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The Perverse Imbalances between Town and Country

Introduction

At a time when environmental constraints are becoming increasingly obvious, understanding the disconnect between town and country becomes urgent. In early 2000 after having worked for a number of years on The Invention of Capitalism (Perelman 2000), a book devoted to the classical political economists' enthusiasm for primitive accumulation -- the brutal confiscation of resources traditionally belonging to poor people in the countryside -- I was attending the annual economics meetings in Boston.

I found myself repeatedly looking out my hotel window at an office building across the street. I wondered what all those people were doing, whether sitting at their desks or moving about. I could not help asking myself what these people might actually be contributing to the economy. Some probably earned modest incomes, but the people ordering them around must be paid very well.

As I continued to look into the office building, I continued to think about the glaring inversion of priorities -- low-paid, low-status caregivers for the elderly, alongside great windfalls for hedge fund managers. These disparities between the town and the countryside set my mind flashing back to the farm workers back home in California. I could not help but contrast the conditions of the people in the comfortable offices with those of the workers picking tomatoes in the sweltering heat of the Central Valley. These meditations led me to formulate what I called the farmworker paradox -- the idea that market economies underprice the most essential goods and services; moreover, that the people who do the most essential work get paid the least.

I was still thinking about the subject of my book, which dealt with the way that economists, even before Adam Smith, advocated ruthless policies of dispossessing people in the countryside and appropriating their resources, while gushing about natural liberties.

These musings about the farmworker paradox led me to begin another project, which culminated in The Perverse Economy: The Impact of Markets on People and Nature (Perelman 2003). This paper will return to that theme, after turning to an entirely different literature, beginning with a discussion of Lewis Mumford and Jane Jacobs. Then I will turn to an earlier treatment of natural resources, represented by Henry Carey, Justus von Liebig, and Karl Marx. Finally, I will offer some concluding observations regarding the relationship between town and country.

Lewis Mumford: Round 1

These two distinguished architectural critics were fighting against the ongoing dehumanization of traditional cities in which human beings could once walk around comfortably and interact with one another. Both saw the agrarian world as the passive object of urban activity, yet they took opposing views regarding the relationship between the urban and agrarian worlds.

Their common nemesis was Robert Moses, the all-powerful New York planner whose massive projects ran roughshod over the kind of neighborhoods that Jacobs relished. Both shared a disgust with Moses's massive New York City redevelopment schemes and attributed the problem to deeper causes.

For Jacobs, Moses was the embodiment of a big government, insensitive to human needs. For Mumford, Moses represented something more intangible and more fundamental. Mumford's Moses personified the almost inevitable evils associated with the combination of untrammelled political power combined with seemingly uncontrollable force of modern technology run amok. Mumford traced the origin of Robert Moses's array of projects back to what he called the "megamachine" -- a form of production that he dated back to the massing of large numbers of workers to construct ancient monumental structures, such as the pyramids. Although this megamachine has the capacity to add to the comforts of life, it is also capable of enormous destruction, especially with the harnessing of fossil fuels and then atomic energy. This latter form of energy was crucial for Mumford.

Mumford originally admired Moses and welcomed the liberating potential of modern technology. Mumford had once been an enthusiastic supporter of the Tennessee Valley Authority, believing that electricity had the potential to eliminate urban smokestacks and create a decentralized economy of small shops located in pleasant suburbs or the countryside. He was shattered when he saw the TVA leading to Los Alamos and finally to Hiroshima and Nagasaki (Hughes 1990, pp. 300-1 and 447-48).

Later, after growing state power combined with the ability to harness fossil fuels, the megamachine took on Frankensteinian proportions (Mumford 1970, p. 30). In Mumford's words: "In this mechanical realm, the human personality was an embarrassment to the new conception of 'objectivity': to eliminate this 'irrational' human factor was the common aim of both theoretic science and advanced technology" (Mumford 1970, p. 430).

Mumford embarked on a detailed historical study of the city, connecting its evolution with underlying economic forces. Commenting on what occurred after the relatively democratic Italian city states gave way to a

more autocratic form (see Bruni 2006, pp. 28-30), Mumford wrote:

... the planning of cities ... [was] supported at every point by profound political and economic transformations.

The forces that had originally brought the royal cities of the ancient world into existence reappeared once more, with scarcely a change, except perhaps that the new engines of power were even more ruthless, one-sided, non-cooperative; even more indifferent to the slow, complex interactions, the patient adjustments and modifications through trial and selection, which mark more organic methods of city development. [Mumford 1961, p. 350]

Mumford continued on this theme:

It was one of the triumphs of the baroque mind to organize space, to make it continuous, reduce it to measure and order Long before [Robert Moses and] the invention of bulldozers, the Italian military engineer developed, through his professional specialization in destruction, a bulldozing habit of mind: one that sought to clear the ground of encumbrances, so as to make a clear beginning on its own inflexible mathematical lines. [Mumford 1961, pp. 365 and 387]

A Digression on Rome

Ancient Rome was for Mumford the archetypical great city. Mumford's Rome offered pleasures, without being pleasant:

... to enjoy it [Rome], one must keep one's eyes open, but learn to close one's nose to the stench, one's ears to the screams of anguish and terror, one's gullet to the retching of one's own stomach. Above all, one must keep one's heart on ice and check any impulse to tenderness and pity, with a truly Roman stolidity. All the magnitudes will be stretched in Rome: not least the magnitude of debasement and evil. Only one symbol can do justice to the contents of that life: an open sewer. And it is with the sewer that we shall begin. [Mumford 1961, p. 214]

Mumford regarded the sewer was a magnificent feat of engineering as well as an object of disgust:

the oldest monument of Roman engineering is the Cloaca Maxima, the great sewer, constructed in the sixth century on a scale so gigantic that either its builders must have clairvoyantly seen, at the earliest moment, that this heap of villages would become a metropolis of a million inhabitants, or else they must have taken for granted that the chief business and ultimate end of life is the physiological process of evacuation. [Mumford 1961, pp. 214-15]

... a gigantic mouth and stomach, sucking in foods, booty, works of art, slaves, religions, gods, scraps of knowledge, turning every refinement of culture, every decency of daily life, into something at once lurid and brutal, sensational and disgusting, pretentious and meaningless. [Mumford 1961, p. 225]

Rome drew upon the produce from a wide swath of the world. As Alfred Marshall noted: "Her imports were won by the sword; they were not bought with the products of skilled work" (Marshall 1920, p. 741).

Peter Temin illustrates the scope of Rome's reach in consuming agrarian resources. He reports that in early Rome, the city already required 150-300,000 tons of imported grain (Temin 2001). A study by specialists puts the figure even higher, at a "colossal (quantity) in excess of 400,000 metric tons" (Aldrete and Mattingly 1999, p. 173). The gravitational pull of Rome's demand for grain was such that even as far away as Egypt and Palestine, the price of grain was equal to the Roman price minus the cost of transportation -- foreshadowing the future of globalization (Temin 2006, p. 139, Figure 1).

Rome did not just consume grain: "Romans imported and consumed delicacies from all over their world: grain from Africa, special breads from Parthia, walnuts from Persia, dried fish from Spain, and wine from Gaul and the Greek islands" (Stambaugh 1988, p. 144).

Mumford's Rome did not just devour the fruits of agrarian society; it also consumed the humanity of the Romans. For Mumford, life in Rome was coarse and cruel, especially for the teeming poor. In short, Mumford declared the great city to be a necropolis (Mumford 1961, chapter 8). Just as the sewer was the symbol of Rome, Rome became the model for later urban overgrowth:

Rome's chief contribution to city development is the negative lesson of her own pathological over-growth; a lesson that is apparently so hard to read that city after city has taken mere physical and economic expansion as a testimony to its prosperity and culture. For this reason, I have dwelt on Rome's chaotic sanitation, its parasitic regimen of life, its compensatory rituals of extermination Every overgrown megalopolitan center today, and every province outside that its life touches, exhibits the same symptoms of disorganization, accompanied by no less pathological symptoms

of violence and demoralization. [Mumford 1961, p. 239]

For Mumford, "Every phase of life in the countryside contributes to the existence of cities" (Mumford 1938, p. 3). In short, Mumford sees Rome, the prototype of the modern city, as a "parasitic regime," consuming the products of agrarian society and then sending its waste products back in return.

Mumford's vision of the human experience modern city is more nuanced, but still essentially negative. He used a photograph of the crowded sidewalk of Fifth Avenue in New York to illustrate "the intense and varied life that this great city offers," but the crush of people in the scene displays no sign of people interacting with each other. Nor could one detect any sign of joy in the photograph. Instead, on the same page, he juxtaposes this photograph with another of an almost equally crowded cemetery, labeling the composite of the two images as "Megalopolis into Necropolis" (Mumford 1970, plate 24).

