and world.

Major shifts in society occur when human experience and interpretation change (Koselleck 2004). There is much to suggest that today human experience is undergoing a significant shift due to major spacio-temporal transformations. The implications for how such transformations should be interpreted are less clear, but what is evident is that the notion of the Anthropocene has become an important interpretative category for making sense of the world today and of human societies within a trajectory of time that encompasses planetary time. In this introductory article we argue that the Anthropocene amounts to a new cultural model and we set out four main areas that are particularly pertinent to social theory: the question of temporality, the nature of subjectivity and agency, the problem of knowledge and, ultimately, a new understanding of governance.

The argument made here is that the notion of the Anthropocene is not simply a condition of nature, but is also a societal condition that offers a new cultural model by which contemporary societies interpret themselves in terms of their past and future. This is partially implied in the approach dominant in Earth science – or as it is sometimes designated, Earth system science – of a new geological era that succeeds the Holocene era wherein humans have become geological agents. As argued by the historian Dipesh Chakrabarty (2008) in a

seminal article that was instrumental in opening the concept to the human and social sciences, the notion of the Anthropocene goes beyond the geological framing of the problem to include wider issues, which also extend beyond climate change and global warming, though these are of course its most important manifestations (see also Chakrabarty 2014 and his contribution in this issue). The attraction of the concept is due in no small measure to capturing these wider questions concerning the relation of human life to planetary life. However, the Anthropocene is more than a concept; it is, we argue, a new cultural model. Once consciousness of the new human condition enters into historical self-understanding, the Anthropocene becomes something of greater significance than a temporal condition in geologic time: it can be seen as a new cultural model that is constitutive of a new object of knowledge and an order of governance. We are therefore proposing that a promising direction for theorising in the social and human science is to approach the notion of the Anthropocene as exemplified in new knowledge practices and thus not simply as an objective condition or requiring a geologic recasting of historical time. It is rather a cultural model that invokes new conceptions of time, agency, knowledge and governance.

Temporalities of the Anthropocene

The notion of the Anthropocene emerged initially as a temporal concept in geologic time, but arguably now has a wider sphere of signification as the concept gets taken up in the human and social sciences. Indeed, the current contestation of the term within the Earth sciences exemplifies an emerging paradigm in that the term covers a wide spectrum of issues. Although a temporal condition, as a recent period in the long history of the Earth, it is also a spatial concept in that it refers to a process that happened in the planet as a whole. In that sense, it is more than the notion of the globe, which refers to the human dominated surface of the earth. But the earth is more than the globe and more than the global environment. Indeed, the notion of the earth as famously commented by Lovelock (1979) and others, is a misnomer since more than two thirds consists of oceans, which are integral to the life of the planet. The notion of the Anthropocene invokes a planetary sense of time and space that requires a re-thinking of the notion of the globe, which does not fully capture the co-evolution of the natural and social world and the deep historical time of human and planetary life. Later in this article we argue that this points in the normative direction of cosmopolitics and the intimation of a Cosmopolocene.

The notion of the Anthropocene gained currency in 2000 with the proposal that the current geologic epoch is the Anthropocene and that therefore the Holocene epoch should be regarded as over, with some claiming that it in fact should be projected back into both geological and historical time to replace the Holocene (Cruzen 2002).^{iv} The Holocene era, which was officially named and dated in 2008 as the Epoch^v that followed the Pleistocene, commenced just under 12,000 years ago when a period of global warming began bringing an end to the last Ice Age. This Epoch was the period in which human civilisation began with the emergence of farming and later the creation of cities and the subsequent birth of, what are now referred to, following Eisenstadt (1986), as the Axial Age civilisations. It is still

officially the geologic Epoch in which we live. The notion of the Anthropocene holds that the Earth is now moving out of the Holocene Epoch due to the extent of human activity. The new Epoch, if it materialises, is the result of humanity having become a geologic force that has fundamentally transformed the earth to an extent that it may have created the geo-physical conditions that will postpone if not prevent another ice age in the future, thus possibly bringing to an end the inter-glacial nature of geologic time that has characterised the history of the earth for some 2 million years. This all means that the Quaternary Period, which began some 2.6 million years ago, will now need to be reconsidered in terms of three epochs, with the Anthropocene of a very recent origin. Geologic time, biological time, and historical time are now inextricably intertwined. Such re-periodisation is not necessarily new, for the Quaternary Period was itself recently changed from 181 million years ago to 2.6 (Zalasiewicz et al 2015a: 198). Such re-temporalisations are of course normal in the human and social sciences, where all boundaries are not immutable.

Although the Holocene encompasses all of human history, it is a short in planetary time – literally in Greek meaning ‘fairly recent’ – given the vast expanse of 4.5 billion years since the formation of the Earth and solar system and 12 billion since the birth of the universe. As the longest and most stable of the three preceding inter-glacial periods, the Holocene is also one of the most stable in terms of environmental conditions and made possible the turbulent history of human societies that began with the rise and victory of *Homo sapiens sapiens* over its rival Hominids. Indeed, the Holocene itself, although defined by non-human conditions, in making human societies possible and thus creating the flow of historical time, is inseparable from human life. Since the beginning of that epoch, human activity already had a transformative condition on the planet, for example in the extinction of certain species of megafauna. Although human activity as transformative of the planet goes back to the invention of fire in the Pleistocene, it was not until the Neolithic revolution that saw the introduction of farming that significant change can be seen in the Earth’s surface. This has led some to argue that the Anthropocene is not a new Epoch as such, since humans have been transforming the Earth for at least well over 10,000 years. This position has been put forward by Ruddiman (2003, 2015) who attributes land exploitation and deforestation for agriculture, including rice cultivation in Asia, as far back as 6000-8000 years ago for variations in CO₂ and methane. This is the so-called ‘Early Anthropocene’ thesis. The main evidence for locating the advent of the Anthropocene before the modern industrial age is the first wave of megafauna extinctions in the late Pleistocene and which can be attributed to hunting. While this appears to be incontrovertible and that ecological changes resulted, it is not evident that it led to major changes in the Earth system, a requirement for a new designation of geologic time.

A good deal of the debate about the Anthropocene is about periodisation and whether formal Geological Time Scales (GTS) should be used, used informally or whether other criteria should be used. There are very different views on when the epoch began and what criteria should be used, for example, whether stratigraphically optimal criteria or environmentally optional criteria should be used. This is a primarily debate about when humans left their imprint on the earth to a point that the earth was fundamentally transformed as a result. The

long view is, as mentioned, that the introduction of farming had a transformative effect on the earth. This probably does not meet the requirement for a geophysical imprint, which is essentially what is required for an official designation of a new geologic epoch in GTS terms. Whether or not the International Commission on Stratigraphy will ratify the proposal for the Anthropocene remains to be seen^{vi}. Geology has traditionally operated with a conception of time determined by fossilisation whereby the signature of the deep past is left on rocks. This limited but demanding requirement for a new periodisation in geologic time has to be countenanced by other approaches to the Earth that do not give primacy to stratigraphy. The emergence of Earth system science over the past two decades would give a broader view on the nature of planetary time. This comes with the recognition, the so called Gaia thesis, that the Earth is a system comprised of its rock formation, the oceans, the atmosphere including the earth's magnetic field, and life itself, both human and inhuman life. The problem of periodising geologic time is complicated by the fact that the most discernible evidence for anthropogenic induced changes to the earth lie in the oceans and in the atmosphere. For these reasons, the stratigraphic conventions of measuring geologic time are not suited to dating the Anthropocene. There is also a wider planetary perspective: in 2016 it was discovered that the melting of ice sheets in Greenland, the cause of which can be assumed to be human, has led to a change in the distribution of weight leading to a change in the earth's polar motion, i.e. in the tilt of the earth, which now leans more eastward.^{vii}

The fact is that all these processes have different temporalities, scales and spacialities and, while interacting with each other, are driven by different forces. The forces that can be attributed to human life can be more easily demonstrated to have an impact on the composition of the oceans and atmosphere than on the deep history of rock formation. Since Lovelock's famous book in 1979, *Gaia: A New Look at Life on Earth*, it is now customary to include life as part of the earth, which is a system in which physical, chemical, biological (including human) processes interact through positive and negative feedback communication. The dating of the Holocene was itself determined by criteria other than fossilisation. The determinant of warming in a core of ice drilled in Greenland was the critical fingerprint used to specify the start of the Holocene, which geologists found in marine and late sediments around the world (Monastersky 2015:145). The temporality of the Anthropocene is further complicated by the fact that it is a construction of the present and is therefore both in and of the present with a projection into the future. The options are to redesignate the Holocene the Anthropocene to incorporate the most recent acceleration in the geophysical planetary transformation, or to agree on a new point of transition to the Anthropocene, which may have to be deferred to a future time, or to down-grade the Anthropocene to an Age in the Holocene Epoch (see Certini and Scalenghe 2015). In view that the Holocene is so contested, some geologists are opposed to the declaration of a post-Holocene epoch since the determination of the Holocene includes much of what is now being attributed to an Anthropocene.

