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The Power of the Machine: Global Inequalities of Economy, Technology, and Environment

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Significantly, from my perspective, Roberts does not appear aware of the works of anthropologists like White and Mintz. Nevertheless, his book presents a concrete and accessible account of theories that are usually too abstract and erudite for the average person to engage. I find this achievement heartening for two reasons. First, it demonstrates that anthropological theory can be used to explain real world problems and suggest solutions to them. Second, it suggests that anthropologists still have a potential role as public intellectuals, if only we would stop talking to each other and begin addressing the public. This, I believe, is journalism's most important lesson for anthropology.

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The Power of the Machine: Global Inequalities of Economy, Technology, and Environment

ALF HORNBERG

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PAPERBACK

REVIEWED BY ERIC C. JONES

Hornborg's book—a seamlessly organized collection of his previously published articles—asks this question: What is the source of the world's current ecological crises? His answer is the familiar bogeyman of capitalism and its henchman *money*. But his explanation of that answer is quite innovative, and has the potential to help build a framework that would be a theoretical breakthrough for understanding human-environment relations. In addition to standard positivist arguments, he also incorporates many concepts and analytical techniques from post-structural theory. He applies these perspectives to the broad scope of global economics and the ubiquity of environmental degradation—and specifically individuals involved in everyday relationships of production, distribution and consumption. Because of its subject matter and innovative approaches, this book should be read by all economic and ecological anthropologists and would provide good material for teachers of upper division classes in those fields, although the book addresses questions that are pressing in virtually all of the social sciences.

In response to a growing literature that wants to push the origins of the process of wealth accumulation back at least 5000 years (see Gills and Frank 1990), the book argues for discontinuities in the modes of wealth accumulation, which are plunder, merchant capitalism, financial capitalism, undercompensation of labor, and underpayment for natural resources (unsustainable extraction). Industrial capitalism is a particular arrangement of these modes that threatens sustainability in a way

that others have not. By Hornborg's definition, all modes of accumulation structure the appropriative processes (via tools), transformative processes (of raw materials) and convertible processes (creation of valuables and consumables). The implication of this theory is that all modes of accumulation have, at base, one thing in common: some minimum net transfer of wealth from one sector of society to another is assured by people's evaluations that support a certain rate of exchange. The latter part sounds almost circular and seems to resemble the rationale of neoclassical economics, i.e., people believe that the trading they are doing is fair (otherwise they wouldn't do it). Combined along with the net transfer of wealth, the ramification is that accumulation, i.e., the existence of haves and have-lesses, is fundamental to complex society, that both the haves and the have-lesses develop beliefs that help maintain the system, and that these beliefs often include hopefulness about the Power of the Machine to solve problems. Drawing from the Second Law of Thermodynamics, Hornborg also tries to join political economy and bioecology first by labeling Marx's and H.T. Odum's analyses of alternative currencies (labor and energy, respectively) as normative theories, second by finding that the energy that remains in a finished product is inversely proportional to the increase in its value. Thus, urban centers of accumulation contain less potential energy, but higher value, and are the result of accumulative processes that exploit human labor and unsustainably mine the biophysical environment. This argument parallels Harvey's (1985) idea of the 'spatial fix', in which capital will always seek places where the global terms of trade can find a cheaper cost of production. Hornborg would emphasize that it does not take less energy to mine the ground in one place than another, and it does not take less muscle or finesse to build a tool in one place than another. If labor and capital costs were equalized across the planet, economic growth would be limited even more than it is now. Thus, it might follow that industrial capitalism always depends upon, and co-exists with, the other modes of accumulation to maintain unequal global terms of trade. Industry is only the latest material

arrangement of the modes of accumulation, while wage labor is the most recent cultural arrangement of the modes of accumulation.

The book asserts that the core of the problem of environmental and economic unsustainability under industrial capitalism is that the dominant use of general purpose money (Marx's D form of exchange value) excludes the use of other ways of compensation that would not accelerate production at such a high rate. Industrial capitalism both promotes and requires growth, and at some point, growth is unsustainable economically due to the inherent limits of human consumption, as well as the limited ability of the environment to support continuous economic growth. The techno fix is not a solution; it is an illusion. Significantly, the book's discussion of these familiar tenets blames not only capitalists, but all human participants in complex society.

