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Ecological economics and political ecology: towards a necessary synthesis☆

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1. Introduction

In the 1970s, an emergent new school of thought caused great excitement and hope among a diverse group of critical thinkers. To those still optimistic from the assertive successes of the social movements of the 1960s, the publication of Schumacher's best-seller *Small is Beautiful: Economics as if People Mattered* (Schumacher, 1973) was experienced as a path-breaking public event. Among a smaller crowd, the appearance of Daly's (Daly, 1977) *Steady State Economics* four years later confirmed the technical merits of this path. The excitement of the new inquiry, and the hope, rested on the very different types of economic and political structures that both books suggested; less intensive economic processes that held closer to the laws of nature (Georgescu-Roegen, 1971) and, especially for Schumacher, smaller institutions that kept closer to the ground.

The initial, and broad, enthusiasm for the emerging discipline had more to do with its challenging institutional assumptions than with the new empirical approaches embedded within it. Over time, however, the field has turned out rather differently. On the one hand, the early hopes for a new public mode of ecologically based economic development did not bear fruit. Quite the contrary, the outside world has evolved in the opposite direction from the smaller scale, less resource-intensive future envisioned two decades ago. Deregulated trade, the continued attachment to linear (which is to say, exponential) growth, the ever-increasing throughput of materials and energy (despite efficiency gains), has spread a 1950s-

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style mode of economic development into every corner of the planet. These trends have become so pervasive that they have now entrenched a new ideology of global giantism that is quite the opposite of Schumacher's celebration of localism and community.

On the other hand, the intellectual progeny of Schumacher's and Daly's works demonstrate a less political, and increasingly technical approach. This orientation is evident at the biannual conferences of the International Society of Ecological Economics (Hinrichs, 1996), and in the society's journal, Ecological Economics. Some topics still seek to break new political and strategic ground—from revising the nature of international trade, to constructing new models of human consumption, to elaborating new control regimes for common property resources. But the emphasis is less on refashioning the basic assumptions and institutions of the market economy than on examining specific policies and sectors through an essentially neo-classical prism of monetary exchange values and discount rates. Discussions largely concern such issues as ecological accounting methods, the problems of intergenerational resource 'borrowing', or the institutional costs associated with management of the environment. The wholesale challenge to our social institutions that was so apparently necessary in the 1960s and 1970s has almost disappeared from view (Hinrichs, 1996).

This orientation is understandable given the global dominance of a neo-liberal policy context. At the same time, practitioners of ecological economics generally recognize the fundamentally different premises which underlie the field (particularly its thermodynamic foundations) in contrast to the dominant neo-classical paradigm, and these premises have significant institutional implications. In this situation, two potentially divergent streams co-exist, and to a degree, must compete for attention in shaping the evolution of ecological economics. On the one hand is a model of technical formalism associated with a scientific tradition that stresses economic efficiency (however defined) and rational policy development. This approach is primarily concerned with explicating ecological concerns in terms of their implications for economic management and regulatory action. On the other hand is a more critical model that looks at the larger systemic context for these interventions, a model that is openly concerned with institutional restructuring, and with the strategies about how to get there.

In this paper, I will argue that the two streams should be seen as one, but that they can be so only by situating the field of ecological economics within a larger ecological political economy. The argument begins by clarifying some distinctions between the various approaches to economics and economy, and by examining the nature of ecological political economy, or 'political ecology'. With this background, the paper reviews the intellectual precursors to the field of political ecology, and then proposes a new characterization of this field that allows it to embrace ecological economics in a mutually constructive fashion. The essence of this characterization involves a new conception of territorial, and institutional, 'space'. Finally, the article looks at some of the implications of this integrated approach, particularly regarding the role of the state and the direction of economic policy and development.

2. What is political ecology?

As a starting point, it is necessary to make several definitional distinctions. First is the distinction between classical economics, which looks to explain the sources of economic value in the processes of the real world (especially the social world of labor-based production, but also the natural world of resource inputs), and neo-classical economics, which largely eschews such a broad philosophical and sociological inquiry in deference to more 'technical' analyses. These analyses achieve their technical status by being based on 'objective' monetary valuations based on supply and demand. Second is the distinction between economics of either type which are concerned with the processes of valuation and wealth creation, and political economy which situates the whole inquiry about wealth and value in a broader consideration of the power dynamics of the social institutions which embody these economic processes (Bowles and Gintis, 1987).

In these distinctions lies the basic premise of this paper, that one cannot attempt a technical calculation of economic value without first clearly situating the exercise in a larger systemic understanding of economic power. One cannot, for example, defer to market values as a neutral tool of economic assessment without first asserting the social primacy of individual utility over, say, community cohesion. Undertaking this sort of contextual critique is, however, unsettling as ultimately it leads one to question the very possibility for the sort of universalist, scientific rationality upon which the neo-classical perspective is founded. As Milberg notes, if "the market is a social phenomenon and exchange is 'contested', then many of the traditional welfare results and labor-market analyses are put into question, and issues of power and policy become integral to the analysis of otherwise 'pure' market transactions" (Milberg, 1993).