Jane Jacobs: Round 2

Jane Jacobs offers an image of the human experience in the great modern city -- one diametrically opposed to that of Mumford. Jacobs famously brought to life a picture of her beloved New York as a vibrant city in which people interact and can enjoy the distinct cultures of the community. Her city, brimming with innovations, technology, and commerce, offers a rich human experience.

According to Jacobs:

Cities have long been acknowledged as primary organs of cultural development; that is, of the vast and intricate collections of ideas and institutions called civilization Cities are also primary economic organs Even innovations created specifically for farming depend directly upon earlier developments of city work. [Jacobs 1969, pp. 6 and 9]

Like Mumford, Jacobs recognized the power of economies of scale in the city. Her version of economies of scale did not involve mammoth projects, such as huge factories; instead, she emphasized complex networks of voluntarily associated small organizations. In fact, the growth of large organizations did not seem to confer any substantial benefits of increasing scale. Perhaps unwittingly, Jacobs echoed Alfred Marshall's vision of industrial districts in which the clustering of like businesses produced networks capable of accelerating progress (Marshall 1920, pp. 265 ff).

Jacobs used the example of Lockheed's factory in Marietta, Georgia to illustrate the fallacy of relying on large organizations to spur economic activity. When the Lockheed began in Los Angeles in the 1920s, a broad network of suppliers and customers in the immediate vicinity contributed to the company's success. Then, in 1951, Lockheed announced that it was going to reopen an old Bell Aircraft plant that had been shut down after World War II. Because no extensive networks existed in the vicinity, the Marietta factory had to rely on the existing contacts of the Los Angeles office. As a result, the Marietta factory remained an economic island, with few linkages to the local economy (Jacobs 1985, pp. 96 ff). The Los Angeles networks presumably continued to grow, while Marietta had to wait until Atlanta's sprawl finally embraced it. Jacobs neglected to mention the contribution of a different kind of network in the company's success -- the company's tight relationship with Georgia Senator Richard Russell, the powerful head of the Armed Services Committee, beginning in 1951, the year of Lockheed's announcement, until 1969.

Jacobs's intended lesson was that agrarian life cannot hope to prosper by plopping down large factories (or in today's world, prisons) to jumpstart their economies. Instead, the natural emergence of intricate networks of small operations provide the foundation for successful development -- a process similar to the arrangement that had helped the Lockheed in its early stages in Los Angeles. For Jacobs, writing before the Internet, such networks can exist only in urban settings.

Established networks are no guarantee of success. Anticipating the history of Silicon Valley, where employees of Fairchild left to create a myriad of Fairchildren, such as Intel, Jacobs insisted that a system of networks will remain vital only if talented employees are free to break away and start their own companies. Such entrepreneurial freedom will enrich the network, even if it might inconvenience employers who loose valued workers (Jacobs 1969, pp. 97-98). In any case, networks develop most effectively where they are already well established.

Jacobs's idealization of the city reflects the obvious attractions of urban life, but her portrait includes only a part of urban life. Reading *The Economy of Cities* one could almost get the impression that the inhabitants of cities are predominately professionals and intellectuals. Jacobs sheds some light on her perspective in interesting passage in which she also seems to have originated the now popular term, "social capital," in describing how cities work. She wrote:

If self-government in the place is to work, underlying any float of population must be a community of people who have forged neighborhood networks. These networks are a city's irreplaceable social capital. [Jacobs 1961, p. 138]

What follows is revealing about her attitude:

Some observers of city life, noting strong city neighborhoods are so frequently ethnic communities -- especially communities of Italians, Poles, Jews or Irish -- have speculated that a cohesive ethnic base is required for city neighborhood that works as a social unit. In effect, this is to say that only hyphenated-Americans are capable of local self-government in big cities. I think this is absurd

One of New York's most effective neighborhoods, with an internal communication that is a marvel, is the Midtown East Side of predominantly high income people, utterly undefinable except as Americans. [Jacobs 1961, pp. 138-39]

In the brief section where Jacobs mentions poverty, she casually asserts that unregulated markets would naturally eliminate poverty (Jacobs 1969, pp. 119 ff). One could be forgiven from assuming that she also believed that the agrarian world would be nothing more than a backwater of rural boobs, without the cities' significant contributions to technology, commerce, and culture. In contrast, one might imagine that Mumford's countryside was once idyllic until it was sucked dry by the large, congested cities.

Lewis Mumford vs. Jane Jacobs: Summing Up

Neither Mumford nor Jacobs would be likely to accept my crude characterization of their work, but the respective mentalities that they represent do lend themselves to that kind of thinking. Although both Mumford and Jacobs present a one-sided picture, both presentations contain important grains of truth.

For Mumford, the inability to make living might have been the only rational reason to leave agrarian society for the horrors of the city. In place of Mumford's horrors, Jacobs captured the exquisite spontaneity of the city like nobody else. Her images of a once delightful urban walk make a stark contrast with the urban world now dominated by the automobile with the attendant freeways, sprawl, and cul de sac developments. For Jacobs, the attraction of the cities drew the best and the brightest from agrarian society, but large-scale planning projects were destroying the very characteristics that gave cities their vitality.

Where Jacobs associated the dehumanization with Moses's version of urban planning, Mumford's far darker interpreted the megacities as an embodiment of a generalized human lust for power, enabled by a mindless appropriation of powerful technology. Both, however, resented negative -- almost totalitarian -- forces engulfing the city.

Today, as urban powers impoverish agrarian society on a global scale, opportunities to lead a decent life in the countryside are rapidly disappearing. Hundreds of millions of people around the world are fleeing to urban slums. In some cases, the attractions of urban life play a role, but push from the countryside is a much greater force.

Although a growing economy requires inflows of labor from the countryside, the crush of people into the cities far exceeds the urban economies' capacity to absorb them. In 2002, the United Nations reported that in 1950 there were 86 cities in the world with a population of more than one million; at the time of the report there were 400, and by 2015 at least 550 are projected (Davis 2006, p. 1). In the process, Mumford's terrifying vision of the city as a neo-Roman necropolis, peppered with luxurious shopping outlets, is becoming all too common around the world.

As the cities swallow up larger populations, they take up larger and larger spaces. As a result, the compulsive accumulation of urban power is no longer confined to siphoning off resources from the countryside, but literally swallows up the countryside itself.

The Labor Nexus between Town and Country

Fernand Braudel once observed, "A town is always a town, wherever it is located, in time as well as space" (Braudel 1981, p. 481). He pointed to:

... the extremely important fact that even the humblest town dweller must of necessity obtain his food-supply through the market: the town in other words generalizes the market into a widespread phenomenon Wherever there are towns, there will also be a form of power, protective and coercive. [Braudel 1981, p. 481]

Armed with this coercive power:

The western town swallowed everything, forced everything to submit to its laws, its demands and its controls. The market became one of its mechanisms. [Braudel 1982, p. 28]

From the urban point of view, rural life has no value except to promote the welfare of the city -- meaning the wealth and power of the already wealthy and powerful.

In early times, one of the most important contributions of the countryside was to provide soldiers in times of war. This value diminished as the military began to depend more on technology rather than on headcounts. With the advancement in transportation, cities became less dependent upon their immediate countryside for their sustenance, as the history of Rome suggests. In effect, the entire rural world serves as the countryside for a great city.

With the expansion of the market economy, the supply of labor for industry, rather than the military, began to be more pressing. At first, the quantity of labor required for industry was relatively modest -- after all, the unequal distribution of income restricted the size of the market.

During early capitalism as the market began to expand, intellectuals became troubled by the idea that masses of people were still subsisting in the countryside, more or less independent of the money economy. For example, Sir James Steuart, a slightly older and initially more influential contemporary of Adam Smith, wrote in his characteristically cold manner that in so far as a person exercised the art of agriculture "as a direct means of subsisting ..., the state would lose nothing though [he] ... and his land were both swallowed up by an earthquake" (Steuart 1767; 1: p. 116; see also 4: p. 314).

In *The Invention of Capitalism*, I showed how important figures of British classical political economy were intensely interested in promoting primitive accumulation -- the cruel dispossession of previously self-sufficient people in the countryside (Perelman 2000). By denying these people their traditional access to their land, they were left with little choice but to offer their services as wage labor. In this way, the emerging business community could enjoy both an adequate labor force and growing markets for industry. This commercial demand for labor was initially in agriculture, then in rural workshops, and finally in more urbanized areas.

Some of the more sophisticated analysts even attempted to calculate the appropriate measures that would calibrate the flow of labor into urban employment with the gradual increase in labor demand. In reality, however, the market economy fluctuates -- often violently. When the demand for urban labor falls far short of the supply, measures to expel some of the surplus come into play.

