

OVERCOMING THE FETISHISM OF MONEY AND MACHINES THROUGH HUMAN ECOLOGY: BUILDING ON THE WORK OF ALF HORNBERG

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ABSTRACT: To comprehend and work out what is wrong with the existing world order, Alf Hornborg embraced and advanced Karl Marx's notion of fetishism of commodities, going beyond him by extending the notion of fetishism to machines. In doing so, he showed the role of technology in imposing and entrenching exploitative and ecological destructive social relations on a global scale. This fetishism is manifest in the belief that technological progress is unstoppable and underpins progress generally. While endorsing and defending Hornborg's work, I will argue that Hornborg's contextualist stance of human ecology should incorporate political philosophy, thereby spearheading a challenge to the dominant worldview of modernity and the socio-economic order it has created. Hornborg's advances have been facilitated by his point of departure in anthropology, particularly cultural ecology, economic anthropology and ecological anthropology, incorporated into the broader framework of human ecology, recontextualizing knowledge and experience and challenging the blindness to contextual relations characteristic of mainstream modernity. Theoretical work in human ecology, recognizing the distinctiveness of humans while situating humanity within nature, advances a process-relational ontology. To realize the full potential of this, I will argue, it is necessary for human ecology to fully overcome the opposition between the sciences and humanities and embrace and advance the humanities, most importantly, ethics and political philosophy. In doing so, human ecology provides the basis for overcoming the is-ought dichotomy and supporting advances in communitarian ethics and politics. Reviving radical politics, human ecology should then serve as the core of an open, dialogically developing grand narrative upholding the value of life and the conditions for it, working towards an ecological civilization.

KEYWORDS: Alf Hornborg; Commodity fetishism; Machines; Human Ecology; Humanities; Political Philosophy; Ecological Economics; Ecological Crisis; Cornelius Castoriadis

INTRODUCTION

Alf Hornborg's book *The Power of the Machine: Global Inequalities of Economy, Technology, and Environment* (2001) was a major advance in making intelligible the current suicidal trajectory of humanity, the failure of environmentalists of various kinds to alter this trajectory, or to chart a path to reverse this trajectory. It is a work even more important at present as we face the development and deployment of artificial intelligence (AI), some of the implications of which have been pointed to by Glenn Diesen (2022). Extending Marx's notion of commodity fetishism to fetishism of machines, Hornborg also clarified the role of money in this fetishism, showing the role of all-purpose money in sustaining the belief that technological progress is liberating, unstoppable and irreversible. Challenging this fetishism has allowed Hornborg and his colleagues to expose the illusions of progress and the injustices generated by the deployment of new forms of technology, which almost always are motivated by efforts of ruling elites and classes to augment their power over those they exploit. They do so in ways that actually increases the amount of work and resources required to produce goods and services, while altering who does the work and who suffers the consequences. Hornborg's focus on machines has facilitated comprehension of the impact of what are supposedly greater efficiencies in production and supposed economic progress on the everyday lives of diverse people in the world-system, revealing the more abstract forces operating to keep this social order in place and the illusions created to do so. This fetishising of money and machines was shown to be related to the magical thinking characteristic of cargo cults, with people in the affluent West blind to the sources of the energy, materials, goods and 'time-space' they buy and consume, and the associated exploitative, oppressive and ecologically destructive effects of such exploitation. This work also exposes the illusion that our suicidal trajectory will be averted by technological fixes in the service of so-called sustainable development, or simply by a transition to socialism. The role of money in commodity fetishism, central to Marx's critique of political economy, where capital in the form of money is invested to produce more such capital, is thereby clarified, and pernicious aspects of this, overlooked by Marx, revealed. Building on this seminal work through a series of books, anthologies and papers, critically engaging with a range of theorists in diverse disciplines, including ecological anthropology, political ecology, thermodynamics, semiotics, economics, world-systems theory and environmental history, Hornborg identified 'all-purpose money' as having a central role in

facilitating all these oppressive relations and illusions, and proposed new forms of money to pave the way for recovery from this exploitative and ecologically destructive global system of oppression.

Hornborg's work is important not only because it is a major effort to expose the current worldview and how it dominates, challenging its claims to progress as illusions while offering an alternative path into the future, but it contributes to advancing a rival worldview. He has engaged in debates within and between a range of disciplines, from cultural anthropology through to world-systems theory, but always in a way that maintained the coherence of his ideas. Such a worldview is required to orient and unite oppressed people for effective action against their domination. In the past, Marxism of various forms provided a focus for challenging the hegemonic culture, but in its orthodox form has lost its credibility. Hornborg's work, incorporating the best insights of Marx and those he influenced but advancing a broader tradition of thought, could revive this challenge.

Hornborg began his career as an anthropologist, but was concerned to advance theory in this area to provide the means to comprehend more complex and broader issues, most importantly, the relation between society and nature associated with exploitation and ecological destruction, and to contrast indigenous societies with the societies of modernity. He embraced ecology and accepted the central place of thermodynamics in comprehending societies while still arguing for the importance of local knowledge. In doing so, he engaged (often critically) with the work of Roy Rappaport, Gregory Bateson, Eric Wolf, Stephen Gudeman, David Graeber, Tim Ingold, Nicolas Georgescu-Roegen and R.N. Adams, among others, and with the biosemioticians influenced by Jacob von Uexküll and C.S. Peirce (Hornborg 1996). This involved moving from cultural ecology to ecological politics, and from there to engage with the work of Marx and diverse Marxists, deploying semiotics to clarify the problematic status of markets, money and nature (Hornborg 1999; Hornborg 2003). This provided the basis for extending the notion of fetishism from commodities to machines, rethinking the whole notion of technology, arguing that technology is not only a relation between humans and nature but a way of organizing global human society. This called for rethinking global environmental history (Hornborg, McNeill & Martinez-Alier, 2007; Hornborg, 2016). Hornborg also engaged with the world-system theorists (Hornborg & Crumley, 2007; Hornborg, Clark &

Hermele 2012; Hornborg 2013). Engaging with the work of Bruno Latour, actor-network theory and posthumanism, Hornborg further clarified and developed his own theoretical framework (Hornborg 2019).

In his more recent books, *Global Magic: Technologies of Appropriation from Ancient Rome to Wall Street* (2016) and *Nature, Society, and Justice in the Anthropocene: Unravelling the Money-Energy-Technology Complex* (2019), Hornborg attacked not only the illusions generated by commodity and machine fetishism but invoked the language of ethics and attacks political doctrines, most importantly, neoliberalism, suggesting that affluent people need to face up to how their lifestyles are based on oppressing and exploiting others, challenging them to embrace much simpler life-styles. Machine fetishism he argued, is an ideological illusion maintained by keeping perspectives from the natural sciences, social sciences and humanities effectively separated. In *Nature, Society, and Justice in the Anthropocene*, Hornborg reiterated his commitment to transcending disciplinary boundaries. As he put it:

More fundamentally, a global, metabolic rethinking of technology requires a theoretical analysis that transcends not only historical, sociological, and ethnographical narratives but also mainstream perspectives in engineering, economics, economic history, sociology, and other social sciences. More than meticulous empirical demonstration, the perspective I am proposing requires a gestalt shift in perception. (Hornborg 2019, 95)

Embracing and advancing human ecology as a transdiscipline has been central to all this.