In light of contemporary ('post-modern') understandings of the socially contextual nature of knowledge, many commentators can now explain economics not as 'science' (Mirowski, 1989; Summers, 1991) but as metaphor (Mirowski, 1994), as rhetoric (McCloskey, 1985; Nelson et al., 1987; Klamer et al., 1988), and as the product of a 'club' (Redman, 1991). These perspectives explain why, despite the identification of myriad false assumptions underlying neo-classical economics (including those articulated by ecological economists), neo-classicists continue to pursue their 'technical' inquiries by ignoring (or assuming away) these criticisms.

The range of false assumptions is extensive, from the market's philosophical foundations in limited assumptions of individualism and self-interested behavior, to the effect of 'imperfect information' on market behavior, to the market's continuing inability to internalize environmental costs and other negative externalities. One example of the impact of these deficiencies in economic science can be seen in the empirical work that demonstrates how the monetary values that will be assigned to environmental assets (such as access to clean air and water) will vary dramatically depending upon whether one is buying that asset or selling it (Kahneman et al., 1991). In the former case, the value will reflect one's 'willingness to pay' (which can be low according to the level of wealth of the buyer) or, in the latter case, will reflect the seller's 'compensation demanded' (which might be very, very high because of the importance that the seller attaches to that asset). This single debate points, on the one hand, to the importance of the prior allocation of legal, or property, entitlements as determinative of economic values and, on the other hand, to the fundamental indeterminacy of economic valuations outside the pre-existing structure of legal allocation. Thus it is to the structure of political and economic systems, with their associated legal entitlements and distribution of power (Mirowski, 1991), that one must turn as the necessary and limiting content for any scientific enquiry.

Having rejected many of the market-based values and utilitarian assumptions of neo-classical economics, ecological economics cannot avoid the need to situate itself within a new moral and institutional context, that is, within a new political economy. If the field is to escape the false procedural self-justifications of neo-classicism, it will keep alive the Schumacherian flame of critical social analysis and open, disciplinary self-reflection. With these objectives in mind, this paper is directed toward elucidating one such contextual perspective within political ecology (what I call below a 'territorialist' perspective) within which to situate the new 'rationality' of ecological economics. Like ecological economics, political ecology is an already well-developed field of inquiry that traces its origins to the same period as gave rise to ecological economics (Eckersley, 1992; Merchant, 1992).

At its root, political ecology points to an emerging philosophical grounding that is quite distinct from the metaphysic of scientific rationality and social individualism. If the rise of the West is associated with anything universal, it is the belief that 'truth' is essentially internal (that is, methodologically self-justifying). Truth exists in a whole host of supposedly neutral, process-oriented methodologies of 'rational' inquiry that allow us to explain the world as it really is—from the scientific method, to the market, to the ideal of the rule-of-law. In contrast, political ecology

presents what might be called a naturalist challenge to the inherited positivist frame within which most current economic discourse continues to take place. This is most evident in the oft-made distinction between a human-centered 'anthropocentric' world-view and a new 'biocentric' perspective. By its nature, this latter perspective inherently seeks to discover principles that are more than purely human constructions as reference points of social accountability. In particular, the task is to situate human actions within the processes of the natural world, and to legitimize them to the degree that they can co-exist in balance with that world.

This shift from a rationally self-referencing and self-justifying system of thinking is a major historical development that sets political ecology and ecological economics apart from the human-centered liberal or Marxian traditions. In this regard, political ecology raises the usual concerns about the need to make modern society 'more sustainable,' but it does so by identifying the problematic character of many of the basic attributes of the modernist project, from its faith in science and technology, to its dependence on economic growth, to its overweening impact on traditional social and cultural systems. In this regard, ecological economics begins by postulating a thermodynamic foundation for economic activity and in so doing points to the physical costs (in terms of the generation of 'entropy') associated with the very act of production and consumption. By demonstrating how a system based on economic throughput is inevitably running down the planet's ecological capital, it shifts the basic frame of reference from that of self-maximizing individuals to that of the inherent operations of the biosphere, operations which impose limits on human ambitions.

Political ecology provides the analytical framework for understanding the operation of the thermodynamic principle at the institutional, and larger social/cultural, levels. Here, as with any interpretative analysis, divergences in the assessment of cause and effect, and in the lessons to be learned, will be many. In this regard, this paper suggests that two tendencies predominate in the system dynamics of modern institutions. As befits a framework that is both political and ecological, these tendencies are spatial in character, and have both a social and a physical dimension. One is the tendency to social centralization; the other is the tendency to organizational hierarchy. These tendencies are present in all societies, but are kept in check to varying degrees and in different ways by countervailing forces (what I describe below as 'territorial' forces). How centralized hierarchies of all forms have arisen, and been maintained, over space and time is thus a central question for those concerned today about the lack of sustainability of large-scale organizations that are dependent on high levels of economic throughput.

This approach takes our historical inquiry beyond some of the most established landmarks of our intellectual tradition. For example, similar patterns of centralist social growth mark a variety of civilizations over many millennia. Non-market forms of hierarchy long predated the liberation of market forces in the West, and did so in such ways that relegates the market from a primary to a subsidiary position in our historical understanding. The pharaohs of Egypt, the popes of Rome, and the Anglo-Saxon kings all had sources of economic sustenance that depended on organized hierarchies which were not market-based, at least not in any conventional sense. To take capitalism or the market or even monetary values as the basic focus of inquiry is thus very limiting, and dangerously so. Rather more important are the dynamics of hierarchical centralization itself and how the market (or other forms of social organization) operates to propel or constrain these dynamics (Polyani, 1944). The significance for ecological economics of developing such an ecologically based historical understanding can scarcely be overstated.