In the modern world, the excess supply of labor, rather than a deficiency, is the rule. The calculus is no less cruel. For example, by the late 1960s, as manufacturing jobs were disappearing in New York, the city began what came to be known as planned shrinkage -- a cynical program designed to eliminate many working-class people from the city. Its primary spokesman was Roger Starr, New York City Housing Commissioner. Starr's most brazen explanation of the plan came in a talk reported by a relatively obscure publication, *Real Estate Weekly*, on February 9, 1976. Because neither the publisher nor any New York Library archives this paper for any length of time, we must rely on the few published fragments that remain, which reads as if it were a satire from Jonathan Swift. According to Starr:

We should not encourage people to stay where their job possibilities are becoming daily more remote. Stop the Puerto Ricans and the rural blacks from living in the city ... reverse the role of the city It can no longer be the place of opportunity Our urban system is based on the theory of taking the peasant and turning him into an industrial worker. Now there are no industrial jobs. Why not keep him a peasant? [Fitch 1993, p. viii]

A few months later, Starr later attempted to justify his program in the *New York Times Magazine*. The paper, which would make him a member of its editorial board within two months, naturally offered him a sympathetic outlet. Starr titled his piece, "Shrinkage Is Inevitable." In his plea for understanding, Starr was hardly apologetic: Planned shrinkage is the recognition that the golden door to full participation in American life and the American economy is no longer to be found in New York The role of the city planner is not to originate the trend of abandonment but to observe and use it so that public investment will be courted for those areas where it will sustain life. [Starr 1976]

Starr's statement was not entirely consistent with the facts. First of all, the city was actively promoting abandonment by intentionally diminishing public investment in order to promote shrinkage. Besides, the expected investment was to come only after the city's policy had driven people from their neighborhoods.

A little context will help. As finance was replacing manufacturing, clearing people from large tracts of land represented a potential boom for real estate interests. The RAND Corporation developed one of the most effective techniques for achieving this objective. By impeding the fire department from reaching targeted neighborhoods, communities would rapidly deteriorate. Property values were expected to fall, while the

accumulation of burnt out buildings and abandoned housing create a dangerous environment in which more people would voluntarily flee, eventually giving the city an excuse to clear out entire area.

The plan worked as expected. Knowledge about many of the details of this strategy only recently became accessible in a horrifying book appropriately titled, Plague on Your Houses: How New York Was Burned Down and National Public Health Crumbled (Wallace and Wallace 1998).

In a sense, the New York program was even worse than the earlier wave of primitive accumulation. I know of only one case when someone was intentionally burned to clear the property in the early stage of primitive accumulation -- perhaps because those in power regarded the potential labor of the workers as important. In the New York case, the people were presumed to be entirely disposable.

More recently, eminent domain has offered a more legalistic avenue for dispossession in the United States, as the Supreme Court's Kelo decision allowed New London, Connecticut to displace homeowners to make way for a commercial development

Globalization is creating an international dimension to this modern version of primitive accumulation, where less affluent countries with large pools of unemployed workers are desperate to create jobs and corrupt rulers are often open to financial inducements. Multinational corporations set governments to bid against each other in order get a major factory located in their jurisdiction, willingly dislocating poor farmers in the name of progress and the promotion of industrialization. No doubt these ruler and their technocrats are ignorant of Jacobs's Marietta precedent.

Conflict and Cooperation

Despite their one-sided presentations, both Mumford and Jacobs captured important elements of the complex mÉlange of conflict and cooperation that characterizes the relationship between town and country.

Jacobs told us that the countryside depends on technological, commercial, and cultural advances developed in the cities. This mutually beneficial side of the exchange between town and country is fairly obvious. Typically the countryside provides essential materials, especially food, water, and mineral supplies, while the urban economies provide goods and services for the countryside. The modern rural population would certainly suffer if it were cut off from access to products from the city. Even cell phones are fast becoming common in poor parts of the world.

In contrast to Jacobs's emphasis to the beneficial role of the city, Mumford brought attention to the important role of asymmetric power relationship in which the countryside has to nourish the towns while receiving the urban wastes in return.

Given the strategic importance of the materials imported from the countryside, one might expect that rural areas would be in better position to extract great rewards from the cities. After all, large cities could not exist without a steady flow of these resources.

For example, for the city to survive, Rome's engineers had to construct magnificent aqueducts to transfer sufficient water to the city from far-off lands. But then, as Marshall noted, Rome's products were largely "won by the sword." So, despite the hierarchy of needs, power generally rests in the cities.

Even the sword did not always favor the cities. In ancient times, the wealth of the cities made an inviting target. As cities accumulated wealth, warriors from impoverished lands -- whether Vikings by sea or horsemen from the Asian steppes -- would raid less warlike settlements. Rome survived for a long time by incorporating soldiers from far off places into its massive army, but eventually Rome too fell.

Today, urban powers have developed a new and possibly more durable strategy. Military force stands in the background, while bankers and financiers manage the flow of wealth from the countryside to the wealthy urban centers. An equitable and environmentally sensitive integration of town and country remains a dream to this day.

I will now turn to a curious trio who addressed the possibility of integrating town and county in the mid-19th century.

Henry Charles Carey

The first of this cast of characters was Henry Charles Carey, the most creative American economist of the time. Carey's father was a strong Irish nationalist, who escaped to France rather than face trial for insufficient British patriotism. Later Marshall Lafayette lent him money to move to the United States, where he flourished as the leading publisher in the new nation.

Carey's education consisted of accompanying his father on book-selling tours. He emerged on the public stage as an ardent free trader, at least until he experienced bankruptcy. Newly transformed as a protectionist,

Carey became the leading theoretician of the emerging Republican Party on the eve of the Civil War.

Underlying Carey's world view was an intense hatred of all things British -- a sentiment that he inherited from his father. Central to his analysis was the charge that the British were exploiting the rest of the world by enticing farmers from far off regions to export their produce rather than manufacturing for themselves.

Carey, using an idiosyncratic terminology, called for an intensification of commerce and the abolition of trade. For Carey, trade meant the long distance exchange of goods, which generally entailed one party selling raw materials to another party -- usually meaning Britain -- which would then work these materials into finished goods. Such trade was necessarily exploitative. Commerce was localized exchange.

Carey had a conspiratorial interpretation of this British policy, charging that the British intended to compel "the rude produce of the earth to be sent to England, there to be subjected to those mechanical and chemical processes required for bringing it to the form in which it was fitted for consumption" (Carey 1858a; i, p. 412).

Carey added an ecological dimension to his argument. He claimed that, in effect, the British said to "the farmers of Brazil and the United States":

Cultivate your rich soils, and leave us to our poor ones. Labor being cheap with us, we can manufacture more cheaply than you do. Do not, therefore, once and for all build mills or furnaces; continue year after year to expend your labors in carrying goods back and forth; continue to exhaust your land; continue to have no combination of effort among yourselves; and you will grow rich. The time, however, will arrive when you will be forced to cultivate the poor soils, and then you will be troubled with overpopulation. Wages falling you may then be enabled to accumulate the capital required for entering into competition with us; that is, the poorer you become, the greater will be your power. [Carey 1858a, iii, p. 66]

According to Carey, the British did not just profit in conventional economic terms; the British also impoverished the exporting countries, which were depleting their soils by exporting nutrients abroad in the form of raw materials, while the British steadily improved their industrial might. This one-sided arrangement would necessarily lead to a decline in the potential of any country foolish enough to allow itself to become engaged in trading with England.

At times, Carey sounded as if he were a brother in arms with Karl Marx, describing how one group of people unjustifiably lived at the expense of the rest. Unlike Marx, who divided the contending groups by class, Carey denounced the exploiters for their British nationality, rather than their monopoly of capital. For example, in denouncing the English school of political economists, he charged:

... the whole basis of their system is conversion and exchange, and not production, yet neither makes any addition to the amount of things to be exchanged. It is the great boast of their system that the exchangers are so numerous and the producers so few, and the more rapid the increase in the proportion which the former bear to the latter, the more rapid is supposed to be the advance towards perfect prosperity. Converters and exchangers, however, must live, and they must live out of the labour of others. [Carey 1851, p. 46]

Guano

Carey's concern with the depletion of soil minerals might seem quaint today, given the present availability of cheap fertilizers. At the time, however, declining soil fertility -- and even more visibly, declining crop yields -- were a matter of international concern. European farmers in this period even raided the Napoleonic battlefields (Waterloo, Austerlitz) for bones to spread over their fields (Foster 1999, p. 375; Hillel 1991, p. 131). Alas, the bones were too few.

Farmers had to look to far off lands in search of guano, which was supposed to be the answer to their problems. John Bellamy Foster reported:

So desperate was the condition of capitalist agriculture in this period that the mid-nineteenth century saw a frantic search for guano throughout the world and in the rise of a period of guano imperialism. The first great overseas colonial expansion of the United States was a direct outgrowth of this crisis of the conditions of production in agriculture. [Foster 1997, p. 286]

Countries even threatened to go to war over access to the limited supplies of guano. American farmers vehemently objected to a British monopoly on this fertilizer. The subject of guano seemed so pressing that Millard Fillmore's first state of the union address called attention to the growing importance of guano (Skaggs 1994, p. 14).

