

## Life on the Edge: A Look at Ports of Trade and Other Ecotones

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Conjunctures create opportunity. This paper examines both natural and institutional conjunctures that provide unique and valuable opportunities whose beneficiaries range from bugs to businesses. Thorstein Veblen, for example, argued that with the rise of the machine age businessmen sought gain by controlling industrial conjunctures rather than relying on unmanageable ones found in nature (1904, 17). The paper shows that ecotones are conjunctures that have been studied by ecologists, anthropologists, and economists such as Karl Polanyi. Moreover, the examination of ecotones may prove valuable to subjects as varied as economic geography, environmental economics, and economic anthropology.

Ecotones and edge effects are concepts borrowed from ecology and are useful tools for analyzing a wide range of economic phenomena. *Ecotones* are commonly defined as the transition zone between adjacent ecosystems (Holland 1988; Gosz 1991; Bowersox and Brown 2001).<sup>1</sup> Wetlands, tree lines, and the meeting of savanna and desert are all examples of ecotones. Ecotones, sometimes called *edges*, frequently support comparatively large amounts of diversity, activity, and biomass—a phenomenon known as *edge effect*.<sup>2</sup> Part of this edge effect is accounted for by the simple fact that the ecotone supports many of the species from each of the overlapping communities. In addition, there are species “which are characteristic of and often restricted to the ecotone” (Odum 1971, 157). This paper examines the economic analog of ecological ecotones and demonstrates the usefulness of the concept in explaining the locus of economic activity as

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well as causes and consequences of this activity. Some of these ecotones are the same biophysically defined ecotones studied by ecologists; others are more of an analog or extension. They are shaped by social and institutional systems not emphasized by ecologists.

The history of the ecotone concept illustrates its use as a tool for understanding issues of location, composition, and dynamics. The etymology of ecotone suggests a tension (*tonos*) between households (*oikos*). This tension refers to “limit conditions that prevail at the extremes of the tolerance spectrum of populations, species, and communities (conditions between sub-optimal and lethal values)” (Lachavanne 1997, 12). Early use of this term, such as by Frederic Clements ([1905] 1977), focused on intersections between plant communities (Hansen, di Castri, and Naiman 1988, 11). The emphasis was primarily on how such transitions affect diversity and species distribution (Gosz 1991, 10). A more modern approach focuses on a wide variety of boundaries and emphasizes boundary dynamics, or “how boundaries influence ecological processes within patches and over the larger landscape; how boundaries affect the exchanges or redistribution of materials, energy, and organisms between landscape elements; and how these transfers can, in turn, act to change the location and nature of boundaries” (Gosz 1991, 10). This broader, more dynamic emphasis grew out of recognition that, while many ecological studies focused on relatively homogenous landscape units, landscapes themselves are a complex and diverse mosaic. Accordingly, boundaries needed to be studied because “abiotic and biotic components must move across heterogeneous landscapes” and ecotones serve important filtering and control functions between landscape components (Holland and Risser 1991, 1).

Collisions between systems studied by economists also create ecotones. For the purposes of this paper, we can define an *economic ecotone* as an opportune conjuncture between multiple interacting systems. These ecotones are an important locus of economic activity because they create unique opportunities. Studying the interstices between systems is important to understanding where and why such edge-specific phenomena take place. The conjunctures between market power and competition or between private property and common property help spur economic activity best understood by studying the edge between systems rather than each homogenous system individually. Additionally, ecotones are important to understanding intersystem dynamics. If one wants to understand the long-run viability of a system, he or she must examine the interactions between that system and others—studying the flow of materials, income, and power. Focusing on competitive markets, for example, is insufficient for understanding the viability of the competitive sector. One must also examine the collision between competition and market power. The following is a survey of a variety of economic ecotones; it is meant to better illustrate the usefulness of the concept.

### ***Historical Ecotones—A Locus of Economic Activity***

Ecotones frequently cradle economic activity. Sometimes these ecotones are defined in principally ecological and geographical terms; other times they are defined in principally cultural and institutional terms. In the former cases, these economic ecotones are precisely the ones studied by ecologists; in the later cases, their composition, if not their consequence, exists outside the purview of ecology.

Humans, like other occupants of the upper levels of the trophic pyramid, are often attracted to ecotones by an abundant and diverse food supply. "Throughout their history, human populations have actively positioned their communities to take advantage of animal and plant populations on either side of and within ecotones" (Crumley 1993, 379). Consider, for example, the Native Americans indigenous to the southeastern part of what is now the United States. Traditionally, many of these peoples lived along the coastal plain, concentrated especially near the coastline—itsself an ecotone between land and sea.

The second important region for the Southeastern Indians was the piedmont, a band of hilly uplands between the Appalachian Mountains on the one side and the coastal plain on the other. The piedmont is separated from the coastal plain by the "fall line," an imaginary line drawn through the shoals and rapids of the rivers as they fall abruptly from the uplands to the flat coastal plain. The territory lying immediately to either side of the fall line was an important region in itself. Some of the most populous societies in the prehistoric Southeast lay along this line, the reason being that from this vantage point the Indians could exploit the natural resources of the coastal plain, the piedmont, and the fall line itself. The best freshwater fishing in the Southeast was at the fall line, where in certain seasons fish could be taken in vast numbers as they swam upstream to spawn. (Hudson 1976, 19)

The fall line illustrates the way ecotones create unique opportunities for taking advantage of the adjoining regions as well as the idiosyncratic characteristics of the ecotone itself. In a very real sense, these Native Americans enjoyed the best of three worlds, while avoiding many of the constraints of each.

