

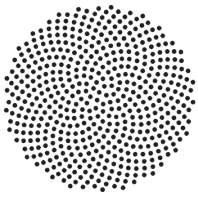
## **Does the Anthropocene Really Imply the End of Culture/Nature and Subject/Object Distinctions?**

Alf Hornborg

I want to begin by thanking the organizers for inviting me to this very special colloquium. The tension between the concepts of 'Gaia' and the 'Anthropocene' opens a fertile field for reflection on human history and the human predicament. It is also very pertinent to conduct such reflection here in Brazil, a part of the world that, on the one hand, has been a victim of and prerequisite for the European developments that brought us the Anthropocene and, on the other hand, is the home of ecosystems and animistic world-views that evoke notions such as James Lovelock's 'Gaia'.

Let us reiterate the basic points of departure. The Industrial Revolution two hundred years ago inaugurated the age of fossil-fuel capitalism that has transformed the planetary biosphere to the point where it is now threatening, within a few generations, to become uninhabitable for human beings. These two hundred years have been represented as a success story propelled by the objectivism of Enlightenment science and unprecedented technological progress. A foundational premise of Enlightenment science was the abandonment of animism: Nature, or the Earth, was from now on to be understood not as a subject or a counterpart in a relation, but as a collection of soulless lumps of matter for humans to experiment with.

We cannot deny that science and technology in these two centuries have made 'progress' in the sense of producing increasingly precise representations of the non-human environment, and of making new means of manipulating it accessible to some segments of world society. But if this 'success story' should lead to the collapse of our contemporary civilization, or even to the extinction of our species, it is hardly appropriate



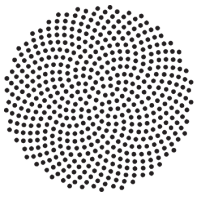
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to think of it as a 'success story.' We need to rethink these two hundred years in terms of what achievements we still may want to retain, and what destructive illusions or blind spots we urgently need to confront.

There seems to be a widespread consensus that the facts of the Anthropocene should prompt us to abandon Enlightenment distinctions between Culture and Nature, and between Subject and Object. But I cannot agree. The biophysical principles and regularities that condition ecosystems and the biosphere as a whole have operated independently of human society and culture for billions of years. They can be analytically identified and defined, as exemplified by the laws of thermodynamics. Human societies and cultural idiosyncrasies are a very recent addition to the set of driving forces and constraints that determine the trajectory of the biosphere. To be sure, biophysical principles and cultural idiosyncrasies are inextricably intertwined in our landscapes, our bodies, and our technologies, but they can – and should – be *analytically* distinguished from each other. I find it strange that, at the very moment when we seem to be realizing how significantly human culture and social organization can transform the biophysical conditions of human existence, it is being suggested that 'society' is an obsolete concept and that the social sciences have nothing to offer. Regardless of how we represent them, the laws of thermodynamics have been in operation as long as there has been a universe, billions of years before the origins of human societies. They are an undeniably 'natural' aspect of human existence that pervades everything we do, and yet have not been, and cannot be, the least altered by human activity. In contrast, modes of human social organization such as markets are ephemeral constructs that can be fundamentally transformed by political decisions or the vicissitudes of history. Yes, thermodynamics and markets are intertwined in fossil-fuel capitalism, but this is no reason to deny that the former belongs to Nature and the latter to Society.

I suppose I am suffering from a similar Enlightenment fundamentalism when I argue that the distinction between Subject and Object has not become obsolete either. The concepts 'subject' and 'object' are of course highly contested modern categories, but I cannot see how they can be discarded. It is one thing to discuss the psychological, social, and indeed quite material consequences of perceiving certain objects as subjects – or *vice*