As has been widely noted, political ecology pushes political discourse beyond its traditional limits, especially those embodied in the usual Left-Right spectrum (Bahro, 1984; Lipietz, 1995). This is so because, regardless of where one sits on this spectrum today, the spectrum itself rests on the common assumption of growth-without-end, an assumption that runs smack into the awareness of the entropy-generating effects of economic throughput. Nevertheless, economic expansionism

marks the history of state and capital development throughout the centuries. A productivist orientation was central to the nineteenth-century Marxist alternative and remains one of the main ecological criticisms of Leftist policies today. But it is precisely because of the centrality of this assumption that no participant in public discourse who wishes to achieve a serious measure of credibility can articulate any course other than one that embraces still more growth. Indeed, given this shared productivist paradigm, the Left's relative lack of enthusiasm for what has now become the prime generator of growth—the unfettered market—has reduced it to a mere shadow of its former interventionist self. (This was expressed most strikingly in the controversial proclamation a few years ago that, with the fall of the Soviet Union and the triumph of capitalism and liberal democracy, we were approaching the 'end of history' (Fukuyama, 1992) because a universally shared 'truth' about how to organize civil society was emergent.)

By drawing attention to the thermodynamic costs which competitive markets and other growth-based economic systems inflict on the natural world, ecological economics inevitably points to the limits of growth. Indeed, its critical focus on precisely this point has led to two seemingly contradictory situations. First, by challenging the common end-of-history assumption underlying the Left–Right liberal synthesis, it stands as the new historical 'antithesis' in the evolution of economic theory. Second, this very status has ironically ensured the field's current marginalization. In the absence of a credible alternative to market-driven, or state-regulated, growth, this marginalization will continue. From a practical viewpoint, this is why ecological economics needs political ecology, for it is this body of analysis which is oriented to discerning the necessary underpinnings for systemic institutional change, that is, for a new sustainable configuration of institutions, infrastructures, and power relations into which society might grow.

3. Political ecology and natural/social space

In turn, the critical question confronting political ecology is how it can build on the thermodynamic critique of economic systems to offer a complementary critique of institutional systems. The core of such a critique is the consumptive pathology inherent in social hierarchies of all sorts, including but not limited to those founded on market growth. In this regard, the special contribution of political ecology as a new form of political economy is its particular concern with spatial relations. As Edward Soja has demonstrated, social theory has historically emphasized the temporal, that is, the historical axis as determinative of human relations to the detriment of the spatial. Citing Michel Foucault, he writes that

> "Space was treated as the dead, the fixed, the undialectical, the immobile. Time, on the contrary, was richness, fecundity, life, dialectic.' To recover from this historicist devaluation, to make space visible again as a fundamental referent of social being, requires a major rethinking not only of the concreteness of spatial practices but also of the philosophizing abstractions of modern ontology and epistemology" (Foucault, 1989).

In this revaluation of space, however, space itself must be reconsidered. For space is both physical, situating human institutions within varying degrees of connection to the natural world, and institutional, situating human relations within institutions of varying degrees of hierarchical power. The world is 'out there', but power is also 'up there.' In this context, the challenge of political ecology is the transformation of a range of centralist hierarchies—whether these be corporate or bureaucratic, urban or technological, cultural or scientific—that are unsustainably removed from both place and people.

With regard to the relations to territorial space, the approach suggested here has important intellectual precursors. One precursor includes those critical political economies that view the market economy as a global system of geographic power relations, such as dependency theory, staples theory, or world-systems theory. For example, in the 1930s, the renowned Canadian scholar, Harold Innis, demonstrated that a spatial differentiation

existed in the global marketplace between highly developed 'core' areas and less developed 'peripheries' that supplied resources to these cores. Innis demonstrated how the nature of the particular resource (or 'staple') which a peripheral economy exploited as a basis for its development (whether it was fur, timber, or wheat) shaped the character of that economy's development in very concrete ways (Innis, 1930; Drache, 1995). Indeed, Innis showed how a newly developing economy often fails to escape its dependence on its primary resource exports, falling into what is called the 'staples trap.'

Later scholars have examined the workings of a capitalist 'world system' (a term most closely associated with the work of Immanuel Wallerstein (Wallerstein, 1974, 1979, 1991)) in which many regions and states are relegated to continuing positions of 'dependency' (of the periphery on the core), a process of the 'development of underdevelopment' (Frank, 1966). In this vein, the recent writings of Andre Gunther Frank are particularly a propos from a political ecology perspective. Unlike Wallerstein, Frank suggests that the patterns of world systems of inequitable accumulation are not specific to capitalist economies, an important suggestion to the extent that sustainability (or the lack thereof) is related to the growth and over-extension of centralist hierarchies of all types, not only those sustained by market-based institutions. If the system of economic transfer and accumulation, which is of so much concern to students of modern capitalism, is in fact, millennia old, thinking about sustainability must go in new directions (Gills and Frank, 1991).