However, not all are convinced, since it is argued that the impact of the Neolithic revolution on the earth as a whole was not significant in terms of GTS and does not amount to humans as geophysical agents. It has been argued that natural occurrences could explain atmospheric variation of CO₂ in the Holocene period. The general consensus is that the period known as

modernity – in the terms of historical time – is in geologic time the epoch of the Anthropocene. The human imprint on the Earth system can be precisely related to the introduction of carbon fuel whose signature in the atmosphere is roughly in proportion to the amount of fossil fuel consumed (Steffen et al 2007: 616). There are three positions as regards the periodisation of the Anthropocene as an epoch whose advent lies within modernity. The first is the argument given by initially by Crutzen and Stoermer (2000 and Crutzen (2002) that the new epoch begins with the industrial revolution, with 1784 as the key date following the invention of the steam engine by James Watt. This is of course a symbolic date, since it took more than five decades for the invention of the steam engine to have made a discernible impact. The industrial revolution in Western Europe marks the point at which there is a huge increase in human population along with a massive expansion in agriculture and industrialisation much of it driven by fossil fuel consumption bringing about a measurable change in the earth system. Fossil fuel made possible the release of gigantic amounts of carbon from the deep history of the earth's past to make possible major social and political transformation. This shift is arguably one of the most significant transformations in historical time and connects the present and future with the deep history of the earth's distant past. However, the real implications of the industrial revolution did not come until much later when other scientific and technological inventions added to the initial impetus of the steam engine. Of particular importance is the revolution in agriculture following the synthetisation of ammonia from atmospheric nitrogen to make fertiliser. It should also be noted that this all occurred at much the same time European powers amassed huge overseas empires that greatly contributed to industrial capitalism and when Europe finally overtook Asia in what is now referred to as the 'Great Divergence'^{viii}, a divergence that today is being reversed.

In a controversial but hugely significant thesis, the so-called 'Orbis thesis,' Maslin and Lewis (2015a), claim that there is an early modern date that marks the onset of the Anthropocene. This is 1610. Their thesis is that following the colonisation of the Americas and the collision of the Old and New Worlds there was a global exchange of species and foodstuffs. Old World crops such as maize and potatoes were brought to Europe while sugar cane, beans, and wheat were brought to the New World in one of the first waves of historical globalisation. This Columbian Exchange could not have occurred without human intervention (see Crosby 2003). The 1610 is a turning point in that it marked the decline of CO₂, signalling the end of a long cool period. However, the core of their argument is that as a result of a massive drop in human population in Central and South America following the Spanish conquest after 1492 – from c54 to 6 million – the result was major reforestation leading in turn to a drop on CO₂ between 1570 and 1620 with a low point in 1610. In view of the magnitude and timing and the globalisation of the world biota, they claim that it is reasonable to attribute the fall in CO₂ to human activity and thus the commencement of the Anthropocene at a time that links with Wallerstein's argument of the emergence of the modern world system (Wallerstein 1974). If the thesis is correct, it would confirm one major theory of historical time and align it with geological time. The argument however is not undisputed (Hamilton 2015; Zalasiewicz et al 2015b). The main objection is that the drop in CO₂ is not outside the range of natural Holocene variability and thus undermines the core of the argument that human activity can be attributed. There are other objections, such as that the impact of reforestation would not have

occurred until much later. A further ramification of this thesis is that since *Homo sapiens* is a product of the Pleistocene interglacial, the existence of the Holocene now needs to be replaced by a much longer-run Anthropocene, which effectively replaces the Holocene, which can at most refer only to the last stages of the Pleistocene. In this recasting of the scales of history, with the placing of increased weight in 'prehistory', the Anthropocene would be entirely taken out of our current conception of the modern period.

Two immediate conclusions follow from this. One is that while geologists, including Maslin and Lewis, continue to insist on the at least in principle possibility of reaching a formal definition of the commencement of the Anthropocene based on the fundamental principles of geological inquiry, the range of interpretations allow for an informal definition where the term is not tied to a specific origin. Clearly the notion of the Anthropocene can no longer be tied to the GST framework and has suffered the fate of all concepts in the social sciences of being essentially contested. The natural sciences are not immune to this tendency. Second, while a stronger case for 1610 has been made than for the Early Anthropocene with the emergence of farming, the general consensus seems to be that the post-second world period, 1950 to 1964, offers the first substantial evidence of human induced change, even if there are earlier antecedents and modernity more generally is the general time span in question. This is the 'Great Acceleration' thesis (Steffen et al 2007; Steffen et al 2015). The thesis, which is inspired by Polanyi's 'Great Transformation', is based on the claim that planetary change must be demonstrable on the Earth System as a whole and must be considerably greater than natural variability. In the footsteps of Karl Polanyi (1944), the notion affirms the need for a holistic view of societal change, but, unlike Polanyi's limited conception of the thesis of a Great Transformation, includes the relationship of society and the earth and moreover has a global scope. Polanyi, it will be recalled, operated with a decidedly nation-state approach and one that was predicated on the British course of modern history. Whether the date is 1610 or 1784, in the final analysis is probably not important, given the long time-scales concerned and the inevitable contestation on the point of origin. According to Maslin and Lewis, the best alternative to 1610 is 1964 when a peak in atmospheric radiocarbon was recorded in tree rings and which can be related to nuclear testing. However, although a clear signal of human geophysical activity, it does not fulfil some of the requirements needed for a designation of a new geological epoch as such. This occurrence is probably better placed within the wider context of the Great Acceleration that happened in the aftermath of the Second World War, with a marked general rise since 1950 of the influence of human activity on the earth of which the fall out of nuclear testing is only one. The war itself was a major contributory factor, as was the Cold War that followed in its wake, in that it led to the rapid development of new technologies which all required increased energy on a scale previously unknown (see Steffens et al 2011; McNeil and Engelke 2014).

This timing of the Anthropocene places it more firmly in the present, and even suggests that it is a future oriented condition that will therefore become more apparent for generations yet to come. The later periodisation of the Anthropocene, with an open ended future, has the additional value of capturing the global scale of what in 1784 was only a relatively small contribution by Western Europe. For geologists, it is also easier to relate this later timing to

clearer evidence for stratigraphic markers than earlier points, which are undoubtedly best seen as antecedents in a historical model of the Anthropocene occurring in stages. An influential group of geologists have postulated 16 July 1945 as the formal date of the entry of the Anthropocene with the detonation of the first atomic bomb (Zalasiewicz et al 2015: 200).