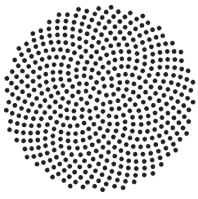
*versa* – and another to account for such perceptions in terms of the observer’s own convictions about what subjects and objects actually are. A subject is a living organism. All living organisms are equipped with a certain capacity for perception, communication, and agency. Objects are non-living things. They do not perceive, communicate, or act. They have consequences, but they do not act. To believe that they do is fetishism. I simply cannot see how we could abandon the understanding that, beyond human perceptions, there are objectively ‘living’ versus ‘non-living’ entities, and that any attribution of agency or personhood to non-living objects – whether by indigenous people in Amazonia or by Actor Network theorists – should be understood as a statement about (mystified) social relations. It is a completely different thing to observe that subjects can be treated as objects, or *vice versa*, but unless we retain the capacity to distinguish between the living and the non-living, we shall not be able to challenge either the insensitivity of capitalist practices – in relation to the non-human environment as well as to fellow humans – or the illusions of fetishism. Insensitivity is precisely treating subjects as if they were objects – and fetishism is treating objects as if they were subjects. In order to identify the occurrence of either insensitivity or fetishism, we thus need to retain the concepts of Subject and Object.

My reason for trying to salvage the analytical distinctions between Culture and Nature and between Subject and Object is that they are essential for my understanding of the global environmental crisis that is evoked by the concept of the Anthropocene. My conclusions about this predicament of our species obviously differ from those of many of my colleagues. I hope you will see why those much-maligned distinctions are important to my argument. The points I will try to make are six in number:

Objectivism is related to the psychological phenomenon of dissociation.

‘Technological progress’ is largely a means of displacing problems to others.

The past two hundred years of technological development would not have occurred without the phenomenon of money.



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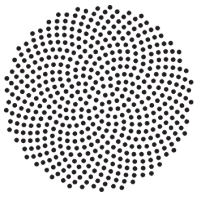
The history of technology is the link between human history and natural history.

Conventional conceptions of money and modern technology belong to the same category of cultural illusions that we tend to dismiss as ‘magic.’

To prevent this planet from becoming uninhabitable, we need to apply our ‘enlightened’ rationality to transform the phenomenon of money.

## **\*1. Objectivism is related to the psychological phenomenon of dissociation.**

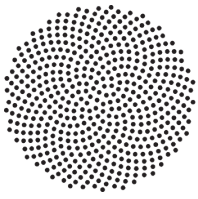
It is appropriate and justifiable for humans to adopt different approaches when relating to a subject or an object, and humans have the capacity to distinguish between them. Because a subject can perceive, communicate, and act, it is reasonable to try to imagine what it perceives, to communicate with it, and to try to predict and influence its actions. Humans are equipped with a unique capacity to interact in these ways with other subjects, both through social relations with other humans and through relations with non-human animals and plants. This capacity to *relate* (cf. Bird-David 1999) was crucial for our species through hundreds of thousands of years of hunting and gathering, and through the long processes of domestication of animals and plants that we call the Neolithic Revolution. The sensitivity to non-human subjects is fundamental to what we know as animism, as identified, for instance, among many indigenous people in Brazil (Viveiros de Castro 1998; Descola 2013). From the perspective of a distinction between the living and the non-living, traditional animism frequently extends the relationist approach even to some non-living things such as artefacts (Santos-Granero 2009), a phenomenon which Europeans in the sixteenth century referred to as ‘fetishism.’ One of the cornerstones of the European Enlightenment was supposedly the capacity to distinguish between Subjects and Objects, and thus to jettison fetishism, but in the nineteenth century Karl Marx showed that the way European economists were perceiving money could also be considered a kind of fetishism. On the other hand, the Enlightenment had argued for an extension of objectivism to most living things. The world around us was from now on to be understood as a collection of inanimate objects to be investigated and



manipulated without any regards to sentiments, morals, or obligations. In this way, objectivism represents an inversion of pre-modern animism and fetishism: while the latter may treat even non-living objects as subjects, the former treats even living subjects as objects.