A second school of thought, which offers some guidance as to what these new directions might entail, is that of the regionalists and regional planners who again date from the 1920s and 1930s. Associated with the work of such noted scholars as Mumford (Mumford, 1934, 1961) and Odum (Odum, 1938), their particular concern was with the need for an organic balance between cities and their regions. As recent expositors of this regionalist perspective, John Friedmann and Clyde Weaver suggest this balance has been upset by the concentration of industrial activity and power in the metropolis that replaces 'regional folkways and territorial modes of social integration' ('natural evolutionary institutions') with the 'technicways' of science and functional organization (Friedmann and Weaver, 1979). More recently, as well, common property theorists such as Ostrom (Ostrom, 1990; Matthews, 1993) draw from this tradition. While also critical of market-based models, these scholars do not view economic/historical factors as the sole determinants of social development, but stress the importance of geographical, ecological and cultural factors.

With regard to the second axis of institutional space, political ecology has close historical roots in debates concerned with direct community versus organizational hierarchy. The range of debate here spans the political spectrum from conservative thinkers (such as the eighteenth-century English philosopher, Edmund Burke, and the twentieth-century American, Amitai Etzioni) to soft-liberal philosophers (including contemporary theorists like Michael Sandel, Alastair MacIntyre, and Charles Taylor) to radical critics (from the sixteenth-century Diggers, to nineteenth-century philosophical anarchists, to contemporary social ecologists). Despite the deep differences between many of these approaches, all share a concern for the role of community-based authority as compared with bureaucratic, or state-centered, authority.

Indeed, contrary to its general characterization as a violent, combative ideology, philosophical anarchism has actually been associated with an approach that seeks social harmony through the dissolution of hierarchical positions of exploitative authority. As is noted in the classic text on the subject by George Woodcock, anarchism "was a protest, a dedicated resistance to the worldwide trend since the middle of the eighteenth century toward political and economic centralization, with all it implies in terms of the replacement of personal values with collective values, of the subordination of the individual to the state" (Woodcock, 1962, 1974). Thus nineteenth-century anarchists such as Kropotkin argued for the primacy of co-operative over competitive forms of economic behavior, and extolled the virtues of self-governing agricultural communes,

all the while criticizing the extractive ethos underlying state power (Kropotkin, 1898, 1902). Regionalists such as Odum (1938), Matthews (1983), Friedmann (1987), but especially contemporary social ecologists such as Murray Bookchin (1991), write in a similarly decentralist vein today.

Situating ecological economic thinking in this manner again has important implications for the way in which ecological economics might develop as a technical and policy-oriented field of endeavor. In particular, it points to the need for policy advocates to identify structural reforms to the nature of institutional spaces, as opposed to incremental changes within existing spatial relations. Structural changes would move beyond regulatory constraints to existing industrial processes, or even to the idea of 'public policy' intervention itself, to the broader challenge of facilitating spatial transitions in our geographic and institutional structures. In the process, the very nature of bureaucratic regulation is put into question (in comparison with community-based strategies of self-management), as is the model of capital-based economic development (in comparison with community economic development).

This perspective has its own built-in limitations, however. Just as the ecological economic critique is eschewed by neo-classicists because of its paradigmatic nature, so too political ecology unsettles the generally shared managerial bent of virtually all progressive economists who instinctively turn to bureaucratic institutions to effect progressive change (O'Connor, 1994). To look beyond the narrow confines of economic technique and public policy decision-making to consider innovative, indeed quasi-constitutional, approaches to the market and the state demands not only new skills, but a new commitment as well.

4. The political ecology of center and territory

In short, then, the signal characteristic of political ecology as a political economy is its concern for spatial relations, both natural and social. From this perspective, the 'development' of the modern world system can be seen as characterized by rise of centralized hierarchies of power that are sustained by non-local resources. Again, however, even this characterization transcends traditional ideological oppositions, describing now-defunct Soviet bureaucracies and now-triumphant American multinationals. Organizing the world to maintain the continuous flow of resources to, and up, these hierarchies is what both communism and capitalism have always been about.

In this light, political ecology introduces a new dialectic into our thinking between what might be called Center and Territory. Unlike specific concepts such as capitalism or communism, these terms are to be understood as two opposing tendencies, or two idealized forms of social organization that are present as a dynamic tension in all human relations and societies. They are, in Friedmann's terminology, cosmic contradictions (i.e. they are ever present) rather than just special historical contradictions (Friedmann, 1988). Center is manifest in organizations built around the imperatives of concentrated power—the castle in the forest, the court bureaucracy, the multinational office tower, the world city. Territory includes forms of social organization rooted in the shared necessities of a social power which is dispersed and on-the-ground—tribes and small villages, local markets and community halls, regions beyond the city. In such places, tendencies to central power exist, of course, whether in the tribal chief that abuses his collective responsibilities or in the aspiring politician whose ego dominates the town hall meeting.

As so conceived, center and territory have a physical/geographic component, but are also omnipresent tendencies in social consciousness and organization that intermingle in various degrees and manifestations in the things and acts of everyday life. Territory may be manifest in the ethnic lifeways and organic gardens of the urban neighborhood. Meanwhile the toxic outputs of center pervade the most remote landscapes of the planet, as do the satellite dishes. Moreover, while a perfectly territorial (i.e. non-hierarchical and self-reliant) society may never have existed, neither could a completely centralist society ever be constructed. Instead, the significance of the dialectic is in the varying operations of the dialectic itself. Thus, in the pursuit of social sustainability one must learn how, on the one hand, the universal tendencies to

center power are held in check by territorial institutions and, on the other hand, how centralist institutions might be re-designed to enforce, rather than erode, territorialist values at all levels.