EVALUATING HORBORG'S WORK

Spelling out the full implications of Hornborg's work and evaluating it is challenging. His work brings into focus the core value of the dominant worldview, shared by most orthodox Marxists that technological progress is the basis of all real progress and the ultimate solution to all problems. However, this belief is part of a broader worldview imposed by a range of institutions designed to manufacture consent for the current world-order, and is maintained and extended by a vast Military-Industrial-Congressal-Intelligence-Media-Academia-Think Tank complex or MICIMATT, (as identified by the former CIA analyst, Ray McGovern) supported by governments designed to cripple and

destroy any political challenges to it. None of this is denied by Hornborg, but neither is it investigated, and all the implications of this faced up to.

The manufacture of consent is now absolutely central to the politics of power elites and has reached colossal proportions, with ruling elites not only embedding conceptions of society and nature in its technology, in society's major institutions and in its built-up environments, but devoting enormous resources to advancing, promoting and inculcating attitudes and ways of thinking required to legitimate this order, or eliminating any challenging alternatives. What most people take to be reality is now largely controlled through psychological manipulation, public relations and advertising, the highly profitable mind-control industries, that now deliberately uphold a false view of reality and also of what is the good life (Rockhill & Zhao, 2023, 32). The good life is identified with self-indulgence, having freedom to shop for ever more consumer goods and accumulating wealth and using this wealth to one's own advantage. This is supposedly best achieved through freeing (really, imposing) markets and developing and implementing new technologies, removing constraints associated with the quest for social justice and the common good. The development of new media technologies and the concentration of media ownership in the hands of billionaire media moguls, along with the transformation of universities into business corporations serving customers or clients, have largely removed the positions in society where people questioning and then challenging the prevailing culture could undertake their work. As Pierre Bourdieu argued, the autonomy of cultural and political fields from the economy and the field of power has been dissolved. The power elites have even set out to control what are taken to be radical ideas by those questioning this order (Rockhill & Dingqi, 2023, 18). A major component of the manufacture of consent is the generation of an 'information explosion', flooding the channels of communication with disinformation while fragmenting academic research into enormous numbers of disciplines, sub-disciplines and sub-sub-disciplines. This has produced such a mass of fragmented perspectives and claims to knowledge (embraced by postmodern intellectuals as liberating) that it has become almost impossible for all but a small minority of people to comprehend what is going on or to begin to question the worldview underpinning civilization's current trajectory. Intellectuals have been almost completely disempowered, except when they serve the ruling oligarchs.

In the resulting world order, the relation between the world-system and the earth-system is not just a matter of one class of people or region exploiting another, engendering ecological destruction. It is a whole hierarchy of power and privilege and of exploitation of regions, nations, classes and individuals, with even relatively poor people in affluent countries benefitting from the intensified exploitation of people and nature in peripheral regions of the world-economy. Most of these relatively affluent people, who generally have embraced consumerism and accepted the precarization of work, are not keen to go back to the hard work required to manufacture real goods, going back to doing work now undertaken by workers in developing countries who work twelve hours a day for pittance. Nor are they keen on doing without high-tech information technology utilizing materials such as boron, a poisonous substance collected by children in the Congo for one or two dollars a day. And they are uninterested in taking responsibility for the future of their society, humanity and nature. This is manifest in pervasive depoliticization of the general population.

This whole system is backed up by military might and the military-industrial-intelligence complex, with USA spending almost \$1 trillion a year on its military, as much as the rest of the world combined. This is used not only to keep in place the current order but to subvert governments, effect regime changes or just destroy any governments that aim to free themselves from this system of exploitation. William Robinson (2020) argued we now live in a global police state, but it is a police state that promotes divisions to rule, often supporting terrorist movements to destroy governments that challenge the agenda of the world's ruling elites or limit access to natural resources. As shown in a recent anthology, this amounts to enforcing ecocide (Dunlap & Brock, 2023). This is undertaken supposedly in the name of freedom and democracy.

Hornborg's proposal for the use of different forms of money provides a practical orientation for creating a new economic order, but most historical cases of efforts in this direction show the difficulties in implementing such a proposal. Markets and money are put in place and kept in place through a range of institutions, involving government decisions and covert and overt use of force based on complex structures of power operating throughout the world. The ultimate all-purpose currency since WWII has been the American dollar. An alternative currency, the *bancor*, had been proposed at the Breton Woods

conference by John Maynard Keynes who conceived it as a currency that would facilitate international trade, but prevent countries becoming indebted to other countries (Desai 2013, 87ff.). However, at that time Britain had been greatly weakened as a military power and representatives from USA used their power to dominate decision-making. The American dollar became the international currency, with the IMF and World-Bank organized to facilitate this. The result was to provide a massive interest free loan to USA, allowing USA to function with massive trade deficits without any obligation to pay for these, and to create more money and eliminate these debts through inflation or simply seizing deposits of other countries in US banks. As Michael Hudson (2003; 2022) argued, controlling international financial institutions has enabled USA to dominate other countries, and as Yanis Varoufakis (2011) argued, all this has allowed USA to become a global minotaur.

If these issues are not fully dealt with by Hornborg it is because, although he has alluded to the work of Karl Polanyi and other theorists of institutions, he has not focussed on the place of States in the governance of nations and their relations of power, including power between nations, or what is involved in such governance. Associated with this, he has only minimally engaged with political philosophy, despite being highly critical of neoliberalism and forms of socialism focussed on promoting the development of technology.

He is not alone in this neglect of political philosophy. Marx wrote a critique of Hegel's political philosophy and his notion of the State, and ignored work by Rousseau, Herder and Friedrich List on the role of nations in liberating people from oppression. All he offered in place of the institutions of nation-states was the notion of the dictatorship of the proletariat, which in the Soviet Union became dictatorship of the Communist Party and then the dictatorship of one person – Stalin. Few Marxists have gone beyond criticising the State, and they have been followed in this by most post-Marxists who claim to be more radical than Marxists, such as Foucault and his followers. Hornborg (2013, 59) does characterize the role of the nation-state as having a gate-keeping function to import resources and export pollution, but does not consider the role of nationalism and States in forming and executing a public will to liberate people from domination and exploitation, and the subversion of these by the new globalized ruling class. As William Robinson (2014) observed, this involves

utilizing State institutions that it has captured to this end.

POLITICAL PHILOSOPHY AND NATURAL PHILOSOPHY

Such limitations are in line with the failure of most recent critics of economic doctrines to engage seriously with political philosophy, although there are notable exceptions, including Cornelius Castoriadis, Michael Sandel, Axel Honneth and Marxists influenced by Karl Polanyi. The dominant worldview embodied in the civilization of modernity is still the worldview that originated in scientific revolution of the Seventeenth Century, upholding a mechanistic, atomistic conception of being and of society, upholding ‘possessive individualism’, although the ‘atoms’ are now more likely to be taken to be fetishized ‘elementary particles’ and ‘bits of information’ (Gare 1996, 140ff.; Gare 2020) and individuals are now seen primarily as consumers. This is the worldview subsequently characterized as ‘scientific materialism’ by Alfred North Whitehead (1932), and it is a worldview inimical to the very idea of autonomy and genuine democracy. As Castoriadis (1987 & 1991) argued, the world-order that developed on this foundation has been dominated by the social imaginary of the unlimited technological mastery of nature (and people), which displaced the quest for autonomy that originated with the Ancient Greeks and had been revived in the late Middle-Ages. This social imaginary was accepted by orthodox Marxists, who as Alain Supiot (2012) documented, symptomatically aligned themselves with neoliberals after the collapse of communism on the assumption that unconstrained markets driven by the unlimited quest for wealth (which Aristotle had condemned for its destructive effects as *pleonexia*) had shown themselves superior to planned economies in achieving this end.