Ecotones also provide good locations for centers of trade because they allow access to different types of food and other goods, as well as different cultures.<sup>3</sup> The most obvious example is the seaport. In the case of seaports, the meeting of land and sea provides the above benefits plus combining the living space of the land with the facilitated transportation of the sea. Polanyi, while never mentioning the word "ecotone," was clearly aware of their anthropological significance with regard to trade. "Thus," he explained, "we find the port of trade as a universal institution of overseas trade preceding the establishment of international markets. It was, as a rule, situated on coastal or riverain sites, where inlets and extensive lagoons eased transportation by land. A related institution, however, might also be found far inland, on the border of two ecological regions, such

as a highland and a plain, but particularly on the border of the desert, that alter ego of the sea” (1968, 239).

The *port of trade* concept was introduced by the Interdisciplinary Project at Columbia University in the book *Trade and Market in the Early Empires*; Polanyi is only one of the contributing authors who discussed it (1957, 263).<sup>4</sup> Anne C. Chapman likewise emphasized the port need not be on the sea. “Transshipments naturally develop from the earliest times on the borders of ecological regions, such as highland and plain, desert and jungle, forest and savannah” (1957, 116). Chapman went on to explain the role of such enclaves in Aztec-Maya trade. Francisco Benet mentioned the importance of ecological borders in the location of a class of Berber *suqs* that served as large regional markets (1957, 197). Others examined ports of trade on the Guinea coast and in the ancient eastern Mediterranean.<sup>5</sup>

Clearly, ecological ecotones have long shaped human society, and they still help shape local culture and politics (see, for example, Crumley 1993, 379). Indeed, the connection between human activity and ecotones is so strong that the historical and anthropological record has been used as a tool for tracking ecotonal shifts that resulted from long-term swings in global temperatures (1993). However, the economy is shaped by more than ecological and physiographical boundaries. Institutional boundaries, in particular, are very important in shaping modern economies. These institutional ecotones also create unique opportunities and allow people to take simultaneous advantage of multiple systems.

### ***Nonecological Ecotones: The Geography of Human Institutions***

The ecologist Paul Risser (1995) has argued that ecotones exist in a wide variety of scales that “can be defined by the question being asked or the problem being addressed” (319). The flexibility and generality of the ecotone concept is likewise captured in a definition of ecotones offered by a 1987 working group. They defined an *ecotone* as a “zone of transition between adjacent ecological systems, having a set of characteristics uniquely defined by space and time scales and by the strength of the interactions between adjacent ecological systems” (Holland 1988, 60). Significantly, the ecotone concept cannot be defined in terms of scale or by specific constraints or interactions. Soil chemistry and intraspecies interactions might shape a small ecotone, while the continental-scale ecotones between biomes are shaped by climate and topography (Gosz 1993, 372). The spatial and temporal scales of different ecological questions span fifteen orders of magnitude (Naiman and Décamps 1991, 131). The concept of ecotones is robust enough to be meaningfully applied to economic, as well as ecological, systems. Different ecotones are shaped by different factors. Boundaries at a particular scale, or for a particular species, may not even be recognizable when viewed from a different perspective (Gosz 1991, 20). While soil chemistry, climate, and species interactions are critical ecological constraints, the economy is also shaped by other factors. When the ranges

of these institutions meet, they too create ecotones. This is not simply equivocation. A key trait of any ecotone is the unique opportunity to take simultaneous advantage of more than one system.

The most readily identifiable institutional ecotones fall into what might be considered an intermediate category because they lie along readily identifiable geographic boundaries. One commonly sees businesses that sell liquor, fireworks, or adult entertainment clustered along the outer boundaries of towns, counties, and states. Businesses and households commonly choose locations that allow them to take advantage of a community's amenities and population base while avoiding its taxes, ordinances, and other disamenities. While these ecotones are easily identifiable with boundaries on a map, the key discontinuity which gives rise to their existence is institutional, not spatial. A few feet in either direction would make no difference except for the abrupt change in laws.

Other examples of nonecological ecotones that are nevertheless geographically discernable are the ports of trade found along the intersection of two roads. Certainly, intersections are distinct from the ecological concept of ecotones. Nevertheless, junctions do allow individuals to take simultaneous advantage of multiple, strongly interacting, systems—transportation systems that bring together people and goods from the four corners of the map. Simple systems, roads well illustrate the point at hand. For a trader, a major constraint of a north-south road is that it does not readily accommodate provisioning from western or eastern sources. Crossroads solve these types of problems simply, completely, and efficiently. Benet mentioned crossroads as another common location for *suqs* (1957, 197), and Lewis Mumford argued, "The Sumerian ideogram for market, a Y, would indicate perhaps that the idea of the market as a juncture of traffic routes was already recognized" (1961, 72).<sup>6</sup> Many institutional, interstitial interactions are not so easily apprehended because they lack an identifiable geographic correlate. These ecotones are nevertheless important because they provide unique opportunities that attract a good deal of economic activity.

As we move from timberlines and shorelines to city limits, crossroads, and beyond, continued discussion of ecotones may seem unwarranted. This would be true if our focus were not on humanity. Human populations find constraints and opportunities in a world that is only partly defined in biophysical terms. Further consideration of ports of trade illustrates this point.