Control over guano deposits set off a war between Chile and Bolivia fought a war, leaving Bolivia landlocked. Not all the guano islands were uninhabited. People had to be displaced to make way for guano mining (Ponting 1991, p. 218-19).

In 1856 Congress passed the Guano Islands Act: "Whenever any citizen of the United States discovers a deposit of guano on any island, rock, or key, not within the lawful jurisdiction of any other Government, and not occupied by the citizens of any other Government, and takes peaceable possession thereof, and occupies the same, such island, rock, or key may, at the discretion of the President, be considered as appertaining to the United States." According to one survey:

Between 1856 and 1903, American entrepreneurs laid claim to ninety-four islands, rocks, and keys around the globe under authority of the Guano Islands Act. Of these places, sixty-six (mostly in the Caribbean sea and Pacific ocean) were at least temporarily recognized by the U.S. Department of State to be American appurtenances, but fewer than two dozen of them were ever mined. Today, nine erstwhile guano islands continue to be U.S. possessions. [Skaggs 1994, p. 14]

The United States is gradually abandoning some of its more outlandish claims to far off territories based on these ancient guano deposits, but the country still tenaciously holds on to some Caribbean guano islands (see Rubin 2001).

Carey, Harmony, and Commerce

Carey's interpretation of trade led him to create a new theory of value, at odds with, but in some ways superior to conventional economics. For Carey value is the cost of reproduction. In Carey's words, "value ... is simply our estimate of the resistance to be overcome, before we can enter upon the possession of the thing desired. That resistance diminishes with every increase in the power of man to command the always gratuitous services of nature" (Carey 1858b, i, p. 148). In other words, the value of a newly produced good reflects the difficulty of reproducing it in the immediate future, making Carey sound closer to the vision of modern environmentalism than that of conventional economics.

For Carey, technological progress would continually reduce the manufacturing costs of Britain. According to his theory of value, each purchase of a product from Britain could help to lower that country's cost of reproduction. At the same time, each export of raw materials to Britain would result in depletion which would increase the cost of reproduction for Britain's vassal states.

Although Carey wrote of a conflictive international economic struggle, he saw the national economy was a system of natural harmony, which could work flawlessly, in the absence of the imperialistic machinations of Britain. In fact, the previous citations about value came from Carey's aptly titled work, The Harmony of Interests.

While condemning the policy of the United States in this epic struggle with Britain, Carey pointed to a harmonious solution that would transcend scarcity through commerce. In contrast to British oriented trade, Carey advocated his own brand of commerce -- a network of transactions in which buyers and sellers are close proximity. Carey insisted:

The words commerce and trade are commonly regarded as convertible terms, yet are the ideas they express so widely different as to render it essential that this difference be clearly understood. [Carey 1858a; i, p. 210]

According to Carey, commercial relations are necessarily harmonious:

The nearer the consumer and the producer can be brought to each other, the more perfect will be the adjustment of production and consumption, the more steady will be the currency, and the higher will be the value of land and labour. The object of protection is to accomplish all these objects, by bringing the loom and the anvil to take their natural places by the side of the plough and the harrow, thus making a market on the land for the products of the land. [Carey 1851, p. 190]

Carey found support for his belief in the efficacy of commerce in the deepest recesses of the human mind: "The first desire and greatest want of man, is that of association with his fellow-men" (Carey 1858a, iii, p. 58).

Elsewhere, he wrote, "All men ... desire to maintain commerce with each other -- exchanging ideas and services, or commodities, in which the services are embodied (Carey 1858b, p. 57).

From his belief in the innate drive toward commerce, Carey jumped to the conclusion that "Every act of association is an act of commerce, implying the production and consumption of two services, neither of which would have been produced, had the demand for them not arisen" (Carey 1858b, p. 61).

Carey went much further. With one of his many great leaps of logic, ignoring his concerns about depletion, he proclaimed: "The treasures of nature are boundless ... requiring for their full development only the

carrying into full effect the idea expressed by the magic word -- ASSOCIATION" (Carey 1858b, p. 51). He calculated that earth could support population of 30 billion with rising living standards (Conklin 1980, p. 265).

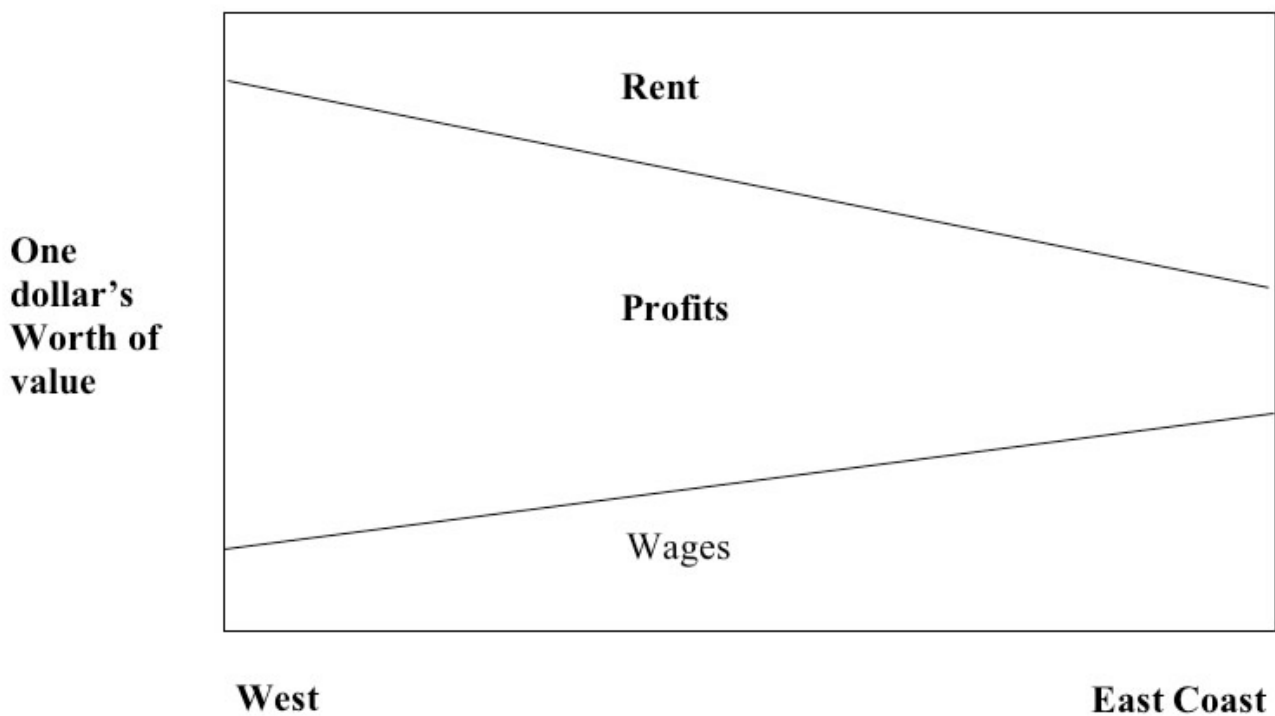
Carey's antagonism toward trade and advocacy of commerce is somewhat reminiscent of the contemporary preference for local business over national chain stores. Even so, Carey promoted the policy of freely chartering corporations as a means of furthering cooperation -- a notion that might horrify agrarian activists. After all, contemporary corporations, rather than Imperial Britain, are the main force increasing trade at the expense of Carey's commerce.

Carey's Commodity Map

In effect then, Carey insisted that extensive trade with Britain would preclude the United States from enjoying the bounty of future technological progress, while preventing the country from enjoying harmonious class relations. This approach allowed Carey to deny the likelihood of class conflict, while justifying his deep-seated antagonism toward Britain.

To illustrate his theory, Carey drew what I think of as a commodity map of the United States (see Carey 1858a, iii, p. 187).

Carey's Commodity Map



The height of this rectangular map represents the value of a dollar's worth of a typical commodity. The horizontal axis represents both geography and progress over time -- more on that later.

Inside the rectangle is a cone, except for the tip, which is missing. The base of the cone covers most of the left hand side of the rectangle. If the cone were complete, its tip would fall to the right of the right hand side of the rectangle. The truncated tip covers a much smaller portion of the right hand side than the base covers on the left hand side.

The cone divides the dollar receipts from the sale of the commodity into rent, profit, and wages. Everything above the top line of the cone represents wages; everything below the bottom line, rent. The cone itself represents profits. Moving from left to right, profits fall, while wages and rents increase.

The left hand side of the figure supposedly reflects conditions in the westernmost settlements of the United States; the right hand side, conditions along the northeastern seaboard. The rest of the graph is supposed to represent the gradations as one travels from West to East.