Hornborg’s attack on machine fetishism is clearly in accord with Castoriadis’ political philosophy, challenging the dominant social imaginary, and challenging the failure of even those critical of current world order to emancipate themselves from it. The critique by Hornborg of those who attempt to replace the labour theory of value with an energy theory of value is important in this regard. Such theories of value manifest the failure to appreciate values other than those that are associated with markets and the quest of technological mastery of nature. As Sandel (2012) argued, there are more important values that cannot be even thought about through markets. ‘Justice’ is one of the most important of these, as is liberty as it was originally understood in Ancient Rome – as not being

dependent on others who can harm one. Marx, with some success, sought to show such that liberty cannot be achieved in a market economy when the means of production are privately owned and workers have to work for these owners. However, it is the eclipse of the quest for autonomy as characterized by the Ancient Greeks that brings into focus what has been lost in modernity, particularly with the triumph of neoliberalism, and it is this which needs to be not only revived, but rethought to challenge the fetishisms examined by Hornborg.

The most influential political philosophers involved in overthrowing the classical tradition of ethical and political thought were Thomas Hobbes and John Locke (Skinner, 1998). These philosophers defended possessive individualism (as characterized by C.B. Macpherson (1964)) with rule by a 'tyrant' – a self-serving individual (in the case of Hobbes) or an oligarchy – wealthy property owners ruling in their own interests (in the case of Locke), above all rejecting the philosophers of the Florentine Renaissance who had struggled to revive ancient Roman and Greek thought (Skinner, 2008). Through being incorporated into economic theory, their political philosophy dominated (although never completely) Britain and its colonies, including USA, and from there, the entire world. This is the political philosophy rejuvenated by neoliberalism, supported by the power elites attempting to maintain US global hegemony.

Above all, Hobbes and Locke rejected the tradition of Aristotelian political philosophy with its focus on justice and the realization of people's human potential to govern themselves and gain wisdom. For Aristotle, constitutions should be judged according to how well they provide the conditions for people to achieve '*eudaimonia*' (literally, 'good spirit'), often translated as 'happiness' or 'flourishing', but better translated as 'a fulfilling and fulfilled life' or even as 'an inspired life'. This, he argued, is the *arche* or first principle of political thought, without which disagreements could never be rationally adjudicated. His conception of *eudaimonia* was based on his theoretical philosophy through which he defined the nature of being, the difference between living and non-living beings, and then between humans and other living beings. Humans were defined as *zoon politikon*, beings who could only realize their unique potential and become fully human, developing their highest virtues associated with their intellectual psyche, by participating in the governance and in philosophical inquiry in the

polis, understood as a self-governing community, united by their shared commitment to the good of the polis. That is, it was a community in which people formulated and enacted their own laws based on philosophical reflection, the essence of 'autonomy'. The cultivation of these virtues was required to uphold and maintain the social order in which *eudaimonia* could be achieved. The notion of liberty developed by the Roman republicans such as Cicero built on the Greek notion of autonomy.

Rejecting all this, Hobbes, aligning himself with the new science of Galileo that had developed in opposition to Aristotelian metaphysics. He argued in accordance with this new mechanistic conception of physical existence that humans are just machines moved by appetites and aversions, with reason being nothing but calculating (characterized as adding and subtracting) how to control the world to satisfy these appetites and avoid aversions (Gare, 1996, 135ff.). Modifying Hobbes slightly, Locke, who defended Newton's physics, defined the good as that which is conducive to pleasure and the bad as what is conducive to pain. In place of the quest for justice, Hobbes and Locke defended rights based on social and political contracts between egoistic individuals, which in the case of Locke, included the right to ownership of what one had mixed one's labour with. This is the philosophy incorporated into subsequent economic theory by Adam Smith and his followers, and as Karl Polanyi argued, it led to disembedding the market from the community and subjecting the community to the laws of the market. This philosophy was generalized and further developed through Darwinism and Social Darwinism by using this view of the economy as a metaphor for life generally, characterizing evolution as the outcome of a struggle between mechanisms for survival and domination, thereby legitimating capitalism, imperialism and the subjugation and elimination of supposedly inferior people, whether individuals or races (Young, 1985). Recently, the mechanistic conception of organisms, including humans, has been updated by conceiving them as information processing cyborgs, essentially, as Richard Dawkins argued, machines for reproducing genes (Gare, 2020).

Hornborg's work is a consistent rejection of this Hobbesian/Lockean tradition of thought, although not presented as such. To recover from this tradition it is necessary to appreciate the tradition of opposition to the Hobbesian/Lockean tradition from the Eighteenth Century onwards, beginning

with figures such as Rousseau, Kant, Herder, Fichte, Hegel and Schelling to Marx and the eco-Marxists, and the direct and indirect influence of this tradition on Hornborg. These philosophers revived a robust notion of reason as more than just calculation, beginning with Rousseau's notion of the general will and Kant's defence of metaphysics and his notion of the categorical imperative (Gare, 2011). Kant also developed a dynamic conception of matter and a new theory of life as self-forming activity, providing support for his conception of humans capable of practical reason. Johann Gottfried Herder, Kant's student, revived the notion of realizing one's potential or self-realization as full participation in a community by developing the notion of culture. He was the first to acknowledge diverse cultures and calling for respect for such diversity. The challenge of each individual and each culture is to realize their unique potential, although in doing so Herder believed that there was a general evolution of cultures to promote greater humanity. Johann Gottlieb Fichte, a later student of Kant, argued that we only develop self-hood and become self-conscious through seeing ourselves from the perspective of others, and showed how this motivates ethical behaviour and our quest for a social order in which the significance of people as free agents is fully recognized, explaining the tendency towards greater humanity through history. He privileged Kant's injunction to always treat others as ends in themselves, never merely as means.

Hegel developed his social and political philosophy by integrating the ideas of Herder and Fichte, according a central place to the dialectic of recognition which operates through institutions along with the dialectic of labour which operates through the development of tools and the dialectic of representation which operates through language. In this, he granted a place to markets as important institutions in the organization of civil society, but argued these had to be limited by the family, 'corporations', that is trade unions and professional bodies, and the State and its institutions in which the principles of individuality developed in civil society and the family are united, subordinating markets to instruments of community as a whole in which the freedom and significance of its members is properly recognized. He argued for an ethics as *Sittlichkeit*, the customary behaviour required for the functioning of these institutions, and through which members of society overcome their alienation by identifying with the broader community, gaining recognition and meaning in their lives and a

sense of who they are (Taylor 1979, 125ff.; Williams 1992; Honneth 1996; Williams 1997). Essentially, Hegel was recovering and developing Aristotle's ethical and political philosophy, but developing and more rigorously defending it, utilizing the work of Herder and Fichte and advancing a more complex notion of humanity portrayed as developing through history by more adequately recognizing the significance and freedom of people through the institutions of the State. This involved going well beyond the polis and formulating political philosophy adequate to the complexity of the modern world in which nations as 'imagined communities' rather than cities are the main political communities (Anderson 1991). Hegel also incorporated the observation from Polybius to Montesquieu that to avoid corruption of institutions it is necessary to have multiple centres of power checking and limiting each other, and added other centres, most importantly, the civil service and 'corporations' – that is, professional bodies and unions.