The shift from a relationist to an objectivist stance cannot simply be understood as an epistemological strategy for practicing more efficacious science, but can be discussed from a variety of perspectives including political economy, sociology, psychology, and theology. These different perspectives do not exclude each other but can all be parts of a more inclusive explanation. Objectivism is simultaneously connected to capitalism, modernity, dissociation, and secularization. The main conclusion we can draw from history is that it was extremely successful. It may not have made Europeans the most agreeable of people, but it was part and parcel of the European conquest of the world. Suffice to say, at this point, that objectivism is not only a matter of capitalist ideology or scientific methodology but simultaneously a personal and existential issue. It is a way of approaching the world around us that suppresses our fundamental human inclination to relate, and it goes against the grain of human being-in-the-world to the extent that it requires many years of training and education to instill in each new generation.

\*'Objectification' became foundational to modernity. While most Europeans saw it as an abandonment of superstition and a prerequisite to scientific progress, it has been challenged, even by many Europeans, from the very outset. Humanist and theological critiques of objectivism have focused on the insensitivity it fosters in the human subject, but the discussions on climate change and the Anthropocene mean that objectivist science itself is now discovering the objectively disastrous consequences of objectivist science. A general question that this convergence raises is whether this should be seen as an argument for a return to animism (as indeed suggested by the notion of 'Gaia'), or if an objectivist stance still has a chance of analyzing our predicament and suggesting means of preventing disaster. We seriously need to consider if it is mistaken to think of this as an either/or issue: it may be possible to argue 'objectively' for sociological conditions that are



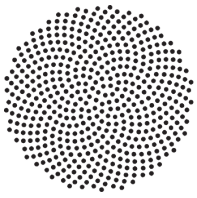
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conducive to relationist cosmologies such as animism, that is to a renewed 'ensoulment' of the world.

## **\*2. 'Technological progress' is largely a means of displacing problems to others.**

The concept of 'technological progress' is central to mainstream narratives about the advantages that Enlightenment science conferred upon Europeans. But it needs to be completely reconceptualized. It is generally represented as the product of human ingenuity and appropriate scientific method, and these are certainly necessary ingredients of technological progress, but they are not sufficient conditions to explain why the 'Industrial Revolution' occurred in Europe. The most important discontinuity in the conditions for technological development in the late eighteenth century was not new ways of applying ingenuity and scientific method, but the implications of economic globalization. What the Industrial Revolution ultimately signified was the opportunity for entrepreneurs in Europe not only to take advantage of the great global discrepancies in the prices of land and labor – this had been the basis of centuries of merchant capitalism – but to harness such discrepancies in production itself. The reason why textile factories turned to coal, and why James Watt and others exerted themselves to design better and better steam engines, was that there were huge profits to be made in trading inexpensive, mass-produced cotton textiles for West African slaves and plantation produce (including cotton fiber) from the Americas. The monetary profits from British industrialism intensified an asymmetric transfer of embodied labor and embodied land from the periphery to the core of the colonial world-system. I have elsewhere called it time-space appropriation (Hornborg 2006, 2013a), and it signifies a systematic displacement of workloads and environmental loads to those parts of the world-system where labor and land are least expensive. By the end of the nineteenth century, the British imports of cotton fiber, sugar, timber, and other resources represented the products of a land area several times greater than the total land area of Great Britain (Pomeranz 2000). By replacing British crops and sheep, the imports paid for by industrial export production saved British space and displaced British land requirements to other continents. The turn to coal also reduced pressure on the land surface of Britain, previously hard pushed to



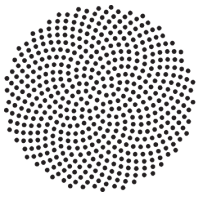
provide not only firewood and charcoal for heating and industry but also fodder for the horses and food for the human laborers now replaced by machines (Sieferle 2001). The turn to fossil fuels provided access to acreages of the distant past, but it simultaneously colonized the future by depleting limited stocks of resources and inaugurating the Anthropocene.