You can also read the horizontal axis as representing time, since Carey believed that the natural progress of the United States, in the absence of a trading relationship with Britain, would carry the economy from a state of natural resource exploitation, common to the West, to a more integrated society, similar to that of the industrial regions of the eastern seaboard.

In the West, the economy is simpler and the division of labor, less refined. Think of the production of cattle. In the West, a handful of workers can manage a huge herd of cattle. Land is virtually free. Most of the returns from cattle production come in the form of profit. Wages are minimal.

Carey conceptualized the West as an exporter of grain rather than cattle, but then the map is only conceptual rather than an accurate representation of the economy. Whether the West specialized in grain or cattle, the principle is the same -- great profits without much going to wages and rents. The continual extraction of fertility in the form of exports of agricultural products without a replacement of the nutrients was bound to deplete the soil. For this reason, Carey denounced the rapid westward movement in the United States, seeing in that process:

[A] waste of capital, in the form of physical and mental power, not exceeded by any country of the world, with the slightest claim to be held as civilized. Farm after farm is cleared, and State after State occupied, to be then in part abandoned because of the growing necessity for robbing the earth of the soil, to be sold in distant markets. Mills follow mills, and furnaces follow furnaces -- ruining, in quick succession, all who undertake such works. Employers and workmen spend years in acquiring skill -- to be then turned adrift. [Carey 1858b, p. 150]

Rather than westward expansion, Carey favored more highly concentrated development in the eastern part of the country. In that region, a multitude of workers could combine their efforts within an elaborate network of production. Workers could work materials up into ever more refined products within a closed ecological cycle in which waste products would return as new commodities.

If Carey's map were an accurate representation of the economy, one could merely add up the sum of the returns from each commodity to determine the distribution of the Gross National Product. Following this logic, Carey suggested that the part of the commodity map representing the East Coast represented the natural outcome for a harmonious market as an economy approaches a locally integrated production process. In the process, wages and rents would increase at the expense of profits, eliminating imbalances that would otherwise lead to conflict. Carey contended that this gradual disappearance of profits, along with the growth in prosperity, proves the ultimate harmony of classes.

What would really happen to the rate of profit? We cannot know for certain, but Carey suggested that the capital-output ratio would fall because the more rapid physical turnover of materials, allowing for a higher throughput. For example, even though a supermarket might only make a fraction of penny on a loaf of bread, if it sells that loaf within a day, replaces it, and sells another tomorrow, then repeating this process over the course of a year could make a very high rate of profit. However, Carey's theory also implies that capitalists should be suffering continual capital losses of their investment as new technology lowers the cost of reproduction.

Carey never invoked increasing returns to scale. However, he predicted that rising population will necessarily create more intensive association and commerce, leading to any number of efficiencies, including lowered transportation costs and more effective reuse of waste materials.

Carey's idealized vision of the Eastern economy also suggests environmental, as well as social harmony. Waste products, presumably including human waste, could be recycled or reused. This closed circuit of resources could provide for an economy that could continue in perpetuity. In the process, the soil would become increasingly productive.

Josiah Tucker, a British clergyman who was a more influential economist at the time than his contemporary, Adam Smith, developed a perspective that was somewhat similar to that of Carey. Like Carey, Tucker had an international context in mind. Tucker was arguing against the need for conquest in order to support a larger population. He wrote:

Only let it be always remembered that the more populous any country is, the more manure and soil will be made by the inhabitants. So that the large towns and populous villages do not only furnish a market for the produce of the country round about, and thereby pay for the labour, and excite the emulation of the husbandman, but also supply him with dung, rags, horn-shavings, ashes, soot, etc., etc., to load his carriages back in order to fructify his grounds for fresh crops. So little cause is there to fear, that a country can be too populous! [Tucker 1758, p. 24]

Given the great potential of integrated commerce, Carey ruled out the possibility of Malthusian scarcity. Producers and consumers would be in close proximity. Most transportation costs would disappear. Products would turn over faster, because goods would no longer have to traverse long distances to far off markets. Because materials would not be tied up in transit for long periods, the effective supply would multiply. According to Carey's vision, the entire economy would evolve into a "green industrial district," which would delight a modern environmentalist. However, Carey never took note of the Second Law of Thermodynamics, which might not be surprising since he was an investor in coal mines.

Unlike Alfred Marshall's industrial districts that specialize in a particular industry, Carey's industrial districts would produce the entire gamut of human needs, similar in many ways to Jacobs's vision (Marshall 1920, p. 271). Although high population density can allow for increasing returns to scale, restricting production to a single locality to restrict trade, also limits potential increasing returns from specialization.

Carey's map, while very clever, has other gaps in realism. What was actually happening after the Civil War in the United States? Industry was finally learning to effectively harness fossil fuels. Capital goods were rapidly falling in price, but each generation operated on a larger scale. Although capital costs per unit of production were indeed falling, just as Carey described, the story was more complex. Increasing scale of production flooded markets with goods, causing competitive price decreases. Major corporations managed to blunt competition by the tariffs that Carey advocated and by corporate consolidations that provided monopolistic power.

Carey was most off base in his prediction for wages, partially because of massive immigration which he opposed; also because business invested in capital goods specifically designed to limit the need for skilled labor (see Perelman 2006).

Although a few people in the United States, such as E. Peshine Smith (1853) and George Waring (Waring 1857), followed Carey's concern with the protection of fertility, Carey's ideas about the importance of protecting the fertility of the soil resonated in Europe, where his prestige was far greater. Probably the most influential person to draw upon Carey was Liebig.

Justus von Liebig

Justus von Liebig, the pre-eminent theorist of plant nutrition who was celebrated in England, gave a great deal of credence to Carey's historical analysis of agriculture. In his Letters on Modern Agriculture, Liebig cited Carey although Liebig's concern with the demineralization of the soil predated Carey's:

In the United States distances of hundreds and thousands of miles separate the places where corn is grown from the markets; the consequence of this may be seen in the fact that the soil is almost everywhere exhausted, and that the prosperity of the country is declining, instead of increasing. Our land has not yet grown feeble from this loss of its life-blood; but the hour is indicated when, should the present system be persisted in, the last throb of the heart of the nation will cease, -- when America, Greece, and grown will stand side by side amidst the ruins of the past. Labour spent in the spoilation of the soil is worse than labour thrown away. [Liebig 1859, Letter XI, p. 220]

Like Carey, he charged that the British were robbing the rest of the world of its fertility:

Great Britain deprives all countries of the conditions of their fertility. It has raked up the battle-fields of Leipsic, Waterloo, and the Crimea; it has consumed the bones of many generations accumulated in the catacombs of Sicily; and now annually destroys the food for a future generation of three millions and a half of people. Like a vampire it hangs on the breast of Europe, and even the world, sucking its lifeblood without any real necessity or permanent gain for itself. [Brock 1997, p. 178]

Yet, for Liebig, Britain's self-inflicted destruction seemed to be more serious than the costs that Britain imposed on the rest of the world. In particular, the recent spread of flush toilets that sent valuable minerals to the sea represented a criminal squandering of resources. A modern writer portrayed Liebig, scolding the British with a dramatic flourish:

Your nation, Britain, has caused the grave depletion of its fields' fertility, by waste of its excretion. As a famous

German chemist Liebig issued the precaution that this cabin creates havoc of Noah's Flood proportion. Each pull of the chain is like a Noah's Flood taking in its cataracts so much nutritious good. What gets flushed away in these gallons of flood water in terms of drowned potential amounts to wholesale slaughter. [Harrison 1992, p. 13; cited in Brock 1997, p. 250]

The toilets were not just wreaking havoc with fertility in the countryside; they were making life miserable in the city. Liebig's biographer, perhaps with an unacknowledged nod to Mumford, recounted: The growing popularity of the water closet amongst the upper and middle classes had had the unfortunate effect of turning the Thames into a giant sewer -- a cloaca maxima -- that at low tide produced a foul, noisome stench in 1856 known popularly as "the year of the great stench," Parliament was forced to postpone business because of smells. [Brock 1997, pp. 251, 252-53]

Even today, London still sends most of its sewage to the sea, although the city pipes it past the area where it might annoy the town's residents (Brock 1997, p. 270).

Liebig's solution was to prevent the loss of soil nutrients by recycling the sewage into fertilizer. His mostly ignored recommendation would be far more difficult today because of the toxic chemicals that get mixed with the sewage.

This complication reminds us that the solution to the relationship between town and country requires a much more comprehensive analysis than is common today. The third member of our trio, Karl Marx, pointed in that direction.

Karl Marx

Henry Carey and Karl Marx were both working at the same time for the leading Republican paper in the United States, The New York Tribune. Carey wrote economic editorials, while Marx, as the leading reporter on European affairs, was at one point supplying a bulk of the paper's text. Because Marx supported the British war against the reactionary Russian government, Carey went out of his way to undermine Marx's standing with the paper -- even going so far as to hire a Polish count to go over Marx's contributions before they could be published. Marx, in turn, resented Carey for using Marx's material in his books, while crediting him only as an anonymous correspondent for The New York Tribune (see Perelman 1987, chapter 1).