Friedrich Schelling, Hegel's onetime collaborator, largely concurred with Hegel's social philosophy, but went beyond Hegel's focus on nation-states and, anticipating the United Nations, argued for global institutions to defend countries against aggression, upholding the rights of nations to self-determination. At the same time, Schelling rejected Hegel's tendency to treat people as nothing but cyphers for Reason and argued for the significance of individuals and their capacity for freedom (work which later inspired the existentialist movement). These ideas provided the point of departure for later work in political and ethical philosophy associated with John Stuart Mill (influenced by Herder) and the British Idealists, such as T.H. Green (influenced by Rousseau, Kant, Fichte and Hegel), who inspired social liberalism (or liberal socialism), the democratic socialism (or social democracy) of Marxist revisionists such as Eduard Bernstein, the socialism of Austro-Marxists such as Karl Polanyi, the Swedish Social Democrats, and in USA, Franklin Roosevelt's New Deal movement, which was supported by the pragmatists influenced by John Dewey and George Herbert Mead and by John Maynard Keynes who had been influenced by the social liberals. Later, the proponents of such ideas, including proponents of Aristotelian virtue ethics such as Alasdair MacIntyre and Hegelian social philosophy such as Charles Taylor and Axel Honneth, united under the banner of communitarianism (Avineri & Avner de-Shalit, 1992) to oppose the atomistic

individualism of the Lockean tradition of liberalism.

Often, although not always, such political philosophy has been associated with Idealism, and has been denigrated as Idealist; that is, not consistent with mainstream science and associated conception of humans, and as such, unrealistic. However, inspired by Schelling's philosophy of nature, advances in these ideas have been accompanied by efforts to challenge and replace the worldview of scientific materialism in order to support and develop the conception of humans advanced by such political philosophy. The success of Newtonian science made it impossible to simply invoke Aristotelian science, but Newtonian science was clearly problematic with its inability to comprehend electricity, magnetism and light, sentient life and conscious beings who could develop science. This challenge inspired work in natural philosophy to provide the foundations for a science that could make intelligible the emergence of life and then of humanity, with a new Renaissance resurrecting the evolutionary cosmology of the early Greek philosophers, Anaximander and Heraclitus, assuming an ontology of relational processes, with objects and subjects understood as derivative from processes. Herder (influenced by Spinoza, Leibniz and Kant) actually began this work, but it was carried through far more rigorously by Schelling (Gare, 2011). Schelling, developing Kant's more radical ideas on natural philosophy, particularly on the nature of life and living organisms that exist by actively maintaining their forms, incorporated Anaximander's notion of emergence through limiting of activity and Heraclitus' notion of order through the balance of opposing forces. The notion of limiting activity provided a naturalistic foundation for Fichte's ethics and political philosophy. Schelling called for a revolution in mathematics and science able to comprehend the reality of life, including human life, that has been largely successful, if not properly acknowledged as such, and which is still underway (Gare, 2013).

All of Hornborg's work is consistent with this tradition of anti-reductionist science and the political philosophy it supports. His starting point in anthropology, was a discipline inspired by Herder's notion of culture, and this underpins all Hornborg's work. Hornborg developed his ideas by critically embracing disciplines and ways of thinking that were consistent with cultural anthropology but went beyond it. This included ecology in its anti-reductionist form, biosemiotics, and much of the work of Marx and the humanistic Marxists.

This way of proceeding has many advantages. Having a solid foundation in a particular discipline clearly has made it easier for Hornborg to appreciate which ideas were consistent and which ideas were inconsistent with the basic assumptions of this discipline. This is illustrated by his appropriation of Marx's ideas, extending these, while criticising aspects of Marx's work – those embraced by most orthodox Marxists.

Marx, who began as a radical Hegelian also influenced by Aristotle, was influenced by diverse thinkers and tended to defend inconsistent views. For instance, early on he suggested that economic categories are the forms of being in a capitalist society. The labour theory of value is associated with the dehumanizing and alienating commodification of labour associated with capitalism, and as such, he implies that it should be replaced by different categories. Elsewhere, however, he held the labour theory of value to have universal validity. The former view, influenced by Sismondi who saw capitalism as a radically new social order, accords with cultural anthropology, while the latter showed the influence of Saint-Simon from whom Marx embraced the notion of technological progress as the driving force of history (Gare, 2021a). Hornborg, sympathetic to the former and highly critical of the latter as a fetishism of machines, is upholding a more consistent position and allowing him to be more critical of modern civilization than was Marx. Hornborg (2019, 161) also engaged with the work of the eco-Marxists, showing their limitations when they strove for a purely objective, quantifiable characterization of use-value, defending Baudrillard and Sahlins who argued that use-value is largely culturally constituted and cannot be objectified in this way. Then grappling with the problematic relationship between subjects and objects, Hornborg (2019, 177ff.) acknowledged the value of the work of Bruno Latour, but defended the distinction and offered a scathing critique of Latour's later posthumanism in which technical objects were ascribed purposive action, failing to see that this is also fetishism, ignoring the responsibility of human actors in creating and maintaining these objects and the outcomes of social processes in which they are utilized. Hornborg also offered illuminating analyses of how aspects of the world could be treated as objects or subjects.

However, despite all this work, Hornborg has not yet developed the full potential of human ecology as the discipline that can overcome the opposition

between the sciences and the humanities, thereby fully engaging with political philosophy and ethics (Gare 2000a). He has invoked the notion of justice and revealed massive injustices operative in the modern world, and the need for affluent people who are the beneficiaries of this to make do with far less, but calls for justice even accompanied by the analysis of fetishism and attacks on global magic, along with guidance on how new forms of money are essential to achieving this, are unlikely by themselves to generate the required political transformations.

HUMAN ECOLOGY AND THE HUMANITIES

The full development of the potential of human ecology involves the full integration of the humanities and the sciences aligned with the humanities, advancing the tradition of thought that attempted this from Herder and Schelling onwards. The focus of the humanities (which originated with the Florentine Renaissance and the quest for education that would inspire people to uphold their liberty and govern themselves with the appropriate virtues) is on humans and the development of humanity, and all this involves. As Roy Allen, promoting human ecology, wrote in his introduction to *Human Ecology Economics* (2008, 4):

The emphasis on *human* ecology combined with economics brings the “*humanities*” as well as the physical science-based field of ecology to the study of economics, and the framework is thus broader than ecological economics. For example, ... ideologies and “ways of being” (as defined through fields such as philosophy, psychology, sociology, religious studies, literature, etc.) are important structural components of the economic system, and they are not given sufficient attention within the fields of ecology, economics, or ecological economics.

However, while economics is perhaps the most important discipline in need of transformation, more is required. Ultimately, what is required is a replacement of the dominant worldview upholding and developing a very different political philosophy and vision of the future to be realized, a vision incorporating not only analyses of how power operates but practical guidance on how to gain power and make and implement decisions and policies that can inspire people world-wide to realize their potential and engage in power struggles to realize this vision, and to develop their virtues and play their roles as citizens in communities that have been liberated. Political philosophies along with philosophy generally, science, the arts and humanities and the ideas they have generated, political institutions

and the virtues of actors within these institutions, also have to be seen as part of the human ecosystems within which people live. Of central importance is history, which through remembering the past of communities at all levels and their institutions, allows people to situate themselves in the present to create the future. This should include 'natural history', the history of the cosmos and of the emergence and evolution of life and humanity.