Early market locations took advantage of interstices that were both physical and institutional. Early ports of trade were often located along ecological ecotones, but functionally, key discontinuities were also institutional. Specifically, ports of trade were often located either along the outskirts of a communal boundary or in the interstices between powerful states. In the case of Berber markets, Benet argued, "Psychologically as well as physically market places stand on the 'fringes' of the in-groups" (1957, 198). Villages and markets are "completely dissociated in the physical sense." "The *suq*," he continued, "stands locationally apart from and in contrast to the village." Market trans-

actions, in both a physical and a social sense, lie beyond the realm of appropriate in-group conduct. The ecotone, however, in typical fashion, allows individuals to take advantage of two distinct systems. "The physical separation of the village and market makes possible the co-existence of two well-developed forms of integration in the same society—market exchange and in-group reciprocity" (199).

Chapman wrote about the importance of the locations of ports of trade used by Aztecs and Maya. These were usually found outside the territories of the two great peoples. "Ports of trade usually developed in politically weak spots, such as small kingdoms near the coast, or chieftains' confederacies, since under archaic conditions, strangers shunned territories that were incorporated in military empires. To hinterland empires the 'ports' served as a 'bread basket,' that is, as a source of supply. Even powerful rulers were wary of laying their hands on the 'port,' lest foreign traders and strangers shy off and trade suddenly dry up" (1957, 116).

Chapman argued that typically such areas were relatively neutral and autonomous (1957). Moreover, these ports of trade, "whether enclaves or buffer states . . . served as intermediaries between militarily powerful metropolitan units" and are crucial to explaining the high level of trade between Aztec and Maya (116). Similarly, in discussing ports of trade in the ancient eastern Mediterranean, Robert Revere (1957) explained, "Its main function was to guarantee neutrality" (52). Traders needed to know that their goods could be safely exchanged and not taken by force. "The presence of a strong military power on the spot would unfailingly frighten them away" (52).

Typically, then, early ports of trade were found in ecotones that were defined in both physical and institutional terms. The quintessence of these ports of trade was that they were situated to take advantage of multiple systems, be they land and water, desert and highland, reciprocity and exchange, Aztec and Maya, or Hittite and Egyptian. Alexandria, a city described by Revere as "the port of trade par excellence" (1957, 61), perhaps best illustrates this point. A coastal city, it was situated at "the point of entry to the west" for commerce coming from the orient via the Red Sea. "Neutrality was its *raison d'être*. Although situated on Egyptian soil and erected under Greek a government, neither the Egyptians, nor even the Greeks themselves were to wield power in it. . . . Its neutrality was guaranteed by settling there Jews and Egyptians in large numbers, so as to reduce the preponderance of the Greeks themselves" (61). Land and sea, east and west, Greek and Egyptian, were all important ecotonal conjunctures that shaped Alexandria.<sup>7</sup>

Institutional and ecological ecotones have been, and still are, important factors in shaping economic geography. This is an important insight because there is "almost no spatial analysis in mainstream economics" (Krugman 1995, 33). On this matter, Paul Krugman (1995) pointed to Mark Blaug's opus on the history of economic thought, wherein Blaug "describes the neglect of spatial issues as a 'major puzzle'" (34). Krugman argued the main problem is that models for economic geography require increasing returns to scale—an anathema to the competitive bias of neoclassical economics. According to Krugman, "to talk even halfway sensibly about economic geography it is necessary

to invoke the role of increasing returns in some form” (36). When it comes to spatial issues, he argued, “you really *cannot get started at all* without finding a way to deal with scale economies and oligopolistic firms” (35, emphasis added). Krugman was on firm ground when he argued spatial issues have been neglected because neoclassical economists eschew topics that would involve modeling economies of scale. However, while economies of scale are important, it is not true that they need be the alpha and omega of economic geography.<sup>8</sup> The advantages of ecotones need not involve returns to scale. Rather, such economies can be local and natural and arise from conjunctures and discontinuities instead of size. They can shape neighborhoods, cities, regions, and trade patterns.

### ***Institutional Ecotones: Systemic Growth and Diminution***

To explain how institutional ecotones might be a useful concept, we now turn far afield from those ecotones found in ecology. As we have seen, ecotones permit one to avoid some of the costs or constraints of a particular system. This creates a problem in economics that is not a concern in ecology. Specifically, commercial systems demand costs be weighed against possible benefits and not simply shirked. Especially under capitalism, the rationality of the system suffers when costs are not eliminated but rather side-stepped or shifted onto others. Cost shifting along economic ecotones is a common phenomenon. While businesses are constrained by the relative elasticities of supply and demand in their desire to shift factor costs onto consumers, shifting costs within the market domain is only one option—they can be shifted out of the market and onto third parties. Indeed, with the erosion of community in a disembedded economy, “private markets promote cost-shifting” (Swaney 1990, 457; 1981). The firm will continue to shift costs as long as it is permitted and as long as doing so is beneficial. For these reasons, part of the burden of factor-market competition is commonly shifted onto third parties competing in other domains.

Take, for example, a manufacturing firm. Such a firm faces, at least implicitly, a choice between polluting or investing in pollution-control capital. Firms which invest in pollution-control capital must compete against others for this resource. However, the firm can avoid such competition, and save money, by shifting the burden of competition onto those who compete for health services. By shifting costs, the firm gains a competitive advantage. Importantly, neither the costs nor the burden of competition has been eliminated. Rather, they have merely been shifted to another domain. These so-called external costs become most apparent when others face the burden of market competition. For example, effluents may increase the pecuniary burden of those who compete for bottled water.