Despite Marx's difficult relationship with Carey, his appearance in this context might seem surprising to some. After all, hundreds of books have dismissed Marx for proposing a labor theory of value -- an expression he himself never used. Frequently, after introducing the idea of the labor theory of value, critics will offer as proof of Marx's incompetence that nature is also important in producing value. For example, in a widely circulated article, Paul Samuelson charged Marx with ignoring "the patent fact that natural resources, too, are productive" (Samuelson 1957, p. 894).

Whether this misreading is the result of willfulness or ignorance is irrelevant. The truth is that natural resources were an integral part of Marx's writings, in part because he regarded the misuse of resources as evidence of the shortcomings of the market.

Marx's environmental perspective is abundantly clear in the short, final section of Chapter 15 of the first volume of *Capital*, entitled Large-Scale Industry and Agriculture, where he addresses the destructiveness of the present "period of ... antagonistic isolation" between town and country (Marx 1977, p. 637). Marx continued: Capitalist production collects the population together in great centres, and causes the urban 'population to achieve an ever-growing preponderance. This has two results. On the one hand it concentrates the historical motive power of society; on the other hand, it disturbs the metabolic interaction between man and the earth, i.e. it prevents the return to the soil of its constituent elements consumed by man in the form of food and clothing; hence it hinders the operation of the eternal natural condition for the lasting fertility of the soil. Thus it destroys at the same time the physical health of the urban worker, and the intellectual life of the rural worker. [Marx 1977, p. 637]

Marx continued:

In modern agriculture, as in urban industry, the increase in the productivity and the mobility of labour is purchased at the cost of laying waste and debilitating labour-power itself. Moreover, all progress in capitalist agriculture is a progress in the art, not only of robbing the worker; but of robbing the soil; all progress in increasing the fertility of the soil for a given time is a progress towards ruining the more long-lasting sources of that fertility. The more a country proceeds from large-scale industry as the background of its development, as in the case of the United States, the more rapid is this process of destruction. Capitalist production, therefore, only develops the techniques

and the degree of combination of the social process of production by simultaneously undermining the original sources of all wealth -- the soil and the worker. [Marx 1977, p. 638]

Marx concluded the chapter, with a long footnote, extensively citing Liebig. In 1887, a few years after Marx's death, Friedrich Engels picked up the theme again. After praising the work of Liebig, he wrote:

When one observes how here in London alone a greater quantity of manure than is produced by the whole kingdom of Saxony is poured away every day into the sea with an expenditure of enormous sums, and when one observes what colossal works are necessary in order to prevent this manure from poisoning the whole of London, then the utopian proposal to abolish the antithesis between town and country is given a peculiarly practical basis. And even comparatively insignificant Berlin has been wallowing in its own filth for at least thirty years. [Engels 1887, p. 368].

Marx's Early Optimism

In his early works, Marx's discussion of scarcity disregarded the complexity of the environment, although he rectified his position in his more mature works. At the time, Marx was convinced that English agriculture was considerably less successful than it appeared to be. Outlining its history, he noted:

The old English industry -- the main branch of which was the woolen industry ... was wholly subordinated to agriculture. Its chief raw material was the product of English agriculture. As a matter of course, therefore, this industry promoted agriculture. Later, when the factory system properly developed, already in a short space of time the necessity for custom duties on corn began to be felt. But they remained nominal. The rapid growth of the population, the abundance of fertile land which had yet to be made cultivable, the inventions, at first, of course raised also the level of agriculture. It especially profited from the war against Napoleon, which established a regular system of prohibition for it. But 1815 revealed how little the "productive force" of agriculture had really increased. [Marx 1845, p. 289]

Five years later, in his notes on Archibald Alison's Fretrade and a Fettered Currency (1847), Marx wrote:

The experience of every age has demonstrated that so great is the effect of capital and civilisation applied to manufactures, and so inconsiderable, comparatively speaking, their influence upon agriculture, that the old state can always undersell the new one in the industry of towns and the new one undersell the old one in the industry of the country. [Marx 1849-1851, p. 112]

Based on the early capitalist advances in agriculture, Marx claimed that scarcity could be easily overcome once capitalism matured and shed its vestiges of feudalism. He attributed agriculture's problems to a precapitalist heritage. He convinced himself that agriculture would eventually progress much like industry:

The soil is to be a marketable commodity, and the exploitation of the soil is to be carried on according to the common commercial laws. There are to be manufactures of food as well as manufactures of twist and cottons, but no longer any lords of the land. [Marx 1852, p. 262]

In this spirit of optimism Marx included in the Communist Manifesto the "application of chemistry to industry and agriculture" among the great technical accomplishments of the bourgeoisie (Marx and Engels 1848, p. 113).

Recent progress seemed to support his buoyant view. For example, his notes from an article in The Economist of 31 August 1850 read:

Cotton manufacture has grown 1248% in a half century, accompanied by a steady fall in the price of raw materials in the last years [to] not more than 1/5 to 1/4 of the price at the beginning of the Century. [Marx 1849-1851, p. 229]

Given this perspective, he predicted a future in which society could easily master natural resource production. For example, in the first part of Theories of Surplus Value, he wrote:

As the constant capital grows, so also does the proportionate quantity of the total labour which is engaged in its reproduction. Nevertheless, the part [of the population] directly producing means of subsistence, although its number declines, produces more products than before. Its labour is more productive. While for individual capital the fall in the variable part of capital as compared with the constant part takes the direct form of a reduction in the part of the capital expended in wages, for the total capital -- in its reproduction -- this necessarily takes the form that a relatively greater part of total labour employed is engaged in the reproduction of means of production than is engaged in the production of products themselves -- that is, in the reproduction of the machinery. [Marx 1963-1971; 1, p. 219]

In Marx's early writings, he attributed the problem of resource scarcity to two interrelated problems: failure of capitalism to harness the scientific method in agriculture along with the deeper contradictions of capitalist system

itself. For example, in The German Ideology, Marx and Engels recognized pollution and other forms of environmental abuse as reflections of contradictions in capitalist society (Marx and Engels 1845-46: pp. 46-47).

Later, he wrote:

The fertility of the soil, as I have likewise already said in the Anti-Proudhon, is something purely relative.

Changes in the soil's fertility and its degree in relation to society, and that is the only aspect of fertility with which we are concerned, depend on changes in the science of chemistry and its application to agronomy. [Marx to Cluss, 5 October 1853; in Marx and Engels 1982, p. 383]

Marx continued this train of thought two weeks later:

In the Misere I cite an example of how in England, land which, at a certain stage of science, was regarded as barren, is at a more advanced stage, considered fertile. I can adduce as a general fact that, throughout the middle ages, esp. in Germany, heavy clay soil was cultivated by preference as being naturally more fertile. In the past 4-5 decades, however, owing to the introduction of potatoes, sheep-farming and the resulting manuring, etc., light sandy soil has taken the pride of place, esp. since it involves no expenses of drainage, etc., and on the other hand its deficiencies can easily be made good by means of chemical fertilizers.... Fertility is not, after all, absolute but a relation of the land to human beings. [Marx to Cluss, 18 October 1853; in Marx and Engels 1982, p. 392]

The Anti-Malthusian Roots of Marx's Optimism

Marx's downplaying of environmental issues was largely political. He did not want to give too much credit to the Malthusian argument that poverty and hardships were due to resource scarcity rather than to the mode of production. For example, Marx wrote to Engels:

The more I get into this crap, the more I am convinced that agricultural reform ... will be the alpha and omega of the coming revolution. Otherwise Parson Malthus would be correct. [Marx to Engels, 14 August 1851; in Marx and Engels 1973: 27, p. 314]

In his optimistic frame of mind in late 1850, Marx copied an extract from William Jacob into his notebooks:

In valuing land, one third of the net produce was formerly considered as the fair proportion to appropriate as rent to the landlord; it is now scarcely a fourth, and in many instances not a fifth. [Jacob 1814, p. 84; cited in Marx 1849-1851, p. 308]

A couple of months later, Marx told Engels that he expected that a study of agricultural progress "would put an end to Malthus' theory of the deterioration not only of the 'hands' but also of the land" (Marx to Engels, 7 January 1851; in Marx and Engels 1975, p. 48). Sometime between January 1862 and 1863, he speculated that the rate of productivity in agriculture would rise even faster than in industry:

This requires: 1. The replacement of the easy-going farmer by the businessman, the farming capitalist; transformation of the husbandman into a pure wage labourer; large-scale agriculture.... 2. In particular, however: Mechanics, the really scientific basis of large-scale industry, had reached a certain degree of perfection during the eighteenth century. The development of chemistry, geology and physiology, the sciences that directly form the specific basis of agriculture rather than industry, does not take place till the nineteenth century....