\*But the main point I want to make here is that, from this historical point, global price relations should be recognized as part of the very definition of 'technology.' If the African slaves would have been paid standard British wages, and depopulated American fields had fetched standard British land rent, I am not sure that there would have been an Industrial Revolution. If, through the world market, the displacement of constraints and unequal exchange are fundamental to modern technology, this implies that 'technological progress' is the experience of a privileged sector of the world-system, and that its promises cannot be universalized.

**\*3. The past two hundred years of technological development would not have occurred without the phenomenon of money.**

If price relations – that is, exchange ratios – and asymmetric transfers of resources are prerequisite to modern technologies, these technologies would not exist without the peculiar medium of (general-purpose) money. The feasibility of a given technology hinges on specific ratios of resource transfers between populations, and such resource transfers are not determined by any other factors than human compliance. Exchange values on the market are thoroughly social arrangements, but the technologies that they make possible are represented as 'natural', as if they were simply generated by the inventors' revelations of the nature of physical reality. The operation of the world economy and the development of technology are conventionally understood in objective and mechanistic terms, as if they could be accounted for in terms of scientifically identifiable principles. But this decontextualization and fetishization of technology obscures its societal prerequisites, viz. the occurrence of asymmetric transfers of resources between populations.





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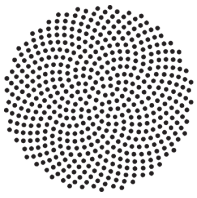
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\*The socio-cultural arrangements through which people are persuaded to comply with unequal exchange are excluded from our everyday definition of technology, although they should be an intrinsic part of it. These socio-cultural arrangements are taken for granted by mainstream economics: most centrally the very idea of (general-purpose) money – that is, the notion that everything can be exchanged for anything else on a global market, and at rates that have nothing to do with the biophysical properties of the items and substances exchanged, but are determined by how much money people have, or what is aptly called ‘purchasing-power.’ The globalized movement of resources is not generated by a law of nature, but by socio-cultural conventions. These socio-cultural conventions are the foundations of what Joseph Schumpeter (1954) called the ‘preanalytic vision’ underlying the science of economics. The huge and incredibly elaborate intellectual edifice of economics is built on these assumptions. They are ultimately the single most important prerequisite of global human social organization, power structures, and inequalities – and they are what brought us into the Anthropocene. The resources that make ‘technological progress’ possible in some parts of the world do not move between the continents on their own account. They are moved by money. And money is an idea. The intimidating vastness and materiality of modern infrastructure and megacities (such as Rio de Janeiro) would not exist but for this idea. Economists think it is a good idea. I am not sure that Gaia agrees. I think it is an idea that we could improve – for our own sake, and for the sake of Gaia. Only humans, with our unique capacity for abstraction, could have come up with this idea – that is the only justification I can accept for the notion of the ‘Anthropocene’ – and only humans can improve it.

#### **\*4. The history of technology is the link between human history and natural history.**

Dipesh Chakrabarty (2009) rightly observes that the Anthropocene forces us to integrate the history of our species with the history of capital. I think the way to go about this is to note that it is our biological capacity for abstract representation (as in language and other semiotic systems) that is prerequisite to money, and that money was in turn prerequisite to the Industrial Revolution that inaugurated the Anthropocene. Our semiotic capacity for abstract representation and language, which had enormous survival

