

## RENTS IN CYBERSPACE (Fellows Address, April 21, 1995)

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It is now more than forty years since Walter Isard sought to create a new discipline, Regional Science. What concerned him was the Anglo-Saxon bias in economics: that economic systems could be analyzed in a spaceless world, literally on the head of a pin. Of less concern were the central assumptions of economics: that people are rational; that economies in which individual decisions are coordinated through markets and prices face resource limitations and thus display diminishing returns; and that everything that is interesting happens at or near equilibrium. The flatlands that replaced the Anglo-Saxon pinhead were patterned and rational, and they existed in a world of static equilibrium and comparative statics.

Flatland statics are now no longer enough. What if individual behavior is not completely rational? What if more of what is produced is not congealed resources that face diminishing returns, like iron or chemicals, but congealed knowledge that display increasing returns, like biotechnology, telecommunications, and software? What if an economy is an evolutionary system that displays increasing complexity? If this is so, mechanistic views of flatland equilibria must give way to a dynamic view of transience, process, and transformation both at the level of individual behavior and at the level of interactions and transactions among the individual actors.

We learn from complexity theory that initially entropic systems will form self-organized structures if they are stressed by energy inputs to perform useful work. Such self-organized structures will be characterized by the rhythmic interactions and behaviors that maintain homeostasis. If energy inputs (and therefore stress) increase, the rhythms will become irregular and the systems chaotic, particularly if the dynamics are nonlinear. Even though there are systematic causal mechanisms at work, the outcomes will seem on casual inspection to be random, and catastrophic transformations can occur. With yet more stress, the semblance of coherency gives way to high-dimensional chaos, and irregular dynamics to fully-developed turbulence.

The received theory of Regional Science is about low-energy systems—about self-organized structures arrayed in flatland space—but the world we now confront

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is that of a higher-energy cyberspace. Is there a coherent spatial theory appropriate to this new world? What about our traditional conceptual tool kit? Let us spend a few moments speculating about one flatland concept—location rent—in the new world of dynamic adjustment.

As every freshman economics student is supposed to know, the payment for a resource that is in perfectly inelastic supply is an *economic rent* if the inelasticity is permanent and a *quasi-rent* if it is temporary and variable costs have to be deducted. Throw in the opportunity cost of production, and you have *Ricardian rents*, and if the alternative uses for what is otherwise a homogeneous resource vary, you end up with a producers surplus in the form of *differential rents*. *Location rent* is a form of differential rent. Without it we could have neither land use theories nor concepts of resource exploitation and use. Where would we flatlanders be without von Thünen and Alonso, Mills and Muth? Where would these theoreticians have been without flatlands in which it is impossible to duplicate particular pieces of property located at particular places?

But now we must learn to live and think in terms of *cyberspace*, the merging electronic culture of computers and networks, information systems and software that exists on the Internet. Vinton G. Cerf, senior vice president of data architecture for MCI's Data Services Division, is to blame. It was he who, in 1973, began work on TCP/IP, the common language that made the emergence of the Internet from the earlier Arpanet possible. Evolving rapidly, the present Internet bears a relationship to the global networks of the future that the nation's highways of 1920—a loose and only partially improved agglomeration of farm-to-market roads—bore with respect to the interstate system. What we see today is a precursor to the global information structure and worldwide web that received an initial airing at the Brussels G-7 Information Summit—a web in which wireless technologies will enable future developments to leapfrog the time and expense of deploying wired networks. We can only speculate what these developments might be.

Already, though, certain characteristics of cyberspace have emerged that seem likely to shape its future evolution. The fundamental property is one that, ironically, reinforces the Anglo-Saxon bias: everything can be here, now, instantaneously, on the head of our pin. It simply does not matter where anything is. Simultaneously, however, the inverse is also true: everything can be everywhere, simultaneously on the head of everyone else's pin. As the costs of communication continue to plummet and the means and quality of interchange continue to improve, these simultaneous qualities support a radical libertarianism devoted to preventing regulatory control of a freewheeling domain in which location, class, hierarchy, race, gender or physical disability matter little. This is a domain that is easy to enter. It is one where people can connect directly to other people without

the influence of mediating institutions, an environment where frankness is less constrained by social convention than when interactions are primary or secondary. Participants are simultaneously everywhere and nowhere; the network is universal and ubiquitous. What is supported is not that which is spatially structured, but locationally indifferent dispersion.