Since it is the humanities that has been marginalized, it is the humanities that need to be re-examined. Mikhail Epstein in *The Transformative Humanities* (2012, 7) offers not only a defence and guidance for reviving the humanities, but more importantly, a crucial clarification of what the humanities are and what role they should play. Succinctly:

The crucial distinction between the humanities and the sciences is that in the humanities the subject and the object of study coincide; in the humanities, humans are studied by humans and for humans. Therefore, to study the human being also means to create humanness itself; every act of the description of the human is, by the same token, an event of one's self construction. In a wholly practical sense, the humanities create the human, as human beings are transformed by the study of literature, art, languages, history and philosophy: the humanities humanize. (Epstein 2012, p.7)

Even characterizing and identifying genuine science belongs to the domain of the humanities, and science can only function and develop when those engaged in it have some appreciation of the history of science, their discipline and current research enabling them to understand what has been achieved and what further research is called for. Hornborg's concern to acknowledge the unique characteristics of humans in opposition to posthumanists, and his work on history suggests sympathy for the humanities. Spelling out the concordance of his work with work in the humanities shows how his work actually augments the humanities, while at the same time ideas developed in the humanities can advance his own work.

This can be seen most clearly in the work of Castoriadis. As noted, Castoriadis shared with Hornborg the hostility to faith in technology as the foundation for all progress and for all that can be hoped for, and who also mounted a critique of Marxism for still assuming this. Castoriadis was deeply concerned about social injustices and ecological destruction, but his focus was not on these as such but why people continue to conform to a social order that was so manifestly oppressive and destructive, accepting their powerlessness in the face of all this. In

The Imaginary Institution of Society, originally published in 1975 and in English translation in 1987, Castoriadis developed the notion of the radical imagination and the social imaginary to elaborate a theory of institutions. The social imaginary as a product of radical imagination came into existence with humans as a symbolic species. It is the foundation and source of what is assumed by people to be social reality, including its institutions, although most of humanity has ascribed the source of these institutions not in their own creative imaginations but to something else - the Gods, the Darwinian struggle for survival with the less efficient being eliminated, or whatever. This analysis clearly supports Hornborg's development of the notion of fetishism.

Castoriadis (1991) argued that the Ancient Greeks, beginning with Anaximander, came to appreciate that they were the producers of their institutions and began a process of unlimited questioning of them accordingly. In doing so, they acknowledged they were effectively producing themselves, and set about doing so consciously. This is the basis of autonomy, in which people become self-limiting, prescribing their own laws. This was the basis of Ancient Greek democracy. Democracy and philosophy emerged simultaneously, as people were led to ask What is justice? and then What is truth? and What is the nature of the cosmos and what is the place of humans in the cosmos? Anaximander, the originator of the notion of the cosmos, was the most profound of the early philosophers, claiming that the creativity of the cosmos is based on limiting the unlimited, elaborating a whole evolutionary cosmology on this basis. This supported the notion that autonomy as self-creation through self-limiting. While liberalism as defended by John Locke purports to be defending freedom, the freedom he defended, with its focus on rights to property, is incompatible with autonomy as understood by the Greeks. It is this inspiring belief in autonomy that was so important, and according to Castoriadis, this was re-awakened in Europe in the Twelfth Century, and accounts for all that has been creative in the West. While Marx had appreciated this, arguing that the bourgeois mode of production while purporting to liberate people actually enslaves even the owners of the means of production to the logic of markets, through his faith in the inevitability of technological progress he still failed to fully embrace autonomy as the goal of humanity as this had been understood by the Greeks.

While Castoriadis' defence of autonomy can be seen as the political

philosophy implicit in Hornborg's critique of fetishism, Castoriadis' work has severe limitations, limitations that Hornborg can avoid. Castoriadis portrayed life in Athenian democracy magnificently, but dismissed the idea that the Greek polis could simply be recreated in the present, while providing very little direction for what could be. He largely ignored Aristotle, the philosophers of the Italian Renaissance and German philosophy, apart from Hegel and Marx whom he critiqued. In doing so, he dismissed them rather than showing how their limitations could be overcome. However, Herder's argument that we are essentially cultural beings, formed by our culture but capable of reflecting and developing or changing it, is another way of characterizing and further developing autonomy as the Greeks understood this, and achieving such autonomy was more common than Castoriadis acknowledged. It also involves more dimensions. Hegel in his early work (strongly influenced by Herder and Fichte) identified three interwoven but irreducible dialectical patterns in culture, the dialectic of labour that operates through tools (or technology), the dialectic of recognition that operates through institutions, and the dialectic of representation that operates through language (Gare, 2009), all of which are prone to fetishisms which can be critiqued and overcome, usually through the dialectic of representation. Individual autonomy is achieved in the context of these, not by rejecting all constraints but through understanding and critically reflecting on the traditions into which they have been socialised. More recent advances in the quest for autonomy have been associated with the emergence and development of the public sphere, as characterized by Jürgen Habermas (1992), and the autonomizing of cultural and other fields characterized and defended by Bourdieu (1993). Developments of the notion of culture, central to anthropology and human ecology, enables Castoriadis' notion of autonomy to be developed and applied to the present.

Bourdieu's work on cultural fields and how these relate to the fields of nations, economics, politics and power along with his notion of *habitus* as a disposition to interpret situations in a particular way, most commonly, practical situations, provides a more nuanced understanding both of what is involved in the formation of institutions and the emergence of the quest for autonomy (Bourdieu, 1993). Bourdieu showed how social reality, including institutions, reproduced through the reproduction of the *habitus*, is sustained without this being either unconscious

or fully conscious. What he did not look at, was the role of instruments and built-up environments for supporting or undermining these fields, which are clearly part of human ecosystems or eco-fields. Autonomy is achieved through the emergence of autonomous cultural fields through which tacitly accepted practices, institutions and beliefs can be interrogated. This is associated with the emergence of political fields concerned with the common good, although autonomous political fields generate and require the emergence of autonomous cultural fields through which politics and social life generally and their associated institutions can be reflected upon, supported, critiqued and new possibilities revealed. This is how philosophy and literature emerged together with politics in Ancient Greece, along with architecture to facilitate the flourishing of these fields. With neoliberalism, the autonomy of cultural and political fields are being corrupted and dissolved into and reduced to instruments of the economic field and the field of power, with national economic fields being dissolved into the global economic field dominated by transnational corporations and a new transnational ruling class (Robinson, 2014). Deconstructive postmodernism and posthumanism herald the complete collapse of the quest for autonomy.

Challenging these developments cannot be just a matter of recognizing the radical imagination, but understanding how imagination operates. Built on Piaget's notion of cognitive structures being generalized from one situation to another, but adding a social dimension, Bourdieu's analysis revealed how the construction of social reality involves analogical and metaphorical thinking, even when not appreciated as such. This can be used to account for the French anthropologist Maurice Godelier's observation (1977, 213), an observation first made by Alexander Bogdanov (2016, 56ff.), that the cultures of societies are integrated by using society and social relations as a metaphor for nature, and nature as a metaphor for society. As he argued:

Spontaneously, by systematically covering all the possible analogous parallels between Nature and Culture, thought constructs a gigantic mirror effect, where the reciprocal image of man and the world is reflected *ad infinitum*, perpetually decomposing and recomposing in the prism of Nature-Culture relations... By analogy the whole world makes sense, everything is significant, everything can be explained within the symbolic order, where all the positive known facts...may take their place with all their rich abundance of detail.

This is also true of civilizations, and I have shown this in the case of European

civilization which came to embrace the mechanistic worldview and has continued to develop the metaphor of the machine in advancing both the natural and the human sciences and in defining the ends of life (Gare 1996).

Hornborg's work on machine fetishism further clarifies what is involved in the domination of civilization by this metaphor and the importance of the struggle for autonomy to oppose it. However, it is only by recognizing the role of metaphors and how they come to be embodied in institutions and in technology and built-up environments that it becomes evident what is needed to effectively challenge and replace current values. It is necessary to challenge and replace the metaphor of the machine, whether a clock, a steam engine, or a cyborg, that still dominates modernity in the organization of society and in its technology and built-up environments.