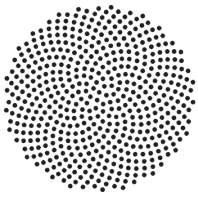




value for hundreds of thousands of years of hunting and gathering, finally generated general-purpose money and the globalized economy, which in turn made the Industrial Revolution feasible. It is through this chain of causes and events that studies of natural and human history can be integrated. Modern technology is the pivot of both, because it implicates both biophysical and socio-cultural dimensions of our increasingly globalized history. For two hundred years it has been a material force transforming the biosphere, yet, as we have seen, it would not exist but for a peculiar cultural convention that only a species like ours could come up with. But rather than imply that climate change is the inexorable consequence of the existence of *Homo sapiens*, as suggested by the notion of the 'Anthropocene,' I would prefer that the geological epoch inaugurated in the late eighteenth century be named the *Technocene* or perhaps the *Econocene* (cf. Norgaard 2013). My main reason for hesitating about the notion of the 'Anthropocene' is that the responsibility for climate change is very unevenly distributed among the members of our species (Malm and Hornborg 2014). Another reason is that I do not think that there is anything biologically inevitable about the cultural conventions and forms of social organization that we know as capitalism. As I hope to show, we can change the idea of money. And with the kind of transformation of money that I am thinking of, very little of the fossil-fuelled technomass that it has generated will prove desirable or even feasible. Another world is possible. The human species is not inevitably a cancer on the body of Gaia.

**\*5. Conventional conceptions of money and technology belong to the same category of cultural illusions that we conventionally tend to dismiss as 'magic.'**

In order to unravel in what sense our relations to money and modern technology can be regarded as forms of fetishism, we need to think about the role of artefacts in human societies. As the primatologist Shirley Strum and her co-author Bruno Latour (Strum and Latour 1987) concluded thirty years ago, the key difference between the sociality of baboons and that of humans is that human relations can be anchored to points of reference beyond the body, such as language, symbols, and – importantly – material objects. Such external reference points actually simplify social life, Strum and Latour suggest, compared to the constant manipulations of baboons. If, to a large extent,



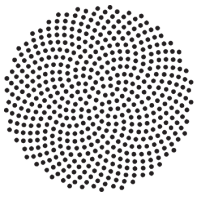
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artefacts (including technologies) are indeed the substance of increasingly complicated human social relations, Latour's focus on their 'agency' within human-artefact networks is understandable. It raises important questions. Most centrally, what is the relation between material objects, social relations, and human perceptions? And in particular, if material objects are mobilized as agents in systems of socio-ecological relations, what is the difference between their capacity to operate *without* the mediation of subjective human perceptions, on the one hand, and their capacity to operate *by means of* such mediation, on the other? In other words, how do we distinguish between technology and magic?

I will argue that technology is our own version of magic. In this sense, I agree with Latour (1993) that 'modernity' is not a decisive break with 'pre-modern' ontologies. The Enlightenment demystification of pre-modern magic and 'superstition' was not a final purge of reliable knowledge, but a *provisional* and politically *positioned* one. Its understanding of the nature of economic growth and 'technological progress' has been a successful instrument of expansion for core regions of the world-system for over three centuries, but the multiple crises currently faced by global society are an indication of the approaching bankruptcy of this world-view. On the other hand, I continue to believe that even the illusions of capitalist modernity can be exposed through rational analysis, and I suppose that, in this sense, I continue to have faith in the Enlightenment. We can use the same Reason that gave us modern technology to show that this very technology is a particular kind of magic.

\*How do we deal with the role of human perceptions and subjectivity in granting agency to 'things'? What is the significance of the human subject for the agency of objects? Let us begin by acknowledging that both *keys* and *coins* have been delegated agency, but of different kinds. Such little pieces of metal can be crucial in providing access to resources, whether by physically opening doors, or by social persuasion. The way these metal objects are shaped – whether as keys or coins – have for centuries determined whether they operate as technology or through magic. Significantly, the invention of the slot-machine enabled even coins to assume technological functions, alongside the magic that Marx called 'money fetishism': when we use coins to buy a Coke or enter a public bathroom we might reflect over the fact that magical objects can be converted into

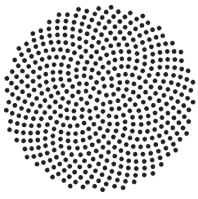


technology. And conversely, of course, technological objects such as keys can become symbols and wield social agency through their capacity to persuade. But in their traditional usages, coins and keys illustrate how social relations of power in different ways are delegated to material artefacts. They exemplify how such delegation can either be dependent on, or independent of, human perceptions.