It may be objected that this preoccupation of geologists with pin-pointing an exact date for the emergence of the Anthropocene is pointless for purposes other than demarking boundaries in geological time scales. For human history, which does not have the golden spikes of geology, this is clearly impossible. Yet periodisation, as Le Goff (2015), has argued in his final work is essential in order to make sense of time. Where one period begins and other ends will always be fuzzy, not least since the history of any one period will always have to be related to wider global contexts. However, it does not necessarily follow from this, as Le Goff claimed, that a single standard for measuring historical time for the world is possible and desirable. In any case, geologic time is by definition planetary and thus does not have this problem. Yet, as geologic time approaches the present, definitions are beset with many of the problems of knowledge in establishing firm and final answers since these will always be open to further contestation. They are interpretative categories for making sense of the present, though it does not follow that they have no objective referents. The recent discovery that plastic debris has become a new 'stone' as a result of combining with natural sediment in the seas could be taken as such an objective referent of anthropogenic influenced change to the earth's rock formation (Corcoran 21014). But there are many others, as the above debate reveals. Temporality is made possible by periodisation, which is a way in which the present is governed since it establishes a point of transition from the past and opening a path to the future. Periods are best seen as points of transition that have long term consequences. Defining the period in which one is in is clearly beset with all kinds of problems, in particular where it concerns the interpretation of the future. Yet periodisation is unavoidable – in particular from the perspective of historical sociology – if the present is to locate itself in history. But for this to be in any way viable, fundamentally new approaches are needed that can encompass global routes to the present. Developments arising from global history around 'deep history' (see below) and 'big history' offer promising directions for sociological and historical inquiry (see Christian 2004, Spiet, 2012, Wisener-Hanks 2015). However, connecting these temporalities with geologic time is by no means clear, in particular since they are based on biological and societal logics of evolution. One contribution from the social and human sciences such as anthropology, sociology and history would be to reveal the processes behind the geological shifts. On this perspective, see Hann's contribution to this issue. However, more than this is required, since the shifts themselves require interpretation by new cultural models.

Some agreement nonetheless does appear to be possible as regards a mid-twentieth century periodisation for the commencement of the Anthropocene in that this timing fulfils both geological and historical considerations of significant human activity on a global level and scale. It is a point at which clear evidence exists of changes to the Earth System in which a marked increase in the three greenhouse gases of carbon dioxide, methane and nitrous oxide occur, and when a globally linked societal system based on industrialisation and massive

demographic explosion coincide. The key factors then are the scale and significance of human activity on the Earth system taken as a whole that take such changes beyond the range of variability for the Holocene. If this is correct, and the consensus appears to point in this direction of a staged formation of the Anthropocene culminating in the second half of the twentieth century, the notion of modernity needs to be reconsidered as the fundamental threshold in history. The key concerns of western social science around post-industrialisation and postmodernity fail to fully capture the take-off of especially Asia in this period, which is a period of industrialisation.

The implications of the advent of the notion of the Anthropocene do not invalidate the notion of modernity, but point to a new contextualisation of modernity and of historical time to account for the now accepted fact that we live in a human dominated geological time unit. The Great Acceleration now includes new industrial and extractivistic countries – Brazil, China, India, Russia, South Africa, Indonesia – and has led to an intensification of a process that more or less coincides with the emergence of modernity in western Europe, but matures only in the second half of the twentieth century at a time when many other projects of modernity are consolidated through different civilisational routes. Both modernity and the Anthropocene are brought together through the long lasting consequences of the imprints of the western world, since there is no doubt that despite the global extension of the human imprint on the Earth system that the western world, even since the Great Acceleration, became a global phenomenon, and has played a far greater role. Now it would appear that the entire world is embroiled in societal and technological modes of organisation that began in Europe in the nineteenth century. Modernity, too, has been strongly influenced by the European and later the North American variants (see Delanty, 2016a, 2016b, Mota and Delanty 2015, Wagner 2012). It would seem to be the case that the diverse routes of modernity throughout the world, while departing in significant ways from the western world, have nonetheless embarked on much the same project of relentless growth and environmental destruction. This would appear to diminish the significance of major varieties of modernity, if in the final analysis all varieties of modernity are embroiled in much the same practices. However, it does not necessarily entirely diminish all dimensions of modernity, other than placing modernity in a much larger-timescale. The fact of a certain co-emergence of modernity, at least in western Europe, and the early stages of the Anthropocene does not reduce one to the other. The real confluence is between the Anthropocene and the Great Acceleration (see McNeil and Engelke, 2014).

A major question for the present day, then, is whether or not the cultural and political currents of modernity can be harnessed to challenge the self-destructive forces that the modern age has unleashed in creating the age of the Anthropocene. In this sense, the challenge of governing the Anthropocene – or transforming it into a positive political project – is also about overcoming the limits of modernity whose presuppositions, it has been much noted, have been based on the separation of human history from natural history (Latour 1993; Rossi 1984). For this reason the problem of temporality lies very much at the heart of the problem. Modernity begins with the presumption of a rupture of human history from nature and is based on a logic of human autonomy and a capacity for the radical transformation of the

present in the image of an imaginary future, to take an influential formulation of the nature of modernity associated with the writings of Castoriadis (1987). But if this condition is also the dystopic condition of the Anthropocene, the transformative powers of human agency will need to be considerably rethought. An alternative account, then, would be to see the advent of the Anthropocene moment as not only a product of modernity or a condition coeval with modernity, but as a condition that can be challenged by the affirmation of modernity and a cultural model that can be located within the modern as opposed to some post or non-modern condition. Whether or not modernity has the capacity to bring about a further transformation is clearly one of the major questions for the present day. From a theoretical perspective, despite the entwinement of modernity and the Anthropocene, and the resulting transformation in the temporal horizons of human and planetary life, the radicalisation of the modern condition is probably the best way to envisage a liveable future. The Anthropocene can be seen as the outcome of the instrumental rationality of modernity, to invoke the Weberian concept of rationality, but modernity always entails more than this condition that has often been equated with capitalism. There can be little doubt that capitalism has been one of the main drivers of the Anthropocene, as argued Chakrabarty (2009, 2014) and Hornborg and others (see below), though positions will differ on whether it is the predominant force. The current situation is best seen as shaped by contradictory tendencies. This is also what Polanyi noted about the Great Transformation: the instrumentalising forces of the market are checked in a 'double movement' by the assertion of social protection. Something like this is not quite in evidence in respect of the Great Acceleration, but the theoretical terms of analysis can be fruitfully applied. Such a double movement, when applied to the Great Acceleration, would have to require a very different kind of political subject than the one Polanyi had in mind. We return to this below.

The Question of Agency: Reconstitution of Subjectivity

At the core of the Anthropocene debate is the question about the nature of agency, of the consequences for history of human action, and the very constitution of human subjectivity. Modernity gave rise to the notion of the autonomy of the human being and heralded a view of history as the emancipation of humanity from nature, a condition that was equated with domination. Modern subjectivity is thus constituted through the domination of nature. In the critical tradition, from Adorno and Horkheimer to Habermas, the domination of nature went with the domination of society and was underpinned by capitalism. Emancipation from domination in this tradition of thought is the emancipation of humanity, not of nature, and does not question the capacity of human agency to recover autonomy. The very foundation of western liberal thought lies in the myth of human society arising from the exit from the state of nature. The Anthropocene debate raises some doubts about this western and Enlightenment conception of human agency as the compass of emancipation. There are a number of related dimensions to this.

The first and most important implication is that nature is not an objective and inert entity but holds sway over human life, which is embodied in nature, and, moreover, human agency is

operative in nature. Even long before the advent of the Anthropocene – at least in terms of the conventional location of this in the modern world – human beings have been acting upon and transforming nature, beginning with the domestication and extinction of species. For this reason, as Latour has argued, the notion that agency is entirely social needs to be abandoned, along with the idea that society exists outside the realm of nature. In acting upon nature as a biomorphic force and later as a geophysical force, humans are also transforming themselves. In this way, human subjectivity is shaped in a process of co-evolution with nature. However, it does not follow from this, as implied in posthumanist theorising, that agency is no longer a relevant category.^{ix}

As most clearly outlined by Strydom in this issue, the Anthropocene is not merely a natural condition of the earth, but is also a cultural model in so far as it is a category of cultural interpretation or sense making (see also Strydom 2015). In terms of the previously mentioned dynamic between human experience and interpretation, the significance of the Anthropocene in one important respect is that it is an interpretation of a new dimension of human experience, namely the perception that human beings are part of nature and that the quintessence of human life does not reside in the promethean domination of nature. In Strydom's analysis, there is a double logic to this. The Anthropocene in becoming more than a concept is also a cultural model in which contemporary society today seeks to interpret itself by recourse to cognitively structured referents, such as responsibility, truth, justice. In other words, the notion of the Anthropocene now captures a wider domain of experience and interpretation about the present and future of the world. It incorporates within it evolutionary thresholds of learning and thus has acquired a strongly normative and critical character. In the present day, this is beginning to have an impact in the ways in which human subjectivity is constituted. In terms of agency, it points in the direction of a conception of agency that is no longer predicated on the destructive separation of society and nature. We discuss this further below in relation to cosmopolitics and the challenge of governing the Anthropocene through a 'Cosmopolocene', which is one of the direct outcomes of what might be more generally termed the Anthropocene complex.