And the blame does not lie just with human behavior, but also with human cognition. Here, the book is not worried about a false consciousness, but about two special qualities of human cognition. The first of these is the innate human sense of reciprocity that creates expectations and obligations that are at the foundation of human society (Mauss 1990 [1925]). Hornborg here also draws from much of Godelier's work on exchange, although *The Power of the Machine* does not engage the groundbreaking *The Enigma of the Gift* (Godelier 1999). Industrial capitalism tends toward a global economic system that lacks insulated protection for communities, thus destroying the bases for reciprocity and forcing greater reliance on general purpose money. Secondly, Hornborg is interested in the human obsession with tools and new technology—'the fetishization of the machine.' Although not addressed in the book, this tendency of humans as toolmakers might be better subsumed under externalized cognition—a broader human pattern that includes tools, language and most forms of labor (see Gumperz and Levinson 1991; Hutchins 1995). This would show how our fascination with machines is inherent to human culture, and how it allows certain economic systems to increase the net transfer of wealth from one part of society to another.

While these processes have obvious implications for the sustainability of human societies, Hornborg does not think that the problem of sustainability will be solved by reducing reliance on technology; technological change is fundamental to human society. Rather, he argues, the key to sustainability lies with reducing the dominance of general purpose money. Otherwise, our worship of machines, when combined with certain arrangements of the modes of accumulation such as industrialism and wage labor, necessarily result in unsustainability. The way to reduce the predominance of general purpose money is by supporting other forms of exchange, which do not allow for such rapid accumulation of wealth—perhaps by the very forms of exchange that people in anti-systemic movements advocate.

Hornborg supports this theory with data from his own ethnographic study of native resistance to mining in Nova Scotia, as well as with archeological data on the use of shell money by complex societies in pre-Columbian Peru. Hornborg's use of these disparate data sets supports his contention that anthropologists should quit "dissecting local worlds," and instead turn their objectifying gaze on processes of modernity to show how local lives have changed as a result of modernity. Specifically, anthropologists should ask how to "conceptualize the relations between money, language, identity, and power in a way that suggests strategies for reempowering local sustainable communities." The book argues that the answer is framed by development—a process by which forces larger than the community come to have a much greater say about the flow of resources in that community than does the community itself.

Hornborg steers clear of romanticizing local and indigenous people, and says that context is what creates behaviors that are sustainable. Feminism, socialism, environmentalism, and indigenous movements all use rhetoric of good and evil, wherein these movements are on the good side, and their enemies are on the bad side. Many would see this as a Levi-Straussian dictum that humans seek to understand through polar opposites. However, the book argues that it is modernity that is responsible for this kind of thinking, rather than deep structure. Perhaps the special impact of modernity (or is it

industrial capitalism?) is caused by another process noted in the book, that modernity pits groups against one another for the limited resource of charity/donation/human development money (and publicity). In order to shore up the relatively sparse argument that modernity is the cause of extremism in identity building, a discussion of revitalization movements would be an interesting addition to the book. Nonetheless, the Nova Scotia case study chapter does provide an interesting perspective on how globalization and world systems help create local meanings and local behaviors, even if those meanings and behaviors themselves can be considered anti-systemic or anti-globalization.

The book does rely on frustrating jargon at times, such as 'objectifying modernity' or 'encompassing encompassment.' And citations are not provided for heady, or perhaps even circular, statements like "Modernist realities tend to objectify, encompass, and transcend the concrete realities of place" (226). Also, the book's editors could have helped the readability of the book by insisting that quotes be removed from frequent use for several words (e.g., 'order', 'value', 'usable form'). These minor qualms aside, the ideas in the book are quite accessible and will prove a fruitful resource with which people interested in theory or application concerning a host of contemporary problems can dialogue for many years to come.

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