This characterization has profound implications for economic thinking. For example, while the 'territorialist' approach bears a strong similarity to the political schools (core-periphery analysis, staples theory) discussed above, it rejects their shared productivist focus which marginalizes the 'periphery' or 'hinterland' in the very terminology it uses. As a prescriptive basis for development, every periphery aspires to core status, every hinterland to becoming a heartland. A territorialist political ecology points to quite the reverse, to the critical importance of protecting and re-building territorial forces as the essential foundation of social and ecological sustainability. Indeed, at the heart of this analysis is the dialectical struggle between a hierarchical center that draws its wealth from afar and from below, and a territorial community that sustains itself locally, and from within.

From this perspective, the growth drives of center are not a given of economic policy but, quite the contrary, constitute the basic contradiction of modern development. For the rise of central power is, and always has been, sustained by the territorial structures that precede that rise, and it cannot survive without them. But centralist growth itself consumes its own territorial supports—and center awaits its own demise. This is the story of countless civilizations past that have risen, only to fall. And, today, this is the character of the center-driven, entropy-creating consumer society spreading out across the globe. This understanding has implications for the most basic of our political and economic institutions, the state and the market. In it lies the beginning of a structural critique that can give context and direction to ecologically-based economic development.

4.1. Ecological economics and the state

The institution of the 'state' is steeped in centralist tendencies, and an attention to these tendencies is critical to appreciating the institutional context within which any ecological economics operates and, thus, to devising appropriate prescriptions for 'public policy'.

Historically, concern about the potential for the abuse of state powers—from early liberal criticism of the British monarchy to contemporary democratic revulsion with one-party states—has been an omnipresent component of Western state theory. In promoting a range of democratic institutions, political theorists have sought to control centralized power by dividing power vertically, particularly through Montesquieu's division of state government into the three branches of legislative/executive/judicial authority. State theorists have, however, not evinced a similar level of concern as to how power should be distributed horizontally as well. Certainly there has been a philosophical reference to popular sovereignty and even an emphasis on federal distributions of authority but, in practice, private power and public authority have flowed from the top-down, or the core-out.

In the British system power flows from the Crown and Parliament, with no sovereign authority held at all by territorial communities or regions. Similarly, in the federal structure of the United States, an historic distrust of government led to a greater concern to protect 'private' economic and property rights outside the governmental (federal and state) sphere. But this was expressed through the protection of individual economic and political rights, with less attention for controlling the agglomeration of power centrally so as to facilitate co-operative, regional and territorial self-maintenance (Arendt, 1963). The focus of the liberal state on individual rights (especially procedural rights) as the basis of anything in opposition to the state actually serves to limit and centralize the forms of behavior that can and cannot operate in contradistinction to state activity (Bowles and Gintis, 1987). Meanwhile municipal governments, counties and regions are invariably created as delegated authorities of 'higher level' governments without a separate constitutional identity (Arendt, 1963; Isin, 1992).

Quite the contrary to embedding local powers of self-maintenance constitutionally, anti-territorial impulses are inherent in the design of the modern state. Historically, internal (and eventually external) territorial colonization provided an indispensable foundation for the rise of central state power

by securing a flow of resources from the periphery to the core. Internationally, a state was defined by its ability to secure and control a land base, including the control of local populations sufficient to ensure that they do not interrupt or even qualify this flow. In the environmental sphere today, for example, a structural antipathy exists to environmental regulations that restrict natural resource development (and thus reduce economic flows to the center), while support is half-baked for 'public participation' that might actually transfer protective powers to the public, especially on a local geographical basis.

In many cases, therefore, the administrative or bureaucratic arm of the state is as resistant to environmental innovation as would be any industry or corporation. And it is so for a host of similar reasons including a shared commitment to economic expansionism, a 'subtheoretical' belief that environmental conflicts are issue-specific and thus can be rationally managed and accommodated to continued growth, a concern to maintain a power base, and an antipathy to structural innovation that challenges these intellectual foundations and perceptions of self-interest.

At the same time, the relationship of the state to territorial values is not unidimensional. Center power can be used to protect territorial values, even as it erodes territory. Thus the federal government encourages oil companies to drill in the Beaufort Sea, and then sets down regulations to try to protect endangered local populations of beluga whale and maintain the traditions of native hunters there. The federal government subsidizes the modernization of the corporate fishing fleet to ensure greater capital efficiency and, when half a town is thrown out of work, funnels in special grants to keep people in their communities. This internal contradiction is a manifestation in center-territorial terms of the oppositional duties of the state to both facilitate accumulation and maintain legitimacy discussed at length by neo-Marxist scholars such as O'Connor (1973). As O'Connor noted over 20 years ago, in this opposition the state inevitably loses, increasing social costs subsidizing the continued accumulation of private benefits, resulting in a steady loss of political legitimacy.

Even as many states are beginning to recognize that financial and logistical constraints necessitate an increasing dependence on localised social structures to carry out some basic resource management activities, the overall structure of state-society relationships continues to hinder the decentralizing of actual decision-making power when to do so would alter traditional patterns of economic growth and monetary flow. Peter Evans argues that 'state-society synergy' is, by drawing on local 'social capital,' increasingly a factor in stable economic development; yet both the state and localized community structures remain attached to growth and development in a traditional (i.e. non-ecological) mode (Evans, 1996a,b).