The implications of this remodelling of the relationship between nature and society go beyond the present in its relation to the future but extend far into the past. An embedded concept of subjectivity, which is implied by the notion of the Anthropocene conceived of as a cultural model in which human subjectivity reflects upon itself and re-evaluates its position in the world and in relation to the earth, suggests an alternative account of history. In this account, human beings are not only embedded in society, but are also embedded in nature, the evolution of life and the earth. As Hannah Arendt (1958: 2) has commented: 'The earth is the very quintessence of the human condition, and earthly nature, for all we know, may be unique in the universe in providing human beings with a habitat in which they can move and breathe without effort and with artifice'.

In recent years the notion of 'deep history' has been put forward to provide a new reading of history in which recent history is contextualised in a much longer-time span than conventional history allows, which possibly gives too much emphasis to the present as accelerating time and planetary transformation. This debate arose independently of the

geological debate on the historical time scales of the Earth system, but relates to it in ways that are only now becoming clear. The first and most important outcome of a deep historical perspective is that it can be seen more clearly that historical time is embedded in the natural history of the earth and a slower sense of time is required than one that is located in the recent present of modernity. The temporal framework of history is based on the division of history and prehistory, whereby history begins with the advent of writing. Recent efforts by historians to overcome this division seek to bring the Neolithic and Paleolithic into view as part of a 'deep history' of human life (Shrycock and Smail 2011; Smail 2008 ; Mythen 1998). By deepening the historical framework in this way, history is also spatially widened to include areas and domains of experience not previously included within historical time which give predominance to the Eurasian civilisations of the 'Axial Age' (Mota 2016). Such a deep historical perspective shows the present in different light and not dominated by spatially bounded entities such as nations. For example, Earle et al (2011) portray human migration, which goes back to the origins of *Homo sapiens*, as normal and driven by human volition rather than necessity. Indeed, migration is older than the dispersal of *Homo sapiens* 60,000 to 80,000 years ago and goes back to the first dispersal out of Africa by *Homo erectus* 1.7 million years ago. Smail (2008) offers an account that gives prominence to the interweaving of biology, the evolution of the brain, and human behaviour. Complex forms of social and political organisation can already be found in the late Paleolithic. It is possible that Paleolithic societies had oral memories (2008: 57-8). Deep history asserts that documents are not the only form of historical evidence. History cannot be denied to those who did not write about their past or if they did not have the means to record it for posterity (Castro 2011). Deep history challenges the nineteenth century theory of history associated with Rank, Langlois and Seignobos that asserts that the unwritten past is unknowable. Against what can now be said to be a short history of humanity, in effect produced by European Christian civilisation, it instead sees a common history that goes back to Eastern Africa where *Homo sapiens* emerged. Smail's call for a deep history of humanity that overcomes the division of prehistory and history offers an interesting and challenging view of historical time and a basis for thinking of human subjectivity in ways that challenge Eurocentric conceptions of history and subjectivity. The notion of deep history resonates with the previously discussed recasting of the scales of geologic time in ways that have not yet been fully developed, but offer much potential. A relevant example is in new developments in heritage. Szerszynski, in this issue, draws attention to the how geologic and historical time are intertwined in monuments that mediate between the different temporalities and facilitate creative ways of thinking about deep time.

One of the most promising avenues for further work in understanding the formation of human subjectivity is to explore the developmental or evolutionary logics and their interactions between geologic time, biological time, historical time as well as the history of consciousness. Current theorising on such interconnections has been mostly confined to the study of environmental influences on human history. The work of Braudel (1990) was the first major attempt to explore long term historical formation in the context of environmental influences. Diamond (1998, 2005) has contributed two path-breaking studies on the influences of biological life on human societies and what happens to societies that fail to

locate themselves in their natural environment, and more recently, inspired by the Anthropocene, Costanza et al (2007) have attempted to produce an integrated history of human life in relation to natural history with the general conclusion that societies respond to climatic signals in multiple ways, which can include collapse or failure, migration, and creative mitigation. In their view, future response and feedbacks with the human-environmental system will depend on understanding the global past. This work makes a strong argument that 'examining socioecological systems across multiple timescales can identify the antecedents further back in time of major phenomena that occur in a particular era or time' (2007: 13). Brooke (2014) has written the first global history of human life in the context of the history of the earth showing how human and biological evolution and earth history are interwoven. Dukes (2011) in *Minutes to Midnight* sought to locate the current Anthropocene era in the context of the history of modern society.

Although most of this work is confined to the analysis of the environmental limits of human societies, the implications are wider. Some of these have been identified by Clarke and Gunaratnam (in this issue) who highlight, following Brooke (2014) and Davis (2001) that significant social upheaval coincided with major geophysical change. For present purposes, it will suffice to mention here that the direction that this emerging work highlights is that human subjectivity must be seen in deep historical terms as embedded in the natural history of the earth. If the Anthropocene is located in the present, from the mid twentieth century, it is a moment in a long time scale in which human life and natural history have interacted. The Anthropocene idea draws attention to the need for society today to form a new relation to nature. The history of *Homo sapiens sapiens* shows considerable variability and learning potential both in the creation of societal organisation, technological mastery, and environmental interaction. Even since the advent of modernity, this is by no means a simple case of the instrumental domination of nature. As Norblad, (in this issue) points out with respect to the governance of forests, throughout European history examples can be found that illustrate a long term view of the relationship with nature and that the administration of the forest was a model for the management of other things and which does not quite fit into the model of instrumental domination.

Mythen (1998) has shown how the evolution of the modern mind took shape in three main phases, beginning with the formation of general intelligence in primates and early hominids, which was followed by specific or modular intelligences in early *Homo sapiens* and Neanderthals, with the third and most characteristically human intelligence of, what he calls, 'the cognitively fluid mind' appearing 60,000 to 30,000 years ago with the consolidation of a human mind capable of communicating between the different forms of intelligence. The evolution of this cognitively fluid mind, which was marked by the final evolution of *Homo sapiens sapiens*, along with the later invention of farming, which made possible human societies, were in the long historical perspective the most significant developments in shaping human subjectivity.

It may be objected that the Anthropocene is a present or even future condition with only a limited historical antecedents. That is indeed the case but the argument for contextualising the present in the deep past is that a long term evolutionary view of human life reveals the

learning capacities of the human mind and that the relation of the human and natural world is one of constant change. That relation must also be seen as unfolding through different temporalities, namely the geologic, the biological, the historical (the history of human societies) and the related temporality of consciousness. All of these involve different manifestations of the logic of evolution.

It may be the case that the present period, the past fifty years, is a decisive time in that relationship and that human agency will take new forms. A relevant consideration in the evolutionary perspective is the fact that the very category of the human being has undergone major transformation in the past few decades, more or less coinciding with the Great Acceleration of the Anthropocene. As Thomas (2014) argues, it is possible that the chemical acceleration of human life now separates us physiologically from pre 1945 human beings. With the natural world transformed by human beings and synthetic forms of life now possible, the result is that human beings are themselves transformed as a result of their very agency. History and human evolution drove the reflective capacities of the human mind, but it also created the toxic body, which may be an evolutionary new creation challenging the very notion of the human being.^x Once life can be synthesised, it ceases to be a natural entity. Bryan S. Turner (in this issue) concludes that the influence of the Axial Age religions with their theology of suffering and unhappiness may be waning as a result of major neurological, biotechnical and physiological changes to the human body that offer new possibilities for human agency. In this account, the age of the Anthropocene is also the age of a radical shift in human nature in which the human body itself is undergoing transformation. There are also questions here about the possible end of the evolutionary process, at least as based on chance. According to Darwin, evolution is triggered by the chance occurrence of a mutation. But there may now be forms of life that are no longer determined by chance. However, it is unlikely that chance will altogether disappear in that whatever humans do, it is evident that they do not entirely master the earth and that major pathogenic forms of life may develop as a result of catastrophes to come and there is always the chance of an impact from the outside, e.g. cosmic radiation. The human species probably therefore remains permeable and consequently open to chance occurrences.