Epstein (2012, 8) in his defence of the humanities, argued: 'humans create themselves by creating 'new images, signs and concepts of themselves ... humans do not so much discover something in the world of objects as build their very subjectivity by way of self-description and self-projection.' This is achieved by appreciating the central role of metaphors in all thinking, practical and theoretical, and as central to cultures. It is not just a matter of creating new images, however. Images have to be able to be justified. The metaphor of the machine displaced the metaphor of the organism because it was associated with what were undeniably major advances in our understanding of nature, incorporating and advancing the Pythagorean commitment to mathematical modelling and developing new forms of observation, including experiments in idealized situations, to advance inquiry. These advances have been identified as the triumph of science, the ultimate arbiter in matters of belief, and if mechanistic science is to be replaced, as Schelling realized, it will only be through developing a demonstratively superior science.

We now have this science, and the discipline which brings into focus and combines all other advances in science, from field theories, quantum theory, non-linear thermodynamics, anti-reductionist biology and humanistic human sciences, complexity theory and semiotics, all best interpreted through an ontology of processes, is post-reductionist ecology granting a central place to human ecology. As the theoretical ecologist, Robert Ulanowicz (1997, p.6) argued in his book *Ecology, The Ascendent Perspective*:

Ecology occupies the propitious middle ground. ... Indeed ecology may well provide a preferred theatre in which to search for principles that might offer very broad implications for science in general. If we loosen the grip of our prejudice in favour of mechanism as the general principle, we see in this thought the first inkling that ecology, the sick discipline, could in fact become the key to a radical leap in scientific thought. A new perspective on how things happen in the ecological world might conceivably break the conceptual logjams that currently hinder progress in understanding evolutionary phenomena, development biology, the rest of the life sciences, and, conceivably, even physics.

Ecology, further developed in human ecology, can also advance the human sciences and the humanities, and do so in a way that aligns the sciences with the humanities, there by supporting the quest for liberty. Ecology can provide the foundation for an entire worldview (as this term was used by Hornborg), essentially a development of the worldview inspired by Herder and Schelling, that can replace the mechanistic worldview, acknowledging the achievements based on the mechanistic worldview but contextualizing these to reveal their limitations, while at the same time integrating and advancing ideas going beyond the mechanistic worldview, sometimes by thinkers who identified themselves as Idealists.

THE ECOLOGICAL WORLDVIEW AS A PHILOSOPHY OF LIFE

‘Ecology’ means the study of the system of households or homes of organisms generated by biotic communities. These were subsequently characterized as ‘niches’. As such, ecology is associated with the defence and development of relational-process ontology in which immanent causation, context and relations are central. Such thinking is built into the name of the discipline, providing grounds for resisting its assimilation to reductionist thinking, although efforts were made to assimilate ecology into reductionist science culminating in the development of socio-biology, popularized by Richard Dawkins.

In opposition to the mechanistic worldview, an ecological worldview requires that we take our starting point the perspective of the whole, which as Mae-Wan Ho (1988) argued in relation to the evolution of terrestrial life, is the biosphere. The beginnings of this evolution involved the early biosphere providing the niches or homes where various new forms of life could emerge, beginning with procaryote cells, then after a couple of billion years, eukaryotic cells, then multi-

celled organisms and then communities of these, creating biotic communities or ecosystems making niches for more complex organisms and their interactions, eventually providing the niches or homes which made possible the emergence of human life, and then for the development of civilizations. Each major development provided the scaffold for later developments, including the development of more complex forms of semiosis and symbiosis, culminating with human cultures. The biosphere and all the emergent ecosystems it has generated are *ecopoietic*, that is 'home' (or niche) producing, providing the environmental conditions not only for each others' existence and flourishing but for the flourishing of the broader biotic communities in which they are participating. Recognising this, an ecological worldview acknowledges the creativity of life and the conditions for it, as opposed to the mechanistic worldview that effectively denies the reality of life and then treats the spontaneous creativity and the conditions for it, essential to life, as things to be dominated, made predictable and effectively eliminated. Acknowledging the central place of *ecopoiesis* or 'home-making', the telos of ecosystems can be characterized as maintaining and augmenting the homes, that is, the conditions, for the life of its components and broader communities.

With the recovery of the original insight that organisms only exist through their relations to other organisms, ecosystems are now recognized as communities of communities existing at multiple spatial and temporal scales. Each particular ecosystem is both composed of ecosystems and exists within ecosystems, having its own immanent dynamics, made possible by the *ecopoiesis* of other ecosystems with which it is interacting. Organisms themselves have been characterized as highly integrated ecosystems in this context. This has facilitated major advances in the science of biology, including evolutionary theory, making intelligible the emergence of not only sentient life, but also humans with their unique characteristics. Ecosystems have evolved by providing new niches facilitating the emergence of new forms of life with new kinds of relations, including new kinds of semiotic relations. In doing so, they have transformed the physical environments and advanced the stability and resilience of these communities, preserving old niches and creating new niches and making possible new forms of life. That is, ecosystems are above all niche preserving and niche creating systems. *Ecopoiesis* is central to ecosystems. However, ecosystems can become sick, as

when niches or homes of organisms important for these communities are being damaged or destroyed by subordinate or superordinate ecosystems. This is illustrated by organisms that develop cancerous tumours.

The evolution of the biosphere has provided the niches or homes for the emergence and development of humans consisting of cultures, languages, institutions, technologies, complex societies and civilizations. These consist of various kinds of communities, institutions and cultural fields, which in turn have provided niches where individuals could explore possibilities to augment the life of these communities, contributing to the development of humanity. Civilizations in order to flourish had to provide homes or niches for subordinate communities and communities of communities to flourish. However, as Joseph Tainter (1988) has shown, most civilizations destroyed the environmental conditions for their existence. The current civilization of modernity, which is now a global civilization, is on a similar trajectory, except that this is on a global scale, and the environmental conditions being destroyed are essentially the conditions for any human civilization, for most of humanity and most other life-forms. The biggest problem with this civilization is that its most powerful actors are dominated by and promulgate a worldview that promotes tunnel vision, making them incapable of comprehending the situation we are in or the drastic changes required to avert this catastrophe and averse to others aspiring to such comprehension. Human ecology is the discipline essential to overcoming this tunnel vision. An entire ecological worldview is necessary to create a different kind of civilization, an ecological civilization, but to understand what this involves and why it could be possible it is necessary to examine further developments in ecological theory (Gare 2021b).

One of crucial theoretical advances in ecology, making all this intelligible, was the work of Howard Pattee. As a quantum physicist, Pattee was preoccupied with how knowledge of physical reality is possible. It must involve the emergence of signs or symbols. Rediscovering the crucial insight of Anaximander, echoed by Schelling, he argued this must involve limiting or constraining of activity, setting up boundary conditions that allow events to be recognized as signs. The notion of enabling constraints has provided the means to understand emergence, including the emergence of life and then humanity. Pattee focused on control in organisms and the symbols required for this. He showed that constraints can be

facilitative or enabling, creating new forms of existence with new possibilities. As he wrote in *Hierarchy Theory: The Challenge of Complex Systems* (1973, 73f.):

The constraints of the genetic code on ordinary chemistry make possible the diversity of living forms. At the next level, the additional constraints of genetic suppressors make possible the integrated development of functional organs and multi-cellular individuals. At the highest levels of control we know that legal constraints are necessary to establish a free society, and constraints of spelling and syntax are prerequisites for free expression of thought. (Pattee 1973, 73f.)