To the extent that ecological economics is more than an environmentally friendly adaptation of neo-classical methodologies (that is, that it has a genuinely ecological—i.e. spatial—element to it), an attention to this dynamic of spatially separating and reorganizing social structures is critical (Scott and Storper, 1986; Soja, 1989). In this light, a territorialist perspective throws new light on the historic problem of primary interest to ecological economists—how to get control of an entropic society that is based on too much resource throughput. Above all, it points to the inherent limits to solutions that depend on continuing bureaucratic (i.e. state-based) regulations to constrain the very sources of economic flow on which those regulatory structures themselves depend. Instead, the issue necessarily becomes a quasi-constitutional one of state design, with a host of accompanying strategic implications for the shape of political and policy initiatives. Yet, apart from vague rhetorical flourishes about the importance of community, the essential importance of fashioning territorial authorities to provide an ecologically-based counterbalance to extractive centralist powers is largely unexplored by ecological economists, in either theory or practice.

In looking ahead, a territorialist political ecology therefore points to the potential for revisioning the structures of state power. The thrust of activity is not simply on seeking more regulatory intervention to guide growth (as 'sustainable development' envisions), or in securing access to territorial resources ever more tightly for an

overextended center (the purpose of free trade), or even in writing off territorial sovereignty as itself the relic of a bygone era (as much social movements theorizing now does) (Kuehls, 1996). Instead, it means re-designing the institutions of central power for the purposes of protecting 'territorial integrity' (Plant and Plant, 1992). How this might be achieved is the critical challenge for both political ecology and ecological economics. It is a common ground for discussion and innovation. In contrast to the assumption prevailing in the much of the literature whereby initiatives are automatically directed at state regulators for consideration, for the state to become a facilitator of the reconstructive process that is necessary would literally involve a 'world turned upside down'.

In this light, many contemporary issues take on a clearer meaning. Take, for example, the debate in the resource management literature around the concept of 'ecosystem management' (Grumbine, 1994, 1997). To some, this means better management of whole ecosystems, rather than just single species—in other words, enhanced technical innovation for existing bureaucratic agencies. To others, the concept is better expressed by referring to 'ecosystem-based management,' the significance of which lies in how it turns the traditional models of economic development and state regulation on their heads.

Historically, environmental variables have been marginal to economic development, and are treated as 'external' values to be brought into market calculations by managers who seek to ensure that market exchanges are truly 'efficient.' In contrast, under an ecosystem-based approach, the entire process of economic development is seen as needing to fit within the maintenance of ecosystem functioning and health. Thus, instead of managing forests as an adjunct to forestry, forestry as a whole industry is redesigned and managed to fit within the needs of maintaining ecosystem integrity. Indeed, for forestry, fisheries, agriculture, or even urban development—the productivist industrial/centralist frame would disintegrate were the maintenance of ecosystem structure and function taken as the context for political decision-making and economic development. This is at the very heart of a territorial political ecology.

By situating the largely technical discussion of ecosystem-based management in a much larger framework, political ecology imbues this concept with the transformative significance which it deserves. For progressive forces, territorial power should not be seen as a threat to political and bureaucratic authority, but as an alternative set of values and strategies to the wave of privatization and corporatization that is now the only avenue open for cash-strapped governments in the age of neo-conservatism. For these forces, political ecology offers a new approach to public policy and political action. It also demands consideration of if, and then how, there might be a revitalized, historically appropriate role for the interventionist state as both a vehicle of transition and then as a central steward of territorial structures in the age of ecological overshoot. This raises a whole host of issues for consideration, from its role in standard-setting, to how bureaucracies might be refashioned to reflect the need for 'democratic administration', to how new forms of economic development might be supported, and so on.

4.2. Ecological economics as a territorialist economics

Parallel to the territorialist political critique is its economic critique. Historically, critical economic analyses have focused their concerns largely on the unequal distribution of wealth inherent in the dynamics of capital accumulation. Ecological economics expanded this essentially social concern by considering the energy costs (entropy) inherent in the dynamics of all forms of production and consumption, which is especially relevant to growth economies that depend on continuous resource throughputs or flows. At stake in this expanded analysis is the need to re-examine the nature of both the claim of economics as a 'science' and the belief in the market as primarily an instrument of exchange. Just as the rationality of bureaucratic management must be contextualized within a centrist paradigm, so too we must understand how the market-based

economic enterprise entails a particular type of social and cultural construction.

The re-invention of economics thus begins with a methodological critique of the scientific foundations of the tradition, in fact of the entire positivist tradition of which the marginalism/individualism of neo-classical economics is a triumphal manifestation. Ecological economics has embarked on this course. On the one hand, rooted in ecology, it rejects the centuries-old reductionism of the biological sciences by embracing a natural world of greater interdependence, complexity, uncertainty, interactivity, dynamism and surprise (Funtowicz and Ravetz, 1994). On the other hand, by explicitly situating economic analysis in a thermodynamic framework, it rejects the (now defunct) 'energetics' model of physics that underpins the nineteenth-century neo-classical paradigm (Mirowski, 1984). More generally, by merging the social (economic) sciences with the natural (biological and physical) sciences, ecological economics explicitly situates human institutions within their natural contexts and, in the process, challenges the tradition of domination over nature inherent in both the natural and economic sciences.