The conjuncture of systems creates special opportunities. The edge, one might say, provides the best of both worlds. The firm may reside in a system characterized by property rights and markets, but along the edge it is free to exploit the advantages of other

domains. The institution of private property conveniently ignores the law of conservation. One may own a ton of coal, or a tank of gas for that matter, but claims of ownership are seldom heard for the postcombustion nitrous oxides, sulfur dioxide, or carbon monoxide. Matter still exists; only property has vanished. This is an important point, for pollution and other externalities are not caused simply by the lack of well-defined property rights. Rather, they arise from the collision between private property and open-access property.

The crux of the problem is the collision of private benefits (profits) and communal costs (pollution).<sup>9</sup> We do not expect the firm to inflict damages upon itself or hurt others in violation of their property rights. Cost shifting is beneficial to the firm only when costs are shifted beyond the realm of pecuniary accountability. We would expect much less industrial pollution (and production) if corporate revenues were an open-access resource, like the air and water. Alternatively, we would expect less pollution if ownership persisted at all entropic levels, thereby forcing responsible disposal of effluents and emissions. This is not to argue that we should eliminate private property. Rather, the purpose is to point out a stark bias in our habitual patterns of social articulation. It is now axiomatic that pollution, resource depletion, and other environmental problems are caused by the lack of well-defined property rights. However, this is more cheerleading than science. Instead of focusing on the conflict between two institutional systems, neoclassical economists simply argue the problem is the lack of their favored institution. By ignoring ecotonal conflict, economists forego critical analysis of this hugely important issue.<sup>10</sup>

### ***Ecotones and the Dynamics of System Composition***

Beyond edge-specific activity, ecotones help shape, and are shaped by, adjoining systems. The rain of seeds from the edge, for example, can alter the composition of flora within the forest. Additionally, the edge need not be stationary—it can alter the relative size of one system or another. If shrubby plants or other factors along the edge facilitate the growth of trees, then we expect the forest, over time and in a nonteleological way, to encroach upon the grassland.<sup>11</sup> To fully appreciate ecotones, one must examine how they affect the composition and relative dominance of adjoining systems.

Looking further at the previous pollution example will illustrate the effect ecotones have on the composition of neighboring economic arenas. The unique opportunities found along the edge between well-defined and poorly defined property rights attract an abundance of activity—namely cost shifting in the form of pollution. Yet, these edge effects are not neutral. In the market sector, certain businesses—like those providing health care or bottled drinking water—will benefit from the edge effects. Other businesses, such as those providing recreational goods, stand to suffer. This is a very simple example, but it illustrates how economists might use the concept of ecotones to direct economic inquiry. First, they need to identify the margins created by the meeting of dif-

ferent institutional structures. Second, they should look for edge effects stimulated by the unique opportunities found along these margins. Third, economists should determine what impact these edge effects have on neighboring domains.

The role ecotones play in the rise and decline of different economic arenas might best be illustrated in the examination of mass marketing. Analysis focusing on effects within a particular market would miss advertising's most important ramifications. For example, when oligopolists' advertising is studied or taught, it is often viewed as a routine strategy whose most important implications are for the profits of the competing oligopolists. Marketing is thought to be only a means of competing for profits and consumers.

However, by including ecotones in our analysis, we can readily see that social imbalance is a consequence of mass marketing more significant than the distribution of oligopoly profits (Galbraith 1984, 190–204). Moreover, marketing becomes recognizable not simply as a means of competition but as a way of shifting the burden of competition away from corporations. In fact, it was recognized as early as the 1920s that corporate advertising, even industry-wide advertising, was too narrow to accommodate the needs of business (Ewen 1976, 53–54). What was needed, and what was created, was a consumer culture that would reliably and perpetually increase the magnitude and breadth of consumer spending, thereby preventing corporate advertising from being a zero-sum game.

A corporation competes for control. Competing against other major corporations for such control is burdensome. However, corporations are able to shirk some of this burden by seeking control elsewhere. Power is most effectively used against the powerless. John Kenneth Galbraith has shown that mass marketing shifts much of the burden of competition from within the planning sector onto the competitive sector and certain public services. Wants creation is most effective precisely where we cease to find it. Producer sovereignty is ineffective when it butts heads with the sovereignty of other producers. It is most effective and most damaging beyond the realm of big-scale production—where it enters the household and changes the consumption and labor-supply choices of individuals. It is powerful when it takes business away from small independent businesses or diverts resources away from public services and toward its own ends. Producer sovereignty is most powerful not within the planning sector but along its edges—where this sector meets the public, competitive, and household spheres. It is only by looking at other domains and the boundaries between them that the primary significance of marketing within the planning sector becomes clear.

The conjunction of market power and market impotence creates an opportunity where power can be effectively wielded in multiple spheres. This economic ecotone helps filter and regulate the flow of material and income between spheres. These dynamics affect the health of the adjoining systems. In particular, producer sovereignty along the edge of the planning sector leads to the ascendancy of this sector at the expense of important elements in the public sector.