These ideas were further developed and Pattee's classic papers are now available in *Laws, Language and Life* (Pattee and Rączascek-Leonardi 2012). This work reaffirms Anaximander's conception of evolution, further advanced by Schelling, as involving limiting the unlimited.

This notion of hierarchical order based on enabling constraints was immediately embraced by ecologists, notably Timothy Allen (1982) and Stanley Salthe. Salthe (2005) also interpreted biosemiotics through Pattee's work and integrated it with 'endophysics', the notion that science has to accept that we, with our unique characteristics, including our capacity to create science, are part of the world we are trying to understand. This work facilitated the development of ecosemiotics, the study of communication processes central to all ecosystems, including the unique forms of communication develop by humans (Maran 2020). Alicio Juaerrero in *Context Changes Everything: How Constraints Create Coherence* (2023), a major work in reviving natural philosophy, has fully developed the notion of enabling constraints, showing its relevance to all disciplines, including the human sciences. She shows that the fundamental flaw in the mechanistic worldview, associated with its tendency to atomism, is its blindness to context. This blindness includes blindness to the boundary conditions for whatever mechanical processes are investigated and revealed by science. The advance of this work has involved not only major developments in mathematics, but a rethinking of the role of mathematics in science, recognizing that the whole of reality cannot be understood through mathematics and that stories are more fundamental than mathematics for comprehending nature as well as humanity (Kauffman & Gare 2015), being essential to scientific rationality and to ethics and political philosophy (MacIntyre 1977; MacIntyre 2016). This implies that the humanities and arts, in which the study and development of narratives is central, is more fundamental than science in human culture and in our efforts to comprehend the world and

our place within it. Through such work, the sciences and the humanities are being reconciled, in accordance with the Schellingian tradition of natural philosophy, with the distinctive characteristics of humans fully acknowledged within science instead of being explained away. And as I have argued elsewhere (Gare 2000a), human ecology is the discipline in which the reconciliation of science and the humanities is being most fully developed in practice, although there are still fundamental theoretical issues to be dealt with.

CREATING AN ECOLOGICAL CIVILIZATION

Advancing our understanding of the world and ourselves through ecological concepts, including ecopoiesis, involves recognizing that doing so is not just making the world intelligible but creating ourselves as members of social and political communities and orienting us for life and action, participating creatively not only in these human communities but also in broader biotic communities. This involves revealing and valorising possibilities which augment the conditions for human life, which includes the conditions for life forms that augment the health of these broader biotic communities in which we are participating. This involves replacing the concepts that now dominate the civilization of modernity with ecological concepts which acknowledge such values. As Roy Rappaport (1990, 68f.) observed: .

In a world in which the lawful and the meaningful, the discovered and the constructed, are inseparable the concept of ecosystem *is not simply a theoretical framework* within which the world can be analyzed. It is itself an element of the world, one that is crucial in maintaining that world's integrity in the face of mounting insults to it. To put this a little differently, the concept of the ecosystem is not simply descriptive ... It is also "performative"; the ecosystem concept and actions informed by it are *part of the world's means for maintaining, if not indeed constructing, ecosystems.* (Rapaport 1990, 68f.)

This is also true of the concepts being developed and deployed by human ecology, characterizing human communities also as ecosystems. Recognizing ecopoiesis as the basic principle of ecosystems enables it to be taken as the basic principle of both ethics and political philosophy (Gare 2010).

This requires understanding and rethinking ethics, political philosophy and economics in the context of world order, revealing the deficiencies of this order and showing how it should function, replacing a global system that is enslaving

most of humanity into agents of global ecological destruction and creating a world order in which people are empowered to develop their full potential to augment life. This means not only ending imperialism, but the global structure of the current world-system as characterized world-systems theorists such as Immanuel Wallerstein, reformulated in thermodynamic and ecological terms by Stephen Bunker (1988), with core zones dominating semi-peripheral regions through comprador elites to exploiting and destructively plundering the resources of the peripheries, thereby increasing their own power to dominate, combined with struggles between members of the core zones to achieve and extend their hegemony. This order has been characterized more recently, by Radhika Desai in *Geopolitical Economy* (2013). The struggle to transform this should be portrayed as a global struggle for liberation.

By reviving Anaximander's and Schelling's insight that evolution occurs through limiting activity, including the evolution of life and humanity, an ecological worldview supports the quest for autonomy understood as self-limiting, together with the communitarian social, political and ethical philosophy inspired by Eighteenth and Nineteenth Century German philosophy. It supports and facilitates the generalization of Aristotle's first principle of politics that the ultimate end of politics is to provide the conditions within which individuals can flourish and develop their full potential, living fulfilling and fulfilled lives, by participating in and augmenting the life of their community. Aristotle's principle can be interpreted as particular example of healthy *ecopoiesis*, the production by a community of 'niches' or 'homes' in which components augmenting the life the community can flourish. Defending and extending this by according a central place to the emergence and development of *semiosis* in evolution, enables the conception of humans proposed by German philosophers, reacting against Cartesian and Hobbesian notions of humans, to be not only defended, but further developed (Gare 2019). This is the conception of humans developed in sociology by the symbolic interactionists and also by Bourdieu.

Bourdieu's work in particular with its notion of fields facilitates the integration of sociology into human ecology. As characterized by Bourdieu (1993), fields are emergent systems of activities with their own specific ends providing niches in which people can pursue these ends defined by the field, competing with each other for the specific 'capital' as defined through each field, which is essentially

power facilitating continued participation in the field. In pursuing such capital, participants maintain and augment the autonomy of the field. Initially, Bourdieu focussed on cultural fields, but generalized his theory to include economic fields, political fields, legal fields, national fields, and a metafield of power, central to understanding the relations between different fields. Fields emerge from other fields on which they are dependent, but as emergent, are not merely the effects of these fields. That is, fields are essentially complexes of ecosystems or communities of communities, although with unique characteristics, providing niches for people to pursue particular ends. Conceptualizing human life through these concepts enables the emergence of philosophy and other domains of culture in Ancient Greece to be understood and Aristotle's principle of politics to be generalized beyond the polis, not only to nations, but also to the various fields of which they are composed, and then to the extended nationalism of major regions consisting of a number of nations identifying themselves as such, for example, Europe, South America and Africa, and then to global economic, political and cultural fields. Understood in this way, the quest for autonomy should not be understood as just a matter of self-limiting, making possible life in a way that could augment the health of broader fields or ecosystems, but a struggle to maintain autonomy from and resist subjugation and even destruction by other fields. In the case of politics, the threat includes other nations, but also through economic relations, particularly those associated with transnational corporations, the dissolution of politics into an instrument of business corporations.

Originally critical of nationalism, Bourdieu came to see the autonomy of the autonomous field of the nation as important and even central to the struggle to maintain the autonomy of cultural and political fields (Bourdieu 1998; Bourdieu 2003). This struggle for autonomy has to take place at local and national levels, but it can and should involve at the same time a struggle for international institutions, as called for by Rousseau and Schelling and advanced through the League of Nations and then the United Nations, associated with the development and enforcement of international law, and also various bodies and institutions recognizing the cultural and political fields of nations – for instance, UNESCO. The role of the United Nations has recently been extended to upholding the importance of environmental issues, notably, the threat posed by greenhouse gas emissions, and has endorsed the commitment to an ecological civilization.