A fundamental paradox of capitalist modernity is that its foundational categories of Subject and Object are so *irrelevant* to the systems of relations that it organizes – that is, in terms of how subjects are *treated* and objects *understood*. Not only does it objectify both human and non-human subjects, and treat humans and nature accordingly – it is equally founded on an unprecedented subjectification of objects. Not that objects are generally attributed with intentionality or personhood, as in pre-modern animism, but some objects are attributed with an autonomous agency, which serves to mystify unequal social relations of exchange. As Marx observed, money is believed to generate more of its own kind, when deposited in bank accounts. In a similar way, machines are believed to ‘produce’ on their *own* account, regardless of the global price relations which make them possible, and which should prompt us to understand them as accumulations of embodied human labour and natural resources *where the money is*. Money and machines may not be perceived as *persons* in modernity, but they are certainly believed to have autonomous agency. We pride ourselves on having abandoned animism, but have organized a global society founded on fetishism.

The distinction between ‘magic’ and ‘technology’ corresponds to a distinction between societies founded on the energy of human labour, on the one hand, and societies founded on the use of so-called ‘exosomatic’ energy (e.g., fossil fuels), on the other. Where political economy is about the social organization of human muscle power, people have to be *persuaded* to exert themselves for the benefit of those in power. ‘Magic’ is the category of social strategies by which such persuasion is achieved.

\*For example, when the Inca emperor offered Ecuadorian *Spondylus* shell to the gods to ensure rain and agricultural fertility, it was incumbent on his many subjects to labour on his terraces and irrigation canals. I hope we can now all agree that the efficacy of



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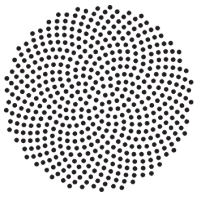
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such ritual sacrifices *is* dependent on human perceptions. But when modern farmers in an increasingly desiccated California resort to high-power water pumps to irrigate their fields, the efficacy of such practices is *not* perceived as dependent on human perceptions. The difference between ‘magic’ and ‘technology’, we tend to believe, is that the latter is a matter of increasingly sophisticated inventions and discoveries that grant our economies the capacity to grow on their own account.

But then, of course, neither did the peasants of sixteenth-century Peru believe that the efficacy of ritual sacrifices of *Spondylus* was dependent on subjective human perceptions. The efficacy of all magic hinges on it being perceived as independent of human consciousness. Like magic, power over other people is universally mediated by human perceptions, but this is *never conceded*, except in retrospect. Would it be possible to use analytical Reason to argue that modernists are as deluded by the magic of their artefacts as any pre-modern people ever were? Can we employ Enlightenment categories such as ‘subject’ and ‘object’ to expose the magic of our technology?

When the Inca emperor imported *Spondylus* shells from Ecuador to persuade his subjects to labour in his fields, the ‘productive potential’ of *Spondylus* was symbolic – it was dependent on subjective human perceptions. When the California farmer imports oil to run his water pumps, the productive potential of oil *appears* to be objective, like turning a key in a lock, independent of perceptions. But here is the illusion of modern technology: his *access* to oil, and to the machinery it animates, is ultimately contingent on the socially constructed ratios by which oil is exchanged for American exports on the world market. And whatever economists will tell us, we should never doubt that those ratios are dependent on human intentions, strategies, and perceptions. Locally, our technology mystifies us by pretending to be productive independently of exchange rates, but viewed from a global perspective, it is *indeed* dependent on human perceptions. In this sense, modern technology *is* magic. It is a specific way of exerting power over other people while concealing the extent to which this power is mediated by human perceptions.

A conclusion from these deliberations would be that there are three fundamental categories of artefacts, defined by the specific ways in which they are

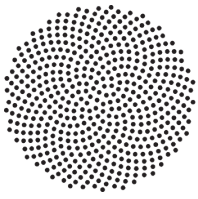


delegated agency. The first is local, non-globalized technology, which operates without the mediation of either human perceptions or exchange ratios, only through the efficacy of objective physical properties. It can be exemplified by simple tools and by keys. The second is 'local magic,' which operates by means of human perceptions, exemplified by coins. The third is globalized technology, which *locally* operates without the mediation of human perceptions, but globally relies on socially negotiated exchange ratios. It could also be called 'global magic,' and can be exemplified by machines such as water pumps run on fossil fuels or electricity.