On the one hand, with the advance of industry, machinery becomes more effective and cheaper; hence, if only the same quantity of machinery were employed as in the past, this part of constant capital in agriculture would diminish; but the quantity of the machinery grows faster than the reduction in its price, since this element is as little developed in agriculture. On the other hand, with the greater productivity of agriculture, the price of raw material -- see cotton -- falls so that raw material does not increase as a component part of creating value to the same degree as it increases as a component part of the labor process. [Marx 1963-1971; Pt. 2, pp. 109-112; see also 1967; 3, p. 760; and Marx to Engels, 2 August 1862; in Marx and Engels 1975, p. 123]

Had Marx progressed no further, his critics might have had some justification for maligning him for insufficient attention to the complexities of scarcity. Fortunately, Marx went on to develop a sophisticated theory of natural resources, which is still worthy of our attention. Moreover, even in his early work, Marx did demonstrate an occasional awareness of the relationship between environmental problems and the capitalist mode of production, but this analysis was not as profound at the time as it would later become.

On the Limits of Capitalist Agriculture

Sometime between 1861 and 1863, Marx developed his analysis of the social nature of scarcity. At that time, he was writing in the notebooks that became the Theories of Surplus Value, the same work in which he set down the

above-cited idea about agriculture progressing faster than industry. In the midst of this work, he suddenly became extremely pessimistic about the long-run prospects for capitalist agriculture. In changing course, Marx asserted: It is in the nature of capitalist production that it develops industry more rapidly than agriculture. This is not due to the nature of the land, but to the fact that, in order to be exploited really in accordance with its nature, land requires different social relations. [Marx 1963-1971, pp. 300-301]

Later, he added:

Capitalist production has not yet succeeded and never will succeed in mastering these (organic) processes in the same way as it has mastered purely mechanical or inorganic chemical processes. Raw materials such as skins, etc., and other animal products become dearer partly because the insipid law of rent increases the value of these products as civilizations advance. As far as coal and metal (wood) are concerned, they become more difficult as mines are exhausted. [Marx 1963-1971; Pt. 3, p. 368]

Marx made the sweeping observation that:

The moral history ... concerning agriculture ... is that the capitalist system works against a rational agriculture, or that a rational agriculture is incompatible with the capitalist system (although the latter promotes technical improvements in agriculture), and needs either the hand of the small farmer living by his own labour or the control of associated producers. [Marx 1967: iii, p. 121]

Marx did not come by this conclusion casually. He became extremely well-read in organic chemistry. He had taken copious notes on Liebig, Johnston, and other agronomists who gave detailed accounts of the problems of soil exhaustion (see Marx 1974, p. 754n). In his opinion, "the new agricultural chemistry in Germany, especially Liebig and Schonbein ... are more important than all the economists put together" (Marx to Engels, 13 February 1866; in Marx and Engels 1942, pp. 204-205). In a fascinating letter to Danielson, written late in his life, Marx continued to display a keen interest in the analysis of soil fertility:

The soil being exhausted and getting not the elements -- by artificial and vegetable and animal manure, etc. -- to supply its wants, will with the changing favour of the seasons, of circumstances independent of human influence -- still continue to yield harvests of very different amounts, though, summing up a period of years, as for instance, from 1870-1880, the stagnant character of production presents itself in the most striking character. Under such circumstances the favourable climatic conditions pave the way to a famine year by quickly consuming and setting free the mineral fertilisers still potent in the soil, while vice-versa, a famine year, and still more a series of bad years ... allow the soil-inherent minerals to accumulate anew, and to work efficiently with returning favour of the climatic conditions. Such a process goes, of course everywhere on, but elsewhere [than Russia] it is checked by the modifying intervention of the agriculturalist himself. It becomes the only regulating factor where man has ceased to be a "power" -- for want of means. [Marx to Danielson, 19 February 1881; in Marx and Engels 1942, p. 384]

Marx's agricultural research eventually led him to the verdict that capitalist agriculture "leaves deserts behind it" (Marx to Engels, 25 March 1868; in Marx and Engels 1942, p. 237). His section on "Modern Industry and Agriculture" in the first volume of Capital reads like some of the most insightful literature from the modern environmental movement:

Capitalist production collects the population together in great centres, and causes the urban population to achieve an ever-growing preponderance. This has two results. On the one hand it concentrates the historical motive power of society; on the other hand, it disturbs the metabolic interaction between man and the earth, i.e. it prevents the return to the soil of its constituent elements by man in the form of food and clothing; hence it hinders the operation of the eternal conditions for the lasting fertility of the soil. Thus it destroys at the same time the physical health of the urban worker, and the intellectual life of the rural worker. But by destroying the circumstances surrounding that metabolism, which originated in a merely natural and spontaneous fashion, it compels its systematic restoration as a regulative law of social production, and in a form adequate to the full development of the human race.... In modern agriculture, as in urban industry, the increase in the productivity and mobility of labour is purchased at the cost of laying waste and debilitating labour power itself. Moreover, all progress in capitalist agriculture is a progress in the art of robbing the soil; all progress in increasing the fertility of the soil for a given time is a progress towards ruining the more long-lasting sources of that fertility. The more a country proceeds from large-scale industry as the background of its development, as in the case of the United States, the more rapid is this process of destruction. Capitalist production, therefore, only develops the techniques and the degree of combining of the social process of production by simultaneously undermining the original sources of

all wealth -- the soil and the worker. [Marx 1977, pp. 636-38]

Marx took up this theme again in the third volume of Capital:

Capitalist production turns toward the land only after its influence has exhausted it and after it has devastated its natural qualities. [Marx 1967; 3, p. 301]

Marx even went so far as to speculate that the destruction of the land by the mindless profit-seeking bourgeoisie represented "another hidden socialist tendency" (Marx to Engels, 25 March 1868; in Marx and Engels 1942, p. 237). Quite a performance for a Nineteenth Century writer, who is supposed to have dogmatically insisted on the unimportance of nature!

Marx distinguished between what he referred to as "social" and "natural" productivity (Marx 1967; 3, p. 766). He understood that technical change would allow agricultural output to expand, but he was convinced that this increase might not be rapid enough to compensate for long-run natural resource exhaustion (Ibid., p. 766; see also Perelman 1975). Until capitalism comes to be replaced by socialism, he believed, it would continue to be plagued more and more by rising raw materials costs.

Marx had always recognized that in the early stages of society, primary products cost little effort because "nature ... assists as a machine" (Marx 1963-1971; Pt. 2, p. 109; see also 1977, pp. 284 and 744 and; 1967: iii, pp. 360-61, 643, 745, and 847-48; as well as Marx 1974, p. 588). By contrast, in industry "nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc." (Marx 1974, p. 706; see also p. 715). Later, he began to stress that, eventually, both more labor and more capital goods must be applied to the production of raw products. As he observed:

[When] in the course of development, a larger output is demanded than that which can be supplied with the help of natural powers, i.e. ... this additional output must be created without the help of this natural power, then a new additional element enters into capital. A relatively larger investment in capital is thus required in order to secure the same outputs. [Marx 1967: iii, p. 745; see also 1977, p. 751]

That is, an increasing proportion of social labor must be applied to the production of raw materials, despite the enormous advances in capitalist agricultural technology. This rising labor requirement is caused, in part, by improved technology that diminishes the portion of social labor used in the production of machinery (Marx 1967: iii, p. 109) and, in part, by the expanding labor requirements of the raw materials sector itself.

This secular tendency is paralleled by cyclical difficulties in raw materials production. As the economy expands, the rapid growth in demand for raw materials, generated by capitalist growth, will not be matched by a proportionate increase in the supply of raw materials (see Marx 1963-1971, Pt. 2, p. 533; and Marx 1977, p. 579).

In one passage, Marx captured the ambiguous capitalist agricultural legacy, noting:

One of the major results of the capitalist mode of production is that, on the one hand, it transforms agriculture from a mere empirical and mechanical self-perpetuating process employed by the least developed part of society into the conscious scientific application of agronomy, in so far as this it at all feasible under conditions of private property. [Marx 1967: iii, p. 617]

Marx added a footnote:

Very conservative agricultural chemists, such as Johnston, admit that a really rational agriculture is confronted everywhere with insurmountable barriers stemming from private property.... [T]he dependence of the cultivation of particular agricultural products upon the fluctuations of market prices, and the continual changes in this cultivation with these price fluctuations -- the whole spirit of capitalist production, which is directed toward the immediate gain of money -- are in contradiction to agriculture, which has to minister to the entire range of permanent necessities of life required by the chain of successive generations. [Ibid.]

Scarcity and Social Relations

Increasing natural resource costs are frequently cited as proof of the operation of the law of diminishing returns, but Marx interpreted the same phenomenon as evidence of a barrier, posed by capitalist social relations, which prevents society from taking full advantage of its natural-resource base.