### ***The Creation of Ecotones: Another Source of Dynamism***

Humans are able to deliberately produce ecotones. Indeed, people have often exploited edge effect by creating both ecological and institutional ecotones. For example, Native Americans, while not expressly setting out to create ecotones, “repeatedly burned off large portions of the forest to create grazing lands, artificially stimulating the number of deer” (Hudson 1976, 19). It is worth mentioning that early examination of edge effect was in regard to its favorable impact on game populations (Leopold 1933). It was not until later that scientists started to worry about some of its deleterious consequences, namely that some species may benefit at the expense of others. Landscape patches, regardless of their causes, are dynamic and will change in their composition and dimensions over time as the disturbance fills in and starts to more closely resemble the surrounding landscape. Benefits to species favored by the disturbance are not necessarily expected to be permanent. Nevertheless, human-created ecotones are important because the creators may not have to consider the costs incurred by others. That is, there are opportunities for both strategic cost shifting and unintentional damage. For example, it has been argued that certain policies in national forests have created an abundance of edge habitat beneficial to deer but deleterious to certain rare plants and other species (Mlot 1992). Hunters and loggers may benefit at the expense of botanists, birdwatchers, and the ecosystem.

Veblen wrote at length about those who “have an interest in making the disturbances of the system large and frequent, since it is in the conjuncture of change that their gain emerges” (1904, 20). While the phrase “conjuncture of change” is evocative of ecotones in general, Veblen was concerned with disruptions primarily in the industrial system. However, he recognized that the opportunity for pecuniary gain arose from differential advantages found along a variety of conjunctures. Moreover, Veblen’s primary thesis in this regard was that the quest for pecuniary gain is often at odds with instrumental imperatives. That is the point being made here. While there can be rewards to some for creating ecotonal disruptions, this added layer of dynamism may, from a broader standpoint, be ecologically or socially disruptive. Current Forest Service policy, some argue, favors the vendibility of logging and hunting permits while its ecological and long-run soundness remains questionable (Mlot 1992).<sup>12</sup>

### ***Ecotonal Analysis of Ports of Trade***

Ports of trade, like any ecotone, cannot be defined in solely spatial terms. Besides a location, the port of trade serves many functions. It is “the main institution” of administered trade (Polanyi 1957, 263). “The port of trade offers military security to the inland power; civil protection to the foreign trader; facilities of anchorage, debarkation and storage; the benefit of judicial authorities; agreement on the goods to be traded; agreement concerning the ‘proportions’ of the different trade goods in the mixed packages or

‘sortings’” (263). However, even this important list of functions does not reveal the full importance of the port of trade. A definition limited to these roles would be incomplete (Hodges 1978, 97).<sup>13</sup>

Both Ron Stanfield and John Adams focused their descriptions of ports of trade on the logic of this institution rather than a listing of its constituent elements. This logic is characteristic of ecotones: allowing access to more than one system or sphere, while minimizing exposure to the spheres’ risks and constraints. Both authors emphasized this double role of provisioning and protection. “Ports of trade is Polanyi’s term for an economic buffer zone that protects the non-market society from penetration by a commercial society when trade is carried on between the two” (Stanfield 1986, 19). Adams argued ports of trade were part of societies’ custom of “demarcating separate external and internal exchange modalities” (1988, 426). They were “keyholes to the outside world,” and, citing Rosemary Arnold, they “solved the dual problem of securing goods while maintaining the social and political isolation of the community from threatening external influences” (427). Significantly, the port of trade helps address the limits of internal trade as well as the dangers of external trade. Internal trade, and the modes of internal trade, eventually becomes insufficient to satisfy all of the collective needs of society. To obtain such goods, society “cannot depend on the shared practices of kinship, magic, custom, and so forth” (428). “External trade is thus exchange that takes place outside the normal networks of domestic transactions—beyond the pales of established consensus and practice” (428).

Using the Athenian wheat market as an example, Adams described how ports of trade provide a safe means for reaching beyond the constraints of internal trade and gleaned goods from a potentially dangerous external realm. “External trade is separated from internal arrangements, subject to different rules, and carefully supervised. It is profoundly political as a consequence of its social significance. The external movements had a different moral basis than did the domestic ones, partly because alien influences could threaten domestic beliefs and mores, via trade channels, and partly because of the vital importance of imports to the survival, security, and the statuses of many” (1988, 428).

While ports of trade serve as a filtering buffer between cultures and polities, the bio-physical parameters shaping these ecotones always remain important as well. In *Trade and Market in the Early Empires* (Polanyi et al. 1957), different authors examined ports of trade found in “Pre-Spanish Meso-America, West Coast Africa before and during early European contact, Ancient Egypt and Mesopotamia, the Hittite and Persian Empires, the Phoenician, Philistine, Ionian, and mainland Greek Ports” (Leeds 1961, 26). In addition, Anthony Leeds has examined ports of trade in India and Ceylon and argued their presence is “indicated in Southeast Asia, Indonesia, and China in the east, and Persia, Arabia, and the East Coast of Africa in the West, for indeterminate periods which begin with the Portuguese conquests at the beginning of the sixteenth century” (1961, 26). All of these ports of trade vary considerably in their location, dates, and insti-

tutional particulars. However, Leeds identified a common thread. "Each of the societies entering into port-of-trade relations occupied ecologically relatively homogenous areas, while the port-of-trade was in an area ecologically distinct from the areas of any of the participating societies" (41). While Leeds' identification of ports of trade in the pre-Portuguese Indian Ocean is sharply criticized by M. N. Pearson (1991), Leeds' more interesting argument is that ports of trade are a moment in an evolutionary process that reflects the interactions between technology and ecology. Specifically, he argued societies using ports of trade were "in some special way connected with the land areas in which they occur." This connection, he continued, "specifically involved the relationship between the technologies of these cultures and the lands upon which the technologies were operative." Importantly, these technologies would be limited "either by nonintroduction of other technological activities . . . or because they were ecologically unfeasible." As an example, Leeds mentioned the absence of pastoralism and stockbreeding in the Indian case he examined (1961, 41).