**\*6. To prevent this planet from becoming uninhabitable, we need to apply our 'enlightened' rationality to transform the phenomenon of money.**

It was through the globalized circulation of general-purpose money that all the ingredients of the Industrial Revolution – American fields, African slaves, cotton fiber, British workers, coal, cotton textiles, etc. – were transformed into commensurable and interchangeable commodities. The generalized commoditization of all this human time and natural space, which made industrialization possible, is *not* an inexorable consequence of the human capacity for representation. If the economic strategies generating globalization and industrialization are root causes of the threat of climate change, it should be theoretically possible to avert this threat by modifying the conditions of economic rationality. It should be feasible, in principle, to organize a monetary system which restricts the interchangeability of products to specific spheres of exchange through the use of special-purpose currencies. The purpose would be to encourage transactions that substantially reduce the consumption of fossil fuels and other practices contributing to environmental degradation.

To make this suggestion more tangible, let us imagine that a nation-state seriously wishes to reduce the long-distance transports required to provision its citizens – and we should add that if a single nation-state is able to set a successful example in this direction, other nations can be expected to follow. It could achieve this goal by establishing a special electronic currency, a certain amount of which is provided to its citizens on a



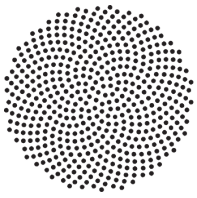
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monthly basis as a tax-free basic income, but which can *only be used to buy goods and services originating within a certain geographical distance from the point of purchase*. It would serve as a 'complementary currency' in the sense that it did not replace conventional money, but only provide an alternative to it.

\*The new currency would tend to circulate within localized circuits of exchange, encouraging the growth of an informal sector alongside the conventional economy. The amount provided to each citizen or household would correspond to basic requirements for survival. The extent to which people wish to continue earning conventional, general-purpose money to enable additional consumption would be a matter of personal choice. A likely scenario would be that most people decided to divide their time between working in the formal and informal sectors. What is beyond doubt is that people would tend to *use* the new currency at least to procure basic necessities such as food, repairs, carpentry, etc., as this would leave more of their conventional income for other kinds of expenditures. Local farmers and other entrepreneurs would be encouraged to accept (tax-free) payment in the new currency for two reasons: (1) they would be able to use some of it to pay for local labour, services, and goods, and (2) they would be offered the option of converting it into conventional money, through the authorities, at beneficial rates. These rates would be set to compromise between the entrepreneur's demands and the authorities' loss of tax revenue.

Once in operation, this system would undoubtedly radically reduce the demand for long-distance transports, which is one of the main drivers of climate change (Hornborg 2013b). In the long run, it would not only be more sustainable (in reducing energy use, greenhouse gas emissions, and waste, while enhancing local cooperation, biodiversity, and resilience), but also reduce public expenses for transport infrastructure, environmental protection, health services, and social security. I offer this admittedly Utopian scheme mostly to argue that there is no inevitable contradiction between a global human society and the health of Gaia. But what might actually prompt a nation-state or other political authority to embark on such a radical transformation of market logic? For the world-view that has brought us into the Anthropocene to break down, business-as-usual must itself be under threat. I can think of at least two such plausible threats, perhaps

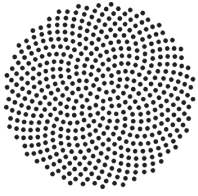


in conjunction: (1) a definitive breakdown of the global financial system, ultimately geared to the rising costs of shrinking supplies of energy and other resources, and (2) a global ecological crisis such as that evoked by the notion of the 'Anthropocene.' When either or both of these scenarios can no longer be disregarded, reforms that currently seem highly improbable, such as the one I have advocated here, may hopefully be considered in a new light.

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