Yet how far has the field really gone, particularly in recognizing just how indeterminate the positivist framework actually is? Although more open to other forms of 'knowing' than reductionist natural sciences, nevertheless the analytical and experimental processes of scientific ecology share many of the materialist assumptions of their predecessors. The recent development of a conception of 'post-normal' science is, however, an important contribution insofar as it suggests that work within established paradigms of analysis ('normal science') is increasingly being displaced by conflicts between paradigms, and that these conflicts are essentially political conflicts involving competing authorities and knowledge processes (Funtowicz and Ravetz, 1993).

Thus, for example, is industrial forestry predicated on the practice of clear-cutting forest ecosystems (justified scientifically because it 'mimics natural disturbances') while, because an adaptive nature is dependent on biodiversity, the competing school of eco-forestry is oppositely predicated on cutting techniques and levels that can maintain the 'composition, structure and function' of forest ecosystems intact. Both schools are justified scientifically, yet they take exactly opposite approaches to ecosystem integrity, each approach rooted in a different set of values and assumptions about the natural, and thus economic, world.

Implicit in the territorial critique is the characterization of the positivist perspective which underlies 'normal' sciences as an instrumental form of rationality, a cultural construction with a colonizing intent. For classical economists (from Smith to Marx), the object of this rationality was an inquiry into the dynamics of wealth creation by market-based society. The radical offspring of these inquiries—the socialist and communist movements of the latter half of the 19th century—were, however, deeply disturbing to the march of capitalist progress. Thus, one of the great attractions of the 'neo-classical' revolution of the 1870s was to relegate these systemic concerns to the margins, shifting attention to how value was created as a product of the process of exchange itself. With the market mechanism 'creating' value in this way, the science of analyzing this objective process of individual rational choice became the dominant concern. As John F. Henry notes:

> "The dominant theory propounded during the post-industrial revolution was of a piece.... The starting point of this perspective was the theory of value. Based on utility, the argument focuses on exchange relationships as primary, thus ignoring, or relegating to secondary status, the underlying production relations...." (Henry, 1990).

That ecological economics begins as an inquiry into the thermodynamic foundations, and costs, of such economic exchanges themselves marks it as a paradigmatic challenge to this rationality. As Martinez-Alier puts it, an ecological approach "destroys theories of value by asking the question of how the exhaustible resources which are susceptible of intergenerational allocation should be valued" (Martinez-Alier, 1987).

In short, then, ecological economics must begin with a self-reflexively critical approach to its scientific methodology recognizing the socially contextual nature of the neo-classical claim to a scientific status. But, as William Milberg notes, a huge resistance exists within the economics profession "to the notion of social determinants or social construction of institutions and individuals". Since the early 1980s, however, many have begun to question "the objective of economics on the basis of its rhetoric, its conception of the individual, its gender bias, its use of empiricism, and its construction of the history of economic ideas" (Mirowski, 1991; Bowles and Gintis, 1993; Milberg, 1993).

From an ecological viewpoint, this inquiry inevitably situates neo-classicism within the powerful social project that has constructed the centrist institutional system that defines modernity. This is a self-reinforcing project. On the one hand, neo-classicism provides an abstracted, instrumental social rationality for centrist accumulation; on the other hand, the resulting structure of the modern urban/industrial world shapes the consciousness of its participants to accord with the assumptions of that rationality.

Over the long centuries of Western expansionism, the human experience has increasingly been situated within a process of territorial conquest, extraction, material growth, accumulation, and technological insulation. While increasing the 'standard of living' of those driving this process, this historical development has also physically removed vast segments of society, including most decision-makers, from the direct consequences of their actions. Readers pour over the endless pages of stock market quotations in the daily papers yet few every query where all the wealth on these pages comes from. The rise of the positivist analytical frame accompanied the growth of the centrist flow economy, and the physical alienation from the experience of territorialism of those in positions of centrist power. Just as mathematics was historically suited to the development of navigational instruments of colonial expansion, so too market mechanisms have worked well to extend the reach of urban organized power into remote resource pools and isolated communities, and to do so without reflection as to the costs.

Unlike either classical or neo-classical economics of the past, an ecological approach recognizes that the creation of capital-based wealth cannot continue in this manner without end. As a result, it is imperative to consider how the factors of production can be re-organized on some form of 'steady state' basis. In pursuit of this objective, some commentators have suggested the need to replace the traditional factors of production (land, labor, and capital) with more holistic conceptions of natural and social capital (Ekins, 1992). Of great significance in this discussion is how such factors might be integrated as whole structures for the production and distribution of wealth in a particular social context (Berkes and Folke, 1992).

In this regard, centrist structures of wealth can be seen to organize them according to a model of extraction and disposal that is inherently unsustainable because of the manner in which it consumes the natural and cultural capital of territorial structures that are organized around a more self-sustaining metabolism. To fuel the profits of remote corporations and feed the disembodied appetites of world cities, everywhere physical environments as self-maintaining systems are being eroded together with the complex communities that have long stewarded these environments. When looking at the factors of production, the critical historical shift has been away from circular, self-maintaining, place-based systems (with the accompanying erosion of the social capital that provides the skills for the maintenance of place) towards linear, unsustainable, and alienated systems of displaced corporate consumerism.