Their environment limited each society's technology. These technologies, in turn, limited the society's ability to expand into new ecological areas. "I would generalize to say that each of our cases displayed relatively homogeneous technologies and hence homogeneous ecologies. They had not yet evolved the technological and concomitant organizational arrangements for joining varied ecologies into an ecologically multiplex unit" (Leeds 1961, 41). Expanding beyond largely homogenous ecological areas would lead to problems in communication, transportation, transshipment, and accommodating multiple agrarian patterns. Until these problems could be addressed, societies were somewhat constrained to a single ecological area. For many, a first step in addressing these problems seemed to be the port of trade. When the need for food, elite goods, military goods, or other goods required external trade, the port of trade served as a filter to bring in these goods with minimal disruption to the existing power structure. Leeds hypothesized that

an institution like the port-of-trade appears when agrarian developments of an emerging polity have developed to the point that the polity has begun to expand into an entire homogeneous ecological area or has run into another polity which is also expanding. In either expansion or competition, the polity requires constant supplies of certain kinds of goods which it does not have or cannot sufficiently produce. It acquires these from external sources from, or through, polities with which it is not in competition, but, rather in symbiosis. When, in particular, the polities or ports-of-trade *through* which the commodities travel expand because of their strategic position and profit-making advantages, as well as through technical innovation, then conditions have appeared which foreshadow the passing of the port-of-trade syndrome. (1961, 42)

The port of trade concept is criticized as being bewilderingly broad, unclear, and in need of further definition (Hodges 1978, 100; Luke 2003, 4). Also, individual aspects of the concept, especially Polanyi's emphasis on administered prices, have long been the

target of criticism that grows today as new evidence is brought to the debate.<sup>14</sup> In specific cases, parts of Polanyi's supporting research appear "to be cast in doubt if not flatly contradicted by the preponderance of the textual and archaeological evidence," which finds money, price-making markets, and dynamism where Polanyi found none (Tartaron 2001, 8). Nevertheless, "the port of trade has an important utility as a universal model of the locational, physical, and institutional arrangements of cross-cultural trade among non-market societies" (10).

The fact that there are many different types and characteristics of ports of trade has left the concept vulnerable to attack. Strict definitions, which demand the presence of particular elements such as elite goods, create a straw man. In refining this concept, it should now be clear that its continuity stems from the tension between different ecological systems as well as the tension between different institutions. That is, ports of trade cannot be understood as simply a location or collection of administrative functions or by the presence or absence of specific institutions. Leeds' emphasis on its ecological characteristics is an important insight but still too limiting. Ports of trade are best understood as unique interstitial systems that, while minimizing risk and disruption, allow access to multiple ecological regions, cultures, polities, arrays of goods, and modes of exchange.

Such an approach is consistent with recent, separate works by Joanna Luke and Astrid Möller. Luke has discussed the ecological, political, geographical, and economic parameters of ports of trade (2003). Moreover, she has argued that it is unrealistic to expect all the various features of ports of trade to be present at each site (8). And while she has pointed to a reluctance in classical archaeology to use models, she has argued convincingly that, nevertheless, "models are employed, but usually unconsciously." Luke, therefore, is more open to the use of models to seek, in her words, "predictable patterns in the material record" (3). However, instead of relying on a narrow, deterministic port of trade model, she has developed a *Kriterienbundel*. The use of such a checklist allows one to categorize similar ports of trade without requiring them to be identical. Similarly, Möller has used a list of nine characteristics to define an ideal-typical port of trade (2001). He has explained that the ideal type is an abstraction that cannot be found in reality but that actual ports of trade have most of the nine characteristics and that each of the characteristics will apply to most ports of trade. These models also seem compatible with Douglass North's approach of identifying institutions that lower transactions costs by increasing capital mobility, lowering information cost, and spreading risk (1991, 27).

Robert Heilbroner has argued that the purpose of dialectic inquiry is to "inform us as to the presence and nature of our systematic misperceptions" (1980, 49). In economic anthropology, the ecotone—in its port of trade manifestation—serves this function. Polanyi and Conrad Arensberg argued the port of trade concept is a crucial instrument for piercing the market mentality. "The market envelopment of our own economy and

society was seen as the major obstacle to understanding the economy in early societies.” They explained:

Only by a radical separation of the economic process from the market complex was it possible to proceed. The conceptual separation of trade from market institutions which might otherwise have appeared as merely pedantic, if not artificial, was justified by the uncovering of the “port of trade,” that almost universal precursor of modern organs of foreign trade. Equivalencies, again, those antecedents of “prices,” only became visible against this background. Similarly, regarding the purely theoretical question of what is and what is not “economic,” what is and what is not a “surplus,” and what is and what is not “scarce,” the role which the market played in the evolution of our thinking emerged as the heart of the problem. Thus both in theory and in fact, detachment from the market context was the way to clarity. (1957, 374)

Indeed, this kind of conceptual separation is a key advantage of the ecotone model. Ecotonal analysis moves beyond tacit assumptions of homogeneity. Differences between systems are made explicit so that the tension between these systems can be better understood. The approach is inherently evolutionary in that the focus is on understanding the dynamics of and between ever-changing systems. It is this emphasis on systemic differences and dynamics that shows that long distance trade is not tantamount to market exchange, that equivalencies are not prices, and that property rights are not a panacea for excess pollution.