The second problem concerns Anthropocentrism. In highlighting the centrality of human agency there is a danger of a certain Anthropocentrism, namely a view of the planet as shaped by human beings who through science and technology have become its masters. Global warming has preceded the existence of human life and unless human action does not prevent a future ice age, undoubtedly the current interglacial period will come to an end, due to circumstances that have nothing to do with humans, who may only succeed in delaying it. Humans may make the planet unliveable, but they are earthbound and cannot escape it. As Hannah Arendt (1958: 3) argued in the opening of the *Human Condition* ‘...we are earth bound creatures and have begun to act as though we were dwellers of the universe...’. It is unlikely that whatever they do they will end up destroying it before it ends its existence. This would be to exaggerate the power of human agency, including the non-intentional consequences of human action. What is more realistic is that human agency will destroy conditions for human life or, more likely, create the conditions for the collapse of existing

societal systems. The current situation might be characterised as a paradoxical one in which human beings have established themselves as the agents of change over nature while also at the same time they are in thrall to nature, which in the final analysis they cannot entirely master since they are part of it. This paradox is discussed by Chernilo in his contribution in this issue. It is also the strongest rejoinder to the position of skeptics, who, in contrast to climate deniers, hold that the climate change is normal and that there have been more intense periods of heat in the deep past of the planet.

In discussing the Anthropocene in terms of major temporal and existential shifts there is a distinct danger of neglecting any consideration of power and inequality, which from a social science perspective are essential to any account of societal change. The Anthropocene is generally discussed with a general reference to humanity as a whole and consequently is in danger of being depoliticised. The problem is that humanity as a species being is rather abstract when it comes to human agency (we return to this in the next section). There can be little doubt that the imprint of the Anthropocene can be attributed to the modern western world which has contributed the vast bulk of the greenhouse gases emitted since the industrial revolution (Bradshaw 2014). This has led to a catching up situation with the developing world, but in a context in which global social inequalities are bound up with climate change (Beck 2010). In addition, to global warming the West also led the way toward laying down a new kind of 'rock' stratum through nuclear technology, both industrial and military, and, since it was invented in 1907, through plastic.

These considerations are important because much of the debate on how the Anthropocene should be understood is dominated by a post-humanist perspective whereby agency becomes dissolved. Representatives of this position are Latour (2013, 2014) and Haraway (2015). Critics of the post-humanist position, such as Hornborg (see his contribution to this issue) have counterposed a Marxist influenced position that places capitalism at the core of the problems of the Anthropocene which concern exploitative global power (see Malm and Hornborg 2014, Moore 2015). In this account, which we endorse, the so-called Cartesian legacy is not to be entirely dismissed, even if we have to question the now untenable separation of humans and nature. The post-humanist perspective is indeed problematical if it jettisons human agency, which Hornborg correctly argues must be retained as an analytical and explanatory category, although it leaves open the question of what would happen in a future post-capitalist world. This is a critique that is just as much addressed to de-referentialised mainstream accounts that posit humanity as a whole as the agent or attribute everything to progress or development. In this view, agency is inexorably connected with the human condition and is characterised by purpose. The fact that society and nature have become embroiled in each other does not mean that these categories are not analytically distinct.

The foregoing is relevant to the debate concerning the designation of the Anthropocene as 'Capitalocene', given the coincidence of the Anthropocene and capitalism. Here, too, analytical distinctions must be made between the different concepts. Capitalism is an economic system characterised by accumulation and the private appropriation of profit, while the Anthropocene is a condition of the world and the Earth system in which major change has

been brought about by human action. Not all human action can be explained by capitalism, but a very large measure can be and this is especially true with the worldwide expansion of capitalism following its adoption in China and in Russia since 1991. Moreover, capitalism is part of a complex global system of production, distribution and consumption, all of which contribute to the Great Acceleration. It makes irrelevant Eurocentric notions such as the post-industrial society. Locating the Anthropocene in social and economic processes as well cultural processes rather than in an abstract and de-politicised human condition is an essential to an understanding of how major societal and environmental change have come about and how it has diverse effects. It is simply not the case that humanity as a whole is in the same boat. There are significant global variations in the negative effects of climate change, for example rising sea levels, as well as in the causes. Invoking humanity as a whole as in the notion of the Anthropocene as the new age of humans can be a misleading way to see the current global situation. Such a myopic view is not only Eurocentric, but attributes a certain determinism to a condition that is essentially social and political. For these reasons, the notion of agency must be retained and cannot be dismissed as in the post-humanist position. Indeed, as we argue in the next section, it is essential to the challenge of governing the Anthropocene and needs to be linked to a normative notion of humanity as a species being.

New Modes of Governance and the Re-Invention of the Political

One of the far reaching implications of the Anthropocene idea is that it compels a new approach to the political. In this article we emphasise that the Anthropocene is not simply an objective condition of planetary change, but it is also an interpretative category by which contemporary societies reflect upon themselves and upon life itself and reimagine their space and time. The Anthropocene as a cultural model is not then a politically neutral concept, but contains strong normative elements including imaginary significations, as in the examples around heritage discussed by Bron Szerszynski (in this issue). The normative dimensions are not clear-cut in that the course of political action is, like the scientific account, contested. It is contested in many ways, in terms of who is the political subject, the nature of objective problems and the potential solutions. The politics of the Anthropocene can be seen in interpretative terms as ways of knowing and containing an imaginary component in that it is about imagining future possibilities and re-defining the present in order to realise future possibilities.

The Anthropocene in entering the political imagination of contemporary societies has now reached a point at which is also becoming an order of governance. To describe it as such means that it has entered into the modes of knowledge by which societies are governed and reaches down to the level of the constitution of subjectivity. Governance refers to a condition in which those governed are embroiled in the apparatus that exercises political control to an extent that they are not outside it, but the means through which it is exercised. It can be seen as both an order of governance and at the same time a mode of knowledge in which the political subject is constituted. Major societal or systemic shifts take place through the creation of new orders of governance entailing new modes of knowledge and technologies of

power by which the individual is constituted. There is already much to indicate that such a point has now been reached with the perception of a planetary crisis. Neoliberalism, which has held sway over the political imagination for almost five decades, is clearly showing signs of decline, at least as a political ideology. While counter-political movements have not yet produced a viable alternative, the current situation entails a world-wide reaction to the societal and planetary crises that the era of neo-liberal of governance produced. It is in this context of crisis and future possibility that a new order of governance is taking shape.

For all these reasons, the problem of agency lies very much at the core of the Anthropocene debate, which is centrally about how contemporary societies can do what is needed in order to make the planet liveable. Agency, whether collective or individual, is predicated on the basis of capacity, intentionality and reflective consciousness. It implies responsibility and rationality; in Habermas's terms, both purposive rational and communicative rationality. Purposive rationality, that is oriented towards an instrumental end, cannot be achieved in most instances without taking account of communicative rationality in that political goals need to be sanctioned through deliberative means. Agency does not exist outside social and political contexts of governance. It is not imprisoned by them, but acts upon such structures, which are also the forms and technologies by which social actors are constituted and productive of subjectivity itself. It was one of Foucault's basic insights that subjectivity is itself constituted through the technologies that make possible knowledge of subjectivity. The most important technologies in modern society that make possible governance are those that take the form of modes of knowledge. But all technologies of governance are part of cultural systems of interpretation. This is best illustrated, although in a way that goes far beyond Foucault, by the example of democracy, which is particularly relevant to the challenges raised by the Anthropocene.