As a constraint on nations, international law should not be seen as limiting freedom, but as liberation, achieved through upholding the conditions for nations and their citizens to achieve autonomy. Countries that ignore the United Nations and international law based on upholding justice, should be recognized as a threat to the positive freedom of all people and their communities to live in a way that augments life and the health of the global ecosystem. These are the countries supporting economic globalization effecting regime changes to achieve this, dominating countries through comprador elites or by just promoting constant warfare, ruling as did the Ancient Roman imperialists, by dividing.

However, construing and evaluating the present state of the world in this way is dependent upon rejecting scientific materialism along with the economic doctrines and Social Darwinism inspired by and built on it through accepting an ecological worldview (Gare 1996; Gare 2000b). From the perspective of ruling elites who hold legal and ethical constraints and the United Nations in contempt, such constraints are hinderances to progress generated by free markets and the struggle for survival and the domination of the fittest. From the perspective of an ecological worldview, such people are cancerous tumours in the biosphere. As the environmentalist, David Korten, wrote:

Cancer occurs when genetic damage causes a cell to forget that it is part of a large body, the healthy function of which is essential to its own survival. The cell begins to seek its own growth without regard to the consequences for the whole, and ultimately destroys the body that feeds it. As I learned more about the course of cancer's development within the body, I came to realize that the reference to capitalism as a cancer is less a metaphor than a clinical diagnosis of a pathology to which market economies are prone in the absence of adequate citizen and government oversight. (Korten 2000,15)

In arguing this, Korten was following Mae-Wan Ho. Ho and Robert Ulanowicz described what kind of world should be created if we take ecology as the basis of our worldview:

We can deal with sustainable economic systems by embedding the global economic system in the global ecosystem. ... The global economic system will have an intricate structure encompassing many national economies. Ideally, the intricate structure of the global economy should look like the many nested subcycles that make up the organisms' life cycle. ... And each national economy, in turn, would have its own intricate structure that is self-similar to the global. If the entire global system is to be sustainable, there has to be a proper balance between the local and

the global, the same kind of reciprocal, symmetrical coupled relationship that one finds in organisms ... Furthermore, the global economy is coupled to the global ecosystem, which too, has to have its own balance ... so that both can survive. (Ho & Ulanowicz 2005, 43)

Another complexity theorist and ecologist, Simon Levin (1999), proposed principles for governance in accordance with these ideas: maintain heterogeneity, sustain modularity, preserve redundancy, tighten feedback loops, minimize entropy production, produce nothing that cannot be recycled and recycle everything, build trust, and do unto others as you would have them do unto you. Developing in this direction could be facilitated by taking human ecology as the primary framework for formulating public policy in place of economics, reducing ecological economics to a subdiscipline of human ecology (Gare 2002).

Ecological thinking should orient people for politics, envisaging what kind of world-order and what kinds of institutions should be preserved and what created, and how this envisaged world could be realized. Most importantly, it is necessary to re-embed markets in communities, subordinating them to the common good of communities, humanity and life, the pursuit of which should always be taken as the ultimate goal in politics. This goal should be embraced by every community at all levels, opposing the cultural, political and military forces imposing and sustaining the disembedded global market while, following Friedrich von Hayek, dismissing the quest for social justice as oppressive.

As I have suggested, what is required are political federations at multiple levels from the local to the global, with institutions designed to localize economic activity as much as possible while defending these institutions from subversion and regime change. Nationalism insofar as it involves loyalty to one's communities and commitment to augmenting the conditions for the autonomy and self-realization of all people, should be fostered at multiple levels, including major regions such as South America, Africa and Europe, as called for by Dudley Seers (1983), protecting the autonomy of their member communities from domination and exploitation. The importance of this has become clearer as the strategy of USA has been shown to involve the destruction of effective governments in countries standing in the way of their exploitation by Western countries. A similar view has been defended more recently by Radhika Desai (2013) and Diesen (2022), with Diesen taking into account and considering how to deal with technological developments associated with the coming fourth industrial

revolution associated with AI.

This world order would consist of communities of communities, not individuals, families and the global market as promoted by the neoliberal British Prime Minister, Margaret Thatcher, with citizens redefined as commodified producers and consumers of commodities, and the monopolar world with these neoliberal doctrines imposed by subversion of governments and military force. What is required, as Desai, Diesen and Jeffrey Sachs have called for, is a multipolar world, with Sachs arguing for centres buffered from each other by neutral States. This involves upholding the United Nations and international law as the basis for national security, with countries and regions organizing their defence in a way that does not threaten other countries. Along with all this, it will be necessary to foster the virtues required for such communities and such a civilization to function, including the disposition to loyalty, justice and wisdom through ecological thinking, and contempt for vices such as *pleonexia*, the endless pursuit of wealth and for ever more and new consumer goods. Through education and cultural institutions upholding the public sphere, it will be necessary to develop a culture which inspires the development of these virtues, including the virtue of loyalty to one's communities. This requires protection of the cultural of communities from hijacking by imperialists while allowing genuine free speech in the pursuit of truth. Embracing the concept of *ecopoiesis*, this can be characterized as the struggle against enslavement which requires secure homes for individuals, their families, and for communities at all levels from the local to the global, where both individuals and communities can assert themselves in the quest for truth and justice without fear of retribution, as the condition for achieving *eudaimonia*. *Eudaimonia* can be conceived of as lives inspired through participating in the life of such communities, committed to upholding justice, developing wisdom and augmenting life, developing people's full human potential to augment life, and for this reason, their lives are fulfilling. Autonomy and liberty can be equated to having such homes, in which people are able to achieve fulfilment through participating in the political and cultural life of such vibrant communities, asserting themselves without fear of retribution. The notion of 'ecopoiesis' provides a way to bring all this into focus (Gare 2025). This is the essence of ecological civilization, and it should be fought for by the whole of humanity.

CONCLUSION

Hornborg's work on money and machine fetishism is a major advance in freeing us from the illusions generated by the mechanistic worldview underpinning the civilization of modernity. In particular, it is important not only for having revealed new dimensions of inequality involved in monetary exchanges and technological processes, but in showing that the claimed achievements of technology in saving labour are illusions hidden in these exchanges. The call to free ourselves from fetishisms and for us to take responsibility for our institutions, most importantly, the institution of money, is clearly central to the promotion of autonomy and genuine liberty. The details of what kinds of money should be instituted is an important contribution towards realising in practice a new world order. Hornborg's engagement with a range of disciplines, integrated through human ecology, further advances the tradition of thought going back to the Eighteenth Century, the tradition developed in opposition to the mechanistic worldview, while combatting purportedly radical views that actually subvert this opposing tradition and the values it upholds. All Hornborg's work can be integrated into the ecological worldview as it is being developed by diverse thinkers influenced by the Schellingian tradition of natural philosophy. This is usually associated with an ontology of relational processes with which Hornborg appears not to have engaged, but his criticisms of rival ontologies are consistent with this ontology. And he has invoked the language of justice, which is really upholding the tradition of Greek thought. However, the call for justice, which should be seen in relation to political philosophy and the governance of communities, is much more likely to be heeded if it is seen as a struggle for autonomy and liberty to augment life, founded on an ontology and social and political philosophy that supports it. In practice, this will involve cultural, economic and political struggles against mind-control, oppression, imperialism and enslavement. This involves advancing a tradition of political philosophy developed in opposition to the possessive individualism of Hobbes and Locke, reformulated through an ecological worldview, and then struggling for and transforming old or developing new cultural, political and economic institutions to accord with this worldview. This involves working towards and then creating an ecological civilization. This will involve overcoming fetishisms and gaining control of which technologies are to be developed and utilized.

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