Cyberspace provides access to information resources. It also enables multiple communities of interest to coexist without competing territorial claims. It is likely to offer increasing numbers of opportunities to meet in virtual spaces, to experience alternatives before choices must be made, and even to enable individuals to seek pleasure and enlightenment in worlds that might never be. Just as the first steam engine, developed in Devonshire, but first applied to lifting water out of coal mines in Staffordshire, ultimately transformed transportation, factory production and energy use, the low-cost communication potentialities of cyberspace are changing both *what* is produced and consumed, and *where*—where people learn, work, shop, and relax—with multiple consequences for system characteristics and behavior. To cite a couple of early examples, the Puget Sound Demonstration Project has discovered that automobile emissions are likely to be 40–60 percent lower for telecommuters. The California Energy Commission estimates that if a third of that state's workers telecommute only 1–2 days per week, transportation-related fuel consumption will be reduced by at least 3 percent.

Now consider the consequences for our concept of location rent. In flatland geographies, locations are unique and their supplies are therefore perfectly inelastic. But in cyberspace every location is everywhere. That makes the supply of each location perfectly elastic, at least to the limits of connection to cyberspace. The essential quality of location, position with respect to other locations, vanishes, and along with it the possibility of earning the types of rents on which our theories of flatland land use reside. To the extent that work, residence, learning and leisure occur through cyberspace connections, choices become relative-location indifferent and received land use theories become merely historically interesting generalizations. To the extent that there then might be a flatland geography, it must be derived from qualities of place, whether endowed or created, that in general are not positional, at least in the sense of location with respect to the activity centers essential to Thünian or Millsian geographies. Since social construct is likely to prevail over natural endowment, the implication is continuing dynamics and an absence of recognizable flatland systematics although, at the limit, there may be the temporary patterning of turbulence.

Some of the consequences are already with us. As a sometime central-place theorist, I find that as the energy in society has increased, my frozen snowflake landscapes are gone, replaced by the dynamics of running water and the turbulence of gas. Gone, except as enforced by inherited structures of governance

and the lifespans of physical capital, is the relevance of differences between urban and rural areas, and between central cities and suburbs. Gone is most of the Weberian orientation to weight-losing raw materials, or for that matter, transport-orientation to markets.

How then, are we to understand spatial organization or the concept of region? A few glimpses of the alternatives and their implications might be emerging:

- Peter Drucker is among those who argue that in the new economic order it is knowledge, not labor or raw materials or capital, that is the key resource. Knowledge can be acquired only by schooling. It can be created anywhere, quickly and cheaply. It changes rapidly. It is portable, not respecting boundaries. In cyberspace, it can be universal. Thus, the competitiveness of individuals and businesses depends upon knowledge competencies in a world that transcends polity: the world economy, rather than that of the nation-state, is in control, the main determinant of performance in the domestic economy.
- We know that, transnationally, human capital formation drives economic growth, that education generates spillovers, that the spillovers induce increasing returns, and that these increasing returns have been the dynamic driving the growth of congealed-knowledge production. In the decades before contemporary cyberspace evolved, this produced new types of agglomerations (like Silicon Valley) in new locations. In future cyberspace, such agglomerations may be just as likely to involve connection to particular bulletin boards serving particular community-of-interest nets, although I realize that some will argue enthusiastically for the continuation of locationally constrained positive feedbacks.

Already we see downsizing and a reassertion of dispersion. We stand on the cusp of the growth of telecommuting. E-mail and fax are becoming the dominant means of transmitting the written word. We can take our GREs or interact with our dissertation advisors on line. Targeted catalogs seek out each of us, with our individual lifestyle preferences and tastes, as department store chains collapse. We learn to fly before we climb aboard the training aircraft. We can walk through buildings or landscapes before they are constructed. The change is generational: my grandchildren are much more adept at surfing cyberspace than I. As we await their ascendancy, what we see today are but the beginnings of a world in which locations are perfectly elastic and in which location rents no longer can be invoked as a cause of the structuring of space. Perhaps the worldwide triumph of markets, reinforced by an evolving cyberspace, is more than that—a triumph of the Anglo-Saxon traits that Walter Isard so valiantly opposed, everything here and instantaneously, on the head of each of our pins. If that is true, it does not bode well

for the future of locational analysis and regional science in the ways that we have known and practiced them. But perhaps the coexisting quality, everything simultaneously everywhere, provides the basis for new rounds of thinking about new types of location in new types of space. That, I think, is the evolving challenge. The environment has changed and we must either adapt or travel the path of irrelevance and extinction.