In view of the severity of the challenges of the Anthropocene a first reaction is that that there may need to be a trade-off between democracy and the objective of reducing greenhouse gases in that democracy may be an impediment to the realisation of planetary objectives. This however would be the wrong way to see the situation since the challenges are ones that cannot be realised through purely instrumental means, even if in the final analysis instrumental or purposive forms of rationality will be what will deliver the necessary results. This can be plainly seen in the recent rise of geo-engineering or climate engineering, which is an expression of the decoupling of the political from technology. Proposals of this kind, such as carbon dioxide removal methods and solar radiation management, are also part of the very condition that gave rise to the problems in the first instance in that geo-engineering is embedded in capitalism (see Hamilton 2013). While such forms of technology may have a limited role to play, it is evident that such measures need to be politically embedded and subject to deliberative processes. The lack of scientific consensus, if not its absence, for such Promethean solutions are all the more reason why technological solutions need to be embedded in processes of democratic deliberation. At the other end of the scientific and technological spectrum, lies the more benign prospect of post-carbon technologies. We do not need to sum up the obvious advances and the problems of such technologies other than to observe that the failure for such technologies to be comprehensively adopted resides to a

large degree in that they remain purely technologies. They have not yet fully entered the order governance because the democratic imaginary has not yet moved beyond the limits of the national and international system that has prevailed for the past some two hundred years.^{xi}

Democracy is based on the notion of a political subject, traditionally referred to as ‘the people’, whose modes of existence have drastically changed since the term was first invoked. As discussed in the previous section, the notion of the subject is now central to the Anthropocene, which calls for new kinds of human agency. The notion of a species is, on the one side, in danger of being politically undifferentiated while, on the other hand, the notion of a single human species is a powerful normative regulative idea that has particular relevance for the challenges of the Anthropocene. It is this latter sense that is important especially with regard to the latent capacities that humanity as a species being could draw upon to develop a variety of competences. This might be realised fully only in a future era after which evolutionary change has also taken place on the level of the human body. For the present, there are sufficient indications that humanity as a species being is not entirely de-politicised.

The signs of such political formation in *Homo sapiens sapiens* are evident in shifts in consciousness since the 1980s. Before the mid-1980s discussion of ecological issues was almost entirely confined to the world of science and when there was little if no awareness of major planetary crisis, as opposed to ecological devastation. Since the Chernobyl explosion and the discovery of the Ozone hole in the Antarctic in 1986 that changed with the rise of climate politics and global environmental movements, such that by the 1990s environmental issues entered the agenda of very government and have entered into new orders of governance around sustainability as the leitmotif and the search for re-knowable sources of energy. There can be little doubt that these developments in governance around green politics have been accompanied by shifts in self-understanding even if they do not as yet translate into a new kind of democracy, which is still confined to the increasingly incapacitated politics of the Right and Left. Relevant too are new social movements addressed to planetary politics or political movements challenging neo-liberal projects in particular places throughout the world.

Democracy is not only about the ‘people’ it is about ‘rule’, or in other words about governance. The mode of governance that defines democracy can be variously described as based on rights, constitutionalism, sovereignty, and participation through citizenship. It is these elements that most invite controversy today, with different interpretations on each of these three dimensions of democracy. It is not only the designation of who are the people but how and over what they rule is what is in question. It is not the aim of the present article to delve further into the nature of democracy other than to highlight that underpinning all these dimensions is the deliberative process whereby political goals are formulated through the medium of communicatively based struggles. It is evident now that these struggles are no longer contained within the context of the nation-state. In view of the planetary nature of the problems to which they are addressed, the political field now extends not just beyond the discourses of right and left but into the global arena.

The challenge of governing the Anthropocene does not require relinquishing all our political concepts and legacies. The main political frames of modernity – socialism, liberalism, republicanism – are certainly challenged, in so far as their presuppositions rest on philosophies of autonomy and freedom that only with great difficulty can be extended to encompass the severity of the current crisis. One of the most promising directions for social and political thought in the age of the Anthropocene might instead lie in cosmopolitics, that is a political conception of cosmopolitanism. This should not entirely be seen as a rupture with the older traditions, for it is itself of ancient origins and has suffused the political thought of the modern age. Over the past two decades, more or less alongside the growing concern with climate change, cosmopolitanism has developed to become one of the most influential approaches in a variety of disciplines. This is not the place to review those trends.^{xii} A distinct tendency in the literature, under the influence of post-colonialism, has been in the direction of a rooted conception of cosmopolitanism and with a strong emphasis on a variety of cosmopolitanisms than a singular and universal one. Such post-universalistic and pluralist conceptions of cosmopolitanism have had a greater resonance in the culturally oriented social sciences than in political philosophy and have been significant in moving beyond Eurocentric conceptions of history and politics. This, perhaps, has led to the result that cosmopolitanism has tended to lose its political impetus in addressing truly global challenges, though this clearly remains the concern of grassroots cosmopolitan movements seeking global justice. For this reason, we use the term cosmopolitics to stress the relevance of a political conception of cosmopolitanism, which is one of the most appropriate responses to the political challenges of the Anthropocene.

The notion of cosmopolitanism invokes not only a global response to climate change, but one that goes to the core of the problem in linking the human polis with the cosmic order of planet. It challenges the reduction of solidarity and loyalty to narrow conceptions of human community kept apart in different spaces and times as well instrumental forms of rationality that are divorced from the more substantive forms of rationality. Moreover, cosmopolitanism is also a normative and critical idea that counter-opposes an alternative to the present while at the same time seeking in the present the sources to make possible a better future. The deliberative conception of democracy fits very well into the cosmopolitan tradition in that both are underpinned by communication as the medium by which political issues are handled. The basis of cosmopolitanism is that in the encounter with the other, the self undergoes change. This can only come about when self and other engage in communication, which can be said to be constitutive of subject formation. This cosmopolitan sensibility accords with the deliberative understanding of democracy. Moreover, it affirms the centrality of agency and an ethic of care and responsibility.

For all these reasons, the political challenge of the Anthropocene is very much one that can be cast in the terms of cosmopolitics. Some of the central objectives of the Anthropocene as a political condition resonate with cosmopolitical ideas, for example increasing biological diversity, the need for a global dialogue between the developed and developing world on reducing carbon emissions in ways that respects the desire of the non-western world to have a share in the benefits it has had until now, the need to strike a balance between short and long

term thinking. Neo-liberalism encourages short-term thinking, while long-term thinking runs the danger of being a justification for doing nothing, a quandary explored by Norblad in this issue, but with the resolution that only a deliberative process can offer a way forward. Thus it would seem that only a cosmopolitical order of governance can offer the only possible political solution to problems that are often objectified as one that can be resolved by purely technological fixes or are simply ignored or even denied. Technology and science are certainly the key to the future, since calls for reducing greenhouse gases are empty gestures if they simply put the individual as the culprit and saviour. Alternative technologies will be required to provide carbon free energy, but such measures will require major re-organisation of the governance of societies. It therefore makes no sense in blaming science and technology, when science and technology are needed to provide the solution to the problem of how contemporary societies can advance human well-being without endangering the very conditions of social possibility. The current discourse of sustainability will undoubtedly prove to be inadequate when it comes to addressing the challenges since it is locked in a hopeless compromise between the instrumental appropriation of nature and inadequate measure of conservation without offering a viable vision for a future that will inexorably increase production to meet the new consumption demands in the developing world. In this scenario the reduction of poverty comes at a cost that cannot be met within the prevailing system, which was predicated on the assumption that only recently has become evident that western civilisation was able to enjoy its privileged assent only because of poverty elsewhere, much of which was contributed to, if not caused, by the West. This has now changed and has opened up new political scenarios that require fundamentally new thinking that recognises that climate change as well as other manifestations of the Anthropocene cannot be contained within national orders of governance. The Earth system is not itself constrained by the human-made boundaries of nations. This implies a possible geopolitics (Clark 2014). Such a politics would require a fundamental rethinking of governance in a cosmopolitan direction, for instance in re-defining boundaries in terms of what Rockstrom et al (2009) have referred to as ‘planetary boundaries.’