For example, Marx insisted that the booms and busts, which are endemic to capitalism, are incompatible with a rational agricultural system:

An actual improvement of raw materials satisfying not only the desired quantity, but also the quality desired, such as cotton from India of American quality, would require a prolonged, regularly growing and steady demand (regardless of the economic conditions under which the Indian producer labours in his country). As it is, the sphere of production is, by fits, first suddenly enlarged, and then violently curtailed. All this,

and this spirit of capitalist production in general, may be very well studied in the cotton shortage of 1861-65, further characterised as it was by the fact that a raw material, one of the principal elements of reproduction was for a time unavailable ...

The closer we approach our own time in the history of production, the more regularly do we find, especially in the essential lines of industry, the ever-recurring alternation between relative appreciation and the subsequent resulting depreciation of raw materials obtained from organic nature. [Marx 1967; 3, p. 121] More importantly, capitalist social relations impede the creation of a rational economic system in general. Although great strides have occurred in agricultural science, Marx's interpretation still seems to be the correct one, especially when we recall his special use of the term "mastering" (see Perelman 1977).

Marx's general position was that, although land can be improved and, more generally, human potential is unlimited (Marx 1963-1971; Pt. 2, pp. 144-45 and 595), the social relations of capital stood in the way of agricultural progress. He gave a specific example of the relationship between the social relations of production and agricultural progress, citing Frederick L. Olmsted's observations of cotton production in the Southern United States:

I am here shown tools that no man in his sense's, with us, would allow a labourer for whom he is paying wages, to be encumbered with; and the excessive weight and clumsiness of which, I would judge, would make work at least ten per cent greater than with those ordinarily used with us. And I am assured that, with the careless and clumsy treatment they must always get with slaves, anything lighter or less rude could not be furnished them with good economy, and that such tools as we constantly give our labourers and find our profit in giving them, would not last a day in a Virginia cornfield -- much lighter and more free from stones though it be than ours. So, too, when I ask why mules are so universally substituted for horses on the farm, the first reason given, and confessedly the most conclusive one, is that horses are always soon foundered or crippled by them, while mules will bear cudgelling, or lose a meal or two now and then, and not be materially injured, and they do not take cold or get sick, if neglected or overworked. [Olmsted 1856, pp. 46-47; cited in Marx 1977, p. 304n]

Scarcity shows up, therefore, not simply because of natural shortages, but also because of the inability of capitalism to utilize nature effectively. So when Marx, late in his career, once again predicted that nationalization of the land would be the only course capable of assuring an adequate supply of agricultural produce, his understanding of the complexity of the resource question was much more sophisticated (see Marx 1872, pp. 288-90).

By this time he realized the importance of respecting the biological processes involved in agricultural production in ways that he did not seem to understand in his youth.

Cotton and Scarcity

What may have caused Marx to have suddenly changed his mind about the potential of capitalist agriculture? His skepticism concerning the potential of capitalist agriculture first occurred during 1862 when the prices of important raw materials, especially cotton, had reached their highest point since the Napoleonic Wars (Farnie 1979, p. 162). The shortages of cotton, popularly known as the Cotton Famine, proved to be a momentous economic event in the world economy and for Marx personally.

The actual extent of the Cotton Famine is a matter of dispute. Some modern scholars note that the outbreak of the Civil War in the United States followed a period of severe overproduction on the part of the British textile industry (Farnie 1979, p. 138ff). Thus, overproduction, rather than shortages brought on by the war caused the crisis. Nonetheless, Farnie maintains that the British cotton manufacturers preferred to blame their problems on disruption in cotton supplies rather than their own business mistakes.

According to this view, the Civil War could not set off crisis, because the British expected a very short war. Speculation that new cotton supplies would be forthcoming kept cotton prices relatively low, at least until 21 July 1861, when the Confederacy won its first military victory at Bull Run (Ibid. p. 141). Thereafter, speculation exacerbated the shortages (Ibid.; and Brady 1963). Cotton was held in the British ports in anticipation of a run-up in future cotton prices.

Eventually, as cotton stocks became depleted, the price of cotton soared. During a three week period in August-September 1862, cotton prices rose by 50 percent (Farnie 1979, p. 145). By this chronology, the Cotton Famine made itself felt only after the crisis had begun.

Engels' correspondence casts some doubt on Farnie's thesis. His letters show a qualitative difference between his attitude before and after supplies were disrupted by the Civil War. Before that time, he wrote

numerous letters to Marx about the sorry state of the cotton industry (for example, Engels to Marx; 9, 11, and 17 December 1857 and 7 October 1858; in Marx and Engels 1983, pp. 220-23 and 343-45).

Engels' letters suggest that the Civil War affected the availability of cotton in two stages. Initially, the South, fearing a blockade, unloaded as much of their cotton as possible, rather than to keep some stocks as hedges (Engels to Marx, January 26, 1860; in Marx and Engels 1985, p. 7). Thus, the Civil War was initially responsible for a surplus rather than a shortage of cotton. Once the conviction spread that the war would persist, the depleted stocks contributed to the eventual run up in cotton prices.

Engels' personal circumstances also seem to contradict Farnie's thesis. Although he took an earlier crisis seriously, he was still able to maintain his standard of living. Rather than be discouraged, he suggested to Marx, "The present crisis provides an opportunity for a detailed study of how overproduction is generated by expansion of credit and overtrading" (Marx to Engels, 11 December 1857; in Marx and Engels 1983, p. 221).

In contrast, the depressed conditions of the Cotton Famine forced Engels' factory to work at only one-half capacity. Prior to the Cotton Famine, Engels was able to maintain two separate residences: one for receiving his bourgeois friends; and one for himself and Mary Burns. With the onset of the crisis, he had to save on rent by living with Mary Burns full-time (Engels to Marx, 28 February 1862; in Marx and Engels 1973: xxx, p. 215).

Not surprisingly, Engels mood was significantly different. Although Engels was usually unperturbed by personal setbacks, by July 1862, his letters contained frequent complaints about the difficulties that the cotton scarcity caused him (Engels to Marx, July 3, 1862, Early September 1862, 9 September and 16 October; in Marx and Engels 1985, pp. 382, 413, 414, and 418 respectively). In addition, he was forced to significantly curtail his expenditures (see below). During this period, he was no longer jaunty about the coming crisis. Instead, his letters referred to hardships that the Cotton Famine was imposing on him.

Of course, a sample of a single producer does not constitute a convincing proof of the state of the industry, but it does provide more evidence for the traditional view of the cotton crisis. Apparently, some of the other cotton manufacturers came to the same conclusion as Farnie, but only in the midst of the Cotton Famine. Marx himself reported on the annual meeting of the Manchester Chamber of Commerce in early 1862 in which Henry Ashworth enunciated the Farnie thesis (Marx 1862a). Despite the diligence with which Marx followed British business developments, Ashworth's idea seemed to be new to Marx. Consequently, Marx seemed to believe that the Civil War set off that Cotton Famine until that point. Moreover, the materials that Marx included in the third volume of Capital did not support that idea that the crisis was a crisis of overproduction.

Regardless of the extent to which the disruption of the cotton industry was due to overproduction or the Cotton Famine, the consequences were clear enough. Marx noted:

As the result of the American Civil War and the accompanying Cotton Famine, the majority of cotton workers in Lancashire were, as is well known, thrown out of work. [Marx 1977, p. 720]

The prolonged bout of unemployment endured by the British textile workers during the Cotton Famine caused them great hardships (Marx 1861c, p. 56; 1862, p. 241; and 1862b, p. 247). Engels wrote to Marx, on November 5, 1862, that according to their friend Dr. Gumpert, the crisis was taking a significant toll on the workers' health (Marx and Engels 1973; 30, p. 295). Henderson confirms Engels observations (Henderson 1973, Ch. 5; but see Farnie 1979, p. 157). Matters became so bad that even Times fulminated against the heartlessness of the Cotton Lords (see Marx 1862b, p. 247).

By 1866, as British industry turned to India for cotton, rice culture was restricted. The result was the infamous famine of 1866, "which cost the lives of a million people in the district of Orissa alone" (Marx 1967; 2, p. 141).

The importance of cotton for Marx's political environment, as well as his intellectual development, was enormous. According to David Riazanov, the crisis following the curtailment of cotton exports from the United States during the Civil War precipitated the formation of the First International (Riazanov 1973, pp. 140-41; see also Hobsbawm 1968, p. 51).

Marx's Personal the Cotton Crisis

The state of the cotton industry was not without personal significance for Marx and Engels. The year 1862, when Marx's analysis of capitalist agriculture was about to change, was a time of "disheartening material suffering" for Marx (Rubel and Manale 1975, p. 174), to a great extent due to the Cotton Famine. Marx's tenuous relationship with the New York Tribune was finally severed that year. Engels was no longer able to supply Marx with much money.

Later in the year, Engels significantly informed Marx that the Marxian theory of rent