### ***Possible Uses and Extensions***

While one hopes the ecotone concept might be useful to institutionalists, it is worth noting that the growing field of ecological economics has a history of borrowing from ecology. Some convergence between institutional and ecological economics is not surprising given the many important similarities between the two fields. While neither is monolithic, it is generally true that both critique neoclassical economics as being devoid of context and overly mechanistic, optimistic, and static. Both are open to normative issues and to state intervention. Both are explicitly multidisciplinary and evolutionary, have an affinity for biological sciences, and are open to researchers using an eclectic array of models (compare Tool 1988 and Costanza 1991; see also Soderbaum 2000).

In examining the usefulness of the ecotone concept in economics, our prognosis is cautiously optimistic. Clearly, Polanyi and others studying ports of trade have made good use of an ecotone concept that had both ecological and cultural parameters. It is less clear how useful the concept of economic ecotones will prove elsewhere. Can formal and rigorous models be based upon it? Could it be used as a pedagogical tool? Or might it merely be a rough reminder that calls our attention to sharp discontinuities shaped by

nature and institutions? Deidre McCloskey (1985) argued that even the most rigorous bits of economic theory rely on metaphor. But still, we would like to guard against carrying any of them too far. While this paper has indicated a number of ways past research can be framed in ecotonal terms, we now speculate about a couple of areas wherein the concept may possibly shed light on ongoing research.

One area of interest, where agents can simultaneously exploit separate spheres, is the collision between modern-industrial and traditional societies. The issues raised by such intermixing range from child prostitution in Thailand to using Africa as a dumping area for dirty industries (Korten 1995, 5; Swaney 1994). The problem, Paul Baran and Paul Sweezy (1966, 336–8) have explained, stems from a quid pro quo economy intermeddling with societies where much production takes place outside the formal economy. As such, individuals lack the quid to obtain the quo of commodities they now desperately need. All too often, sexual and environmental exploitation offer the surest way of obtaining money needed to survive in a formal economy. Stanfield (1986) argued that Polanyi's port of trade work anticipates much of the more recent work "on the cultural disruption of premodern economies penetrated by the industrialized countries" (19).

Empirical research addressing economists' most basic assumptions about human behavior is another area pointing to the importance of studying collisions between spheres. Though not surprising to institutionalists, there is a growing recognition that not all individuals are self-interested maximizers. Experimental evidence shows that a sizeable part of the population displays reciprocal-type behavior and will repay gifts or take revenge even at a net loss to themselves. Further experiments show that when both reciprocal-type and self-interested-type individuals are present, aggregate outcomes can be contrary to that predicted by conventional economic models. For example, sustained provision of public goods becomes a possibility because the presence of even a minority of reciprocating types may be enough to prevent self-interested types from free riding (Fehr and Gächter 2000, 165). Focusing on one type of individual or another is not sufficient to predict outcomes. What is important is collision between groups; context and interactions become paramount. "Details of the institutional environment, like the presence of incomplete contracts or of costly individual punishment opportunities, determine whether the reciprocal or the selfish types are pivotal" (160). This suggests the proper management of common property resources might require the complicated task of addressing the unique incentives for exploiting multiple systems of laws, beliefs, or habits of behavior created when such systems collide. More generally, when the economic landscape is no longer assumed to be homogenous, we start to question the reassuring benevolence of competitive self-interest and are left to wonder what happens when such behavior is no longer checked by similar behavior in others.

### Conclusions

This paper has shown that while ports of trade are shaped by culture and institutions, they cannot be understood outside their ecological context. While they are disparately shaped by social and ecological factors, their *raison d'être* is ecotonal on several levels—taking simultaneous advantage of multiple cultural, ecological, and economic systems. In economics as well as ecology, ecotones demonstrate that theories of parts are not sufficient. Often, phenomena must be explained in context of the peculiar dynamics and opportunities that arise when systems collide. Ecotones are unique and distinct from their principal parts. As such, they require study in their own right. Problems such as cost shifting often arise from the collision of two domains rather than the existence of one domain or another. Accordingly, it is clear that arguments such as “excess pollution exists because of the lack of well-defined property rights” are only half true. The real problem is both the existence and the lack of property rights.

Ecotones are also important because the effects from these conjunctures feed back into the principal domains—altering them and helping to determine relative ascendancy. For example, the port of trade itself or some political power it benefits may rise to dominance and eventually eliminate the need for a buffer between two great powers. As ecotones attract activity, they must also attract our attention.

It is inconceivable that ecologists studying a pond would ignore the chemical, physical, and biological processes that occur along the marshy ecotone that marks the boundary between pond and land. Economists, however, typically address various economic spheres as if they were discrete and isolated. Textbook chapters on competitive markets, to take one example, celebrate the absence of market power but fail to discuss the opportunities created where competition ends and market power begins. Consequently, much of economics that is important, interesting, and dynamic receives inadequate attention. It is time for economists to wade in and examine the marshy margins between various economic (and noneconomic) domains.

### Notes

1. This definition is admittedly and deliberately “relatively general” (Holland 1988, 60). The lack of specificity is necessary to encompass the wide variety of research done on ecotones with vastly different scales and parameters.
2. While the terms *edge* and *ecotone* are not always used interchangeably, they frequently are (Bowersox and Brown 2001, 89). The preferred term seems to be as much a function of the researcher as the phenomena being examined. Ecotones are also known as *landscape boundaries* and *transition zones* with “no compelling argument for differentiating” between the terms (Gosz 1991, 8). James Gosz has used boundaries, transitions, and edges seemingly interchangeably. Moreover, while acknowledging the problems of different terms springing from different scientific schools and the difficulty of describing various phenomena across different scales, it has been explicitly argued that the term *ecotone* “be extended and used to refer to interfaces, edges, transition zones or boundaries between adjacent ecosystems” (Lachavanne 1997, 12).