Cosmopolitanism was born with the notion of hospitality, as in Kant’s argument in *Perpetual Peace* in 1795 that the cosmopolitan law requires the recognition of the right of the stranger. In the epochal scale of time of the Anthropocene, it is now humanity as a whole that is the stranger in the earth which it inhabits for what will be a short time in the history of the planet. Cosmopolocene might be the new name for the descriptively unpolitical Anthropocene and in terms that are more readily translatable into the language of the human and social sciences. While the current preference for the Anthropocene is not likely to give way to any of the alternatives it has provoked, such ‘Capitalocene’ or ‘Technocene’, it is worth reflecting on the value in naming the current age by its oppositional forces. It is possibly something like this that Nietzsche was anticipating when he wrote in a famous section called ‘Masters of the Earth’ in *The Will to Power*: ‘Inexorably, hesitantly, terrible as fate, the great task and question is approaching: how shall the earth as a whole be governed? And to what end shall “man” as a whole – and no longer as a people, a race – be raised and trained?’ (1967: 501). The theme of governing the earth and the subsequent discussion of agency in this work was

such an attempt to raise the prospect of a new kind of agency, though not in this case with a geophysical crisis in mind.

In sum, the argument leads us in the normative direction of a politicisation of the concept of the Anthropocene as a cosmopolitical project. This is both a utopia and thus a critique of the dystopic narrative of the Anthropocene signalling that it can be transformed into an order of governance. This, however, would require a deepening of the present cultural model of the Anthropocene.

The Problem of Knowledge: Ontology and Epistemology

The idea of the Anthropocene offers a new way in which to interpret not only the earth system but the human world. It shows how the human inhabited world is embedded in the physical and biochemical processes of the Earth and is inserted in a vastly different scale of time and histories. The social and human sciences have operated with a very different understanding of the world as an entirely human creation and as the dominant force on the planet. Now it would appear that the human world is merely inhabiting the Earth for a brief period and will one day vanish for reasons that have nothing to do with what human will do, but with future changes to the solar system and the orbital cycles of the earth.

The notion of the Anthropocene raises both epistemological and ontological questions for the human and social sciences. It challenges existing epistemological frameworks of knowledge in a number of ways. The first and most important is in moving beyond the society versus nature dualism that has been a fundamental assumption of social science. As noted above, this does not mean that these analytical categories as such need to be abandoned, but social science can no longer operate with an epistemology of blindness to nature as outside of the domain of the social and the human. The social sciences have been for long bifurcated between those that are modelled on the natural sciences and those that are essentially interpretative and based on quite different epistemological assumptions. Both are now in question in their fundamental philosophical assumptions. The naturalistic or neopositivistic conception of social science sees scientific knowledge as based on causal explanation and value-free with society as an object of analysis akin to the model of natural reality. This is a model of knowledge that no longer accords with the self-understanding of the natural sciences. The idea that the earth somehow provides a stable ground on which the social or human world is constructed must be abandoned as incompatible with developments in earth system science over the past two decades (see Clark and Gunaratnam in this issue).

The emerging paradigm of Anthropocene science within Earth system science challenges some of the epistemological assumptions made by the philosophy of social science about the practice of science and its role in the world. On the other side, the interpretative sciences since Weber have clung onto a model of interpretation that assumes the existence of a social world entirely divorced from the natural world. A tradition of social science became firmly established since the early twentieth century that regarded the natural sciences as the enemy of the emerging social sciences. Here the main controversies concerned the political

engagement of the social sciences and their relation with the humanities. For the interpretative sciences shaped by hermeneutics and phenomenology, the interpreting subject was the central category for sciences that operated with an entirely de-naturalised conception of society. Where the neo-positivistic philosophy of social science was heavily naturalistic, the interpretative tradition strove to de-naturalise science, effectively putting culture in place of nature. The result is that, as things stand now, the social sciences are not the best equipped to deal with major reorientations in the natural sciences.

One of the striking developments in recent years is a transformation in the understanding of ontology. The interpretative social sciences have operated with a strongly social ontology, as in the long established sociological tradition of the social construction of reality. In this tradition, reality is entirely social and is the product of routinised social interaction. The Anthropocene debate since it first emerged within geology offers a new view of ontology and in ways that challenge the neo-positivistic philosophy of science. This most naturalistic of all the sciences has produced a major shift in thinking about ontological questions in a new key with the insight that humans are now authoring rocks, as Yusoff (2016: 6) has put it: 'If humans now author the rocks, atmosphere and oceans with anthropogenic signatures then the inhuman (as nature, earth, geology) becomes decidedly changed as a result'. The geologic notion of the Anthropocene recasts physical ontology to include the human imprint on nature. Biology was for long the model science of the social sciences, especially sociology and anthropology, which borrowed many of their foundational concepts from biology. It would be an oversimplification to say that the Anthropocene shift has put geology forward as the source of new thinking, not least because the major innovations are within the wider Earth science. However, it does require a resituating of biology in relation to geology and to social science. This does not mean that geologic models must replace social scientific ones or diminish biology as the primary relation of humanity to the earth. Until now the impetus has come from geology, but the social and human sciences have yet to respond. It does not seem likely that the geological conception of the Anthropocene exhausts all possible meanings of the notion. While we agree that this designation of the present age as the Anthropocene is the best of the alternatives – for example the postmodern or the posthuman or global era – and suggest it is not incompatible with all currents in modern thought.

So we do not need to draw the conclusion that the philosophy of the social sciences has nothing to offer and that Earth system science has all the answers and that therefore what is required is a geologisation of social science. The Anthropocene debate has exaggerated the crisis of science and modern thought. We believe that the critical and interpretative approaches – for there is not just one – in social science, in particular in sociological theory, can be radicalised to address the Anthropocene challenge. For example, as suggested above, notwithstanding the problem of the over-sociocentric conception of the social within sociology, in sociological light, the Anthropocene is a political construction because it is first and foremost a means by which contemporary societies interpret their place in the world in light of major shifts in experience. It is certainly the case that place is now part of a deeper history of the earth, but it is not an exclusively naturalistic category but an interpretative one. It is for this reason that geologists, despite their concern for a rigorous definition of GTSs,

cannot extricate themselves from the politicisation of the concept. As Chakrabarty points out in his contribution to this issue, many of the ideas that the Anthropocene highlight require interpretation, and as we have argued above, deliberation, a point also made by Norblad. The idea of the Anthropocene is then a mode of knowledge, a way of knowing the world in order to understand and to govern it. As such, it will be open to different interpretations, which are likely to be all the more conflicting at a time of crisis.

One of the attractions that the notion of the Anthropocene has is that it offers a narrative that links the present to the past and the future in which the human subject is the author. Narratives are essentially interpretative categories by which people – whether individuals or collective actors – make sense of their situation and give continuity to their lives. The Anthropocene fulfils that function even if the dominant narrative portends doom. However, the catastrophic narrative of a dystopic future is not the only one. Other Anthropocene narratives offer a more positive account of human potential to bring about change (Schwägerl 2014). Anthropologists and sociologists, as Chris Hann (in this issue) argues, have much to contribute in grasping subjectivities, including spatio-temporal orientations and perceptions of epochal transformation. Narratives are important, but in so far as it is a cultural model, the Anthropocene is more than a question of narratives, but also entails normative and explanatory components that go beyond the subjective dimension of narratives.

It is undoubtedly the case that in order for the social and human sciences to respond to the challenges of the Anthropocene greater integration of the sciences will be necessary. This may be the moment for an integrated social science, following the example of Earth science, and for greater dialogue between the natural sciences and the human and social sciences. Until now this has mostly been in interdisciplinary areas such as environmental science and the disciplines of geography and archaeology with global history taking the lead in the human sciences. We do not think that this requires a strong thesis of convergence. A strong argument of the convergence of historical and geological time was proposed by Chakrabarty (2009) in the first of his four theses on climate change. Chakrabarty's intervention made a signal contribution to the Anthropocene debate and has led to much fruitful discussion to a point that most contributions have only been footnotes. However, on closer inspection we do not think that a strong thesis of convergence is required for what can simply be accounted for as a process of entanglement whereby human and inhuman or natural history become implicated in each other. To take this further in the direction of convergence is unwarranted and not supported by the empirical facts provided by Earth science, which shows that human action has had a transformative impact on the Earth. It follows from this that human and natural history cannot be separate but not that they converge. The human imprint on the Earth may be damaging for the future of human societies and possible existence, but the Earth will continue to have its own history once humans have vanished. It is possibly then more a matter of interconnectivity and continuity through negative and positive feedback flows. The signature of the *Anthropos*, while raising new questions concerning ontology, is not so great that it has fundamentally changed the earth other than in ways that have implications for the human world. In short, it is important not to lose sight of the developmental logics in different histories, which overlap and often become entangled but do not necessarily

converge. The danger, as Lukes (in this issue) rightfully complains about, is that the notion of the Anthropocene is often a simplification of complex challenges facing societies and economies today with an underling message of an ‘us’ who must act. The result is a misplacement that produces mystification.