Recasting our understanding of wealth in this context is the challenge of ecological economics as a 'classical' economics. The circular steady-state metabolism of physical territory with its embedded social community (with all the institutional and cultural processes that this entails) is the essence of the territorial model. The linear metabolism of removed, hierarchical structures of urban and corporate power (with all the bureaucratic and abstracted 'rational' processes that this entails) is the essence of the center model. In this regard, using market values as a base unit of analysis is highly problematic not only for the many biases that Milberg and others point to, but because the

market mechanism also has had, and continues to have, a critical colonizing role for center over territory. This role is inherent in the instrument itself, in the very nature of the competitive market as a vehicle for the competitive exchange between producer and consumer for monetary value.

This understanding of the market as inherently a flow mechanism is the starting point of a territorialist approach to ecological economics. As a mechanism of exchange, one must first make money doing something, anything, before one can purchase the products one needs as a consumer. This is clearly different from mechanisms of self-provision or institutions of communally-based collective production. In the process, the market privileges production over consumption because individuals must first make the money that will allow them to consume.

In all this, central importance attaches, of course, to the means of exchange, money. Markets demand comparable valuations, monetizing and assigning 'exchange value' to every 'commodity', and denigrating those things that don't have such value, whether it is the value of biological diversity, or the interests of our unborn grandchildren. This characteristic of the market is inherently destructive of territorial interests whether it be the unpriced contributions of the rain-forest to global oxygen supply or the social costs of replacing the breast-feeding that doesn't generate monetary flow and wealth with the infant formula that does. By driving the spread of this monetizing process, the competitive market mechanism thus facilitates the colonization of center over territory in countless big ways and small, and over both social and natural capital.

Despite conventional thinking to the contrary, the process of market exchange is not a circular, but a linear, process. Because markets separate production and consumption, they tend to create a linear flow of resources. Resources flow to where the money is—to the North, to the cities, to the wealthy—that is, to and up the social hierarchy. This linearity is geographical as well. With the specialization of producers, a product leaves one place for consumption somewhere else, to be paid for by production at that place, the products from which are themselves then bound for consumption somewhere else. Thus although the monetary exchange system may be circular on one level (money being exchanged for goods), the physical products themselves start at one place and end up somewhere else. In the process, a lot of energy is consumed, and huge disposal problems are generated.

The market mechanism is thus far from a neutral vehicle for scientific analysis, especially when the tendencies to scale and hierarchy associated with an open competitive character are added in. As Milberg notes, "[i]f the market is a social phenomenon and exchange is 'contested', then many of the traditional welfare results and labor-market analyses are put into question, and issues of power and policy become integral to the analysis of otherwise 'pure' market transactions" (Milberg, 1993). Change the structure—the context for economic transactions—and the economic values will change.

The overall direction of the change contemplated by a political ecology critique is, instead, away from the imperatives associated with ecological centralism (that is away from corporate and bureaucratic forms of rationalistic organization that dominate natural systems) towards the more stable processes associated with territorial communities (that is, forms of participatory organization that exist within natural systems). As one political ecologist put it, "the kind of reflexive institutional re-creation appropriate in a new ecological political economy involves reasoning constitutively rather than instrumentally about institutions" (Dryzek, 1996). As the territorialist regional planners propose, this would mean 'selective territorial closure,' the communalization of productive territorial wealth, the equalization of access to the bases of social and economic power, and the strengthening of the territorial economy through enhanced self-reliance, the enhancement of a 'use' (in contrast to exchange) economy, and the development of regionally controlled markets.

This analytical perspective informs the overall character of economic development away from free trade-based regimes towards community-based forms of territorial self-maintenance. As well, it informs a wide range of cutting-edge technical-scientific innovations—eco-forestry, ecosys-

tem-based management, demand management, precautionary principle, clean technology, industrial ecology—which embody a different set of starting principles than the 'laws' of the competitive market, and a very different set of process and power elements to them. Huge transformations are in store as the industrial model that is today based on creating ever more supply—in energy, water, transportation, even agriculture—is shifted to managing the linear nature of demand (M'Gonigle, 1994). Countless industrial processes that depend on the environment's assimilative capacity will need to be overhauled when the scientific uncertainties associated with linear environmental discharges (the essential concern of the precautionary principle) are taken seriously (M'Gonigle, 1999).

5. Conclusion

A number of conclusions follow from this brief excursion into political ecology. First, any new economic 'science' cannot rely on market-derived values as 'neutral,' not the least reason being that the values are socially-constructed using a market mechanism that is inherently anti-ecological. Instead, the primary lesson of ecological economic science is the need to create new political contexts that will shift economic activity from linear to circular processes of wealth-generation, at which point economic 'values' will begin to have some relevant, contextual meaning. Second, the political/power context for economic activities must be explicitly addressed. In particular, the 'constitution' of the modern state needs to be reinvented if territorial values are to be realized in the necessary reformation of centrist institutions. This situates ecological economics within a larger political economy while again pointing to new models of economic development that reflect the needs of ecosystem integrity and community health. Finally, the challenge is far less a technical, policy one than it is one of developing a broad process of social transition. This is a profoundly political and social task.

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