Though edge effects are well-known and have long been linked to ecotones, the term is considered ambiguous and edge effects vary considerably across locations and species so that it is hard to make generalizations (Sisk and Battin 2002, 38). The increase in diversity and density along edges is now debated and, indeed, edges can sometimes produce the opposite effect (Juge and Lachavanne 1997, 109-110).

3. Lewis Mumford (1956), for example, argued the rich and varied diets of those who lived along shorelines not only helps explain urban growth but also may have “contributed to the vital energy of city dwellers as contrasted with the more sluggish ways of the hinterlands and perhaps may also have partly offset the bad effects of close quarters in spreading communicable diseases” (384). Compare this to the ecological argument that edges can create “feeding or reproductive subsidies” (Sisk and Battin 2002, 39). (Their borrowing from the vocabulary of economics seems only fair).
4. The coining of this term is briefly mentioned on page 115.
5. For a more recent examination of ports of trade, see Geertz 1980. Clifford Geertz looks at ports of trade in nineteenth century Bali, including one “in the ecotone between the wet-rice area and the coffee highland” (117). Also see Sabloff and Lamberg-Karlovsky 1975, Tartaron 2001, Möller 2001, and Luke 2003.
6. For an interesting overview of Lewis Mumford and institutionalism see Long 2002.
7. Drawing on medieval Europe for his prototypes, Richard Hodges identified four classes of ports of trade, each emphasizing a different type of conjuncture (1978): the Dorstead-Hedeby type, characterized by site neutrality; the Kaupang-Hamwih type (which were still, at least, semi-neutral), characterized by being between the end of alien trade routes and the beginning of inland routes; the Verdun or quasi-port of trade type, which were located between two ecological regions; and a fourth, un-named, type which took place on boats in Icelandic fjords and estuaries. Hodges’ distinction between ports of trade and quasi-ports of trade seems too strong (compare Tartaron 2001). While Karl Polanyi (1968, 239) did mention caravan cities on the edge of deserts might fall “in the category of quasi ports of trade,” the word *quasi* is taken by this author to refer only to the word *port*, rather than modifying the entire port of trade concept. Ports of trade along desert and other ecological boundaries are repeatedly referred to as simply “ports of trade,” without further modification, by Polanyi and others. Moreover, this paper, drawing on Leeds 1961, argues ecological boundaries are typical of ports of trade in general. Joanna Luke has also distinguished between three types of ports of trade based on who wielded political control over the port. Types A, B, and C had hinterland, autonomous, and trader control respectively. Types A and C were typically located on the “edge of the host region” while type B was located on “central transition points of an ecological, transportational or economic nature” (2003, 7).
8. Mumford, for example, championed regional planning that would take advantage of natural economies as opposed to economies of scale (Luccarelli 1995, 3).
9. Another problem arising from the collision between open access and property rights involves digital music piracy. See Gallaway and Kinnear 2002.
10. Arguably another interesting, though subtle, example of interinstitutional cost shifting occurs between markets and households. Consider Galbraith’s claim that “The servant role of women is critical for the expansion of consumption in the modern economy” (1973, 33) or Nancy Folbre’s argument that care giving is a valuable subsidy for the commercial sphere. Folbre has likened the situation to the imaginary and cautionary world of CorporNation—whose citizen/employees are highly paid but must be highly skilled, healthy, and childless (2001). “CorporNation takes advantage of the human capabilities of its citizens/workers without paying for their production or maintenance when they become ill or old” (185). Both authors suggest business benefits from simultaneously exploiting one sphere, where work is coordinated by convention and gender roles, and another coordinated by money.

11. This example is reminiscent of Dwight Billings' classic examination of plant succession (1938), owed largely to changing soil characteristics, from colonizing annuals and perennials to pines to hardwoods (compare Loehle, Li, and Sundell 1996). The study of ecotones draws on modern successional theory (Holland 1988, 50).
12. Additionally, the historical overabundance of logging on Forest Service land can be partly explained by the ecotone between market and public sectors that creates an opportunity to avoid the costs and constraints of each. For example, while the U.S. Forest Service does pay attention to ecological concerns—including issues of biodiversity as it relates to ecotonal dynamics—its road-building activity does not have to satisfy the strict market criterion of profitability. The result is more than 375,000 miles' worth of roads that effectively create an enormous subsidy for the logging industry (Cooper 1998, 907). Likewise, the harvesting activities of the timber companies are not restricted by the broader social and ecological concerns or the exogenous budgetary constraint faced by the Forest Service. Not surprisingly, suggestions for improving the situation often call for either increasing the market accountability of the Forest Service or the legislative accountability of timber companies.
13. Richard Hodges is critical of Dr. C. Blindheim on just this point.
14. Certainly some of this dissent has stemmed from miscomprehension of the substantivist view of economics and by overlooking the many conditions required for free-floating market prices to exist. Philip Curtain (1984, 14) suggested much of the debate between formalists and substantivists stems from a failure of both to remember that the other side is using abstractions. Curtain and others have also pointed to new evidence that prices were more flexible than Polanyi argued. Marion Johnson (1980) has offered a brief overview of some of these newer challenges to several different Polanyian themes.

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