An additional substratum that deserves some attention in this context is consciousness. Human history is not only a logic of societal formation, but of the evolution of consciousness and in particular of meta-representational consciousness. It is ultimately what marks the human from other forms of life and geophysical entities. Human beings at a point in their history – roughly the evolution of *Homo sapiens sapiens* – acquired the capacity for consciousness, by which is meant here the ability to reflect upon and self-problematise themselves and devise modes of action that will allow them to act upon the world in light of their vision of how the world should be. While research on other species has revealed similar abilities in some instances, but at best non-human forms of consciousness is highly limited in scope. This can be attributed to the larger brain size of *Homo sapiens sapiens*, which made possible the cognitively fluid mind, and is possibly not more mysterious than the evolution of the front lobe of the brain (Strydom 2015: 240-1). Whether or not this amounts to a species difference is a matter of some contention, but the important point is that the condition of the Anthropocene is one in which consciousness of the condition has entered into the play of forces. The self-understanding of contemporary societies is now very centrally articulated in the language of the Anthropocene. Although we depart from the post-humanist position, the implication of the critical-interpretative position put forward here is that from a social theoretical perspective the Anthropocene is a discursively constructed reality in which science, including the social and human sciences, are now actively participants. This constructivist position does not dispense with the notion of nature as a domain only of interest to the natural science. As argued by Strydom (2015 and in this issue) there are essentially two models of nature interacting: external nature and human nature. Both act upon each other. Human nature is not entirely determined, but neither is it totally outside external nature, but formed reflexively in relation to it. The epistemological and ontological implications of this point in the direction of a philosophy of naturalism that has nothing to do with the older and now discredited positivistic naturalism. But neither does it support the post-humanist position that seeks to overcome the category of the human and that of nature. As Chernilo (in this issue, see also 2017) has argued, a feature of the human condition is the capacity for reflexivity which makes possible self-transcendence.

Conclusion: World and Earth in the Cosmopocene

There has been as yet no satisfactory analysis of the Anthropocene debate in the social and human sciences that could offer a theoretical framework with which to reflect upon this problem. The growing body of literature has opened serious questions that go to the heart of the social and human sciences. This can be summed up under six headings as follows:

First, the Anthropocene can be seen as an emerging paradigm in Earth science that has significant implications for the social and human sciences. The main theoretical issues, are as discussed, largely relating to establishing boundaries in geological timescales and whether there should be a formal or informal definition. The Gaia thesis is one such early theorisation of the Earth as holistic system. Geologists and physical geographers, such as Lewis and Maslin, Steffen, Zalasiewicz have made important contributions. As we have seen, the most extensive literature is largely within the domain of Earth science and to which the social and human sciences can make only a limited contribution.

A second development within the human and social sciences emerged around deep history and big history, where the impetus has come from global history. In a disparate literature the main concern is with locating present time in the deep past of *Homo sapiens sapiens*. While these contributions are largely concerned with biological evolution in relation to historical time, they have a bearing on the geologic definition of Anthropocene in adding another layer of temporality to the biological and historical timespans, as in work by McNeil and others. Relevant too here are notions of an integrated history of humanity that places a stronger emphasis on the environmental embeddedness of human societies.

The third development arose around an equally disparate literature on climate change and society. The notion of the Anthropocene as first articulated in Earth science offered an alternative to the notion of climate change, which could be situated in a temporal framework in which the present could be viewed historically. Chakrabarty's intervention is one such example of this shift in thinking, which also has implications for re-thinking globalisation. However, much remains unclear as regards the development of new concepts and whether the Anthropocene is taking on a new signification. While a dialogue between the sciences is absolutely essential, it is not the only solution for a refinement in social science theorisation.

The fourth development marks a point at which new theoretical ideas begin emerge within sociology and philosophy. The clearest indication here is what might be broadly called the post-humanist perspective, which takes shape around the contribution of Bruno Latour. The central idea here is the questioning of modernity and the nature/culture dualism that supposedly underlies modernity. This approach has clearly become influential and offers an alternative to received notions of agency.

A fifth body of largely philosophical work is beginning to emerge that seeks to deepen the implications of the Anthropocene for critical thought and for social and political transformation. The dominant trend here is the notion of a geo-subject and the re-naturalisation of the social. The notion of the Anthropocene here has more of the function of a cultural model than a concept or theory.

Finally, there is the more critical response to the notion of the Anthropocene by those who see it in part as a mystification of what can be more accurately interpreted by other notions. One trend here is the Marxist inspired re-casting of the Anthropocene as a 'Capitalocene' with the argument that the human induced geo-physical change can be explained by

capitalism. An issue here too is the question of agency. These contributions are not necessarily opposed to the notion of the Anthropocene but seek to circumscribe it.

The above reveals within the space of just over two decades how an idea that emerged as a concept in the world of natural science progressed to become a wider theoretical model across a range of science, beginning by becoming the basis of a paradigm in the Earth science. Two further developments can be seen. In the human and social sciences, as well as in wider public understandings of science, the Anthropocene has become a cultural model. As a cultural model, it is an interpretative category by which contemporary societies make sense of the world as embedded in the earth and articulate a new kind of historical self-understanding in which an alternative order of governance is projected.

The position offered in this paper is in line with the various positions identified above that have emanated from the social and human sciences. While we agree that dialogue between the Earth science and social and human sciences is essential, the argument advanced in this paper seeks to clarify a distinct social theoretical position. The critical interpretative position here is that Anthropocene has become a way in which the human world is re-imagined culturally and politically in terms of its relation with the Earth. This has implications for governance, which point in the direction of cosmopolitics – and thus of a ‘Cosmopolocene’ - rather than a geologisation of the social or in the post-humanist philosophy, the end of the human condition as one marked by agency.

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Endnotes

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ⁱⁱ Some of the main publications include wide-ranging surveys by Hamilton, Bonneuil and Gemenne (2015), Bonneuil and Fressoz (2016) and Davis (2016). Palsson et al (2012) provide an overview of the implications for the social sciences. Contributions by historians include Chakrabarty (2009, 2014), Jonsson (2012), Robin (2013), Robin and Steffen (2007), Bashford (2013) and Thomas (2014). Contributions by sociologists can be found in the special issues edited by Szersznski and Urry (2010) and Skillington (2015), see also Clark (2014), anthropological contributions include Moore (2015) and Geographers, Buck (2015), Johnson and Morehouse (2014), Yusoff (2016). In heritage studies, see Harrison (2015).

ⁱⁱⁱ The historical antecedents are discussed in Lowenthal (2016).

^{iv} Initially in a short paper in 2000 (Crutzen and Stoermer 2000)

^v Geological Time Scales (GTSs) unlike historical time scales are rigorously defined and periodised into Eons, Era, Period, Epoch and indicated by capital letters. An Epoch in the GTS refers to a unit within a Period. The current Period is the Quaternary, which has two Epochs, the Pleistocene and Holocene.

^{vi} <http://quaternary.stratigraphy.org/workinggroups/anthropocene/>

^{vii} <http://www.theguardian.com/environment/2016/apr/09/melting-ice-sheets-changing-the-way-the-earth-wobbles-on-its-axis-says-nasa>

^{viii} Pomeranz (2000).

^{ix} For other perspectives on this, see Archer (2008) and Chernilo (2017).

^x See Thomas (2014) for an account on the relation between biology and history.

^{xi} See Mitchell (2011).

^{xii} See Delanty (2009, 2012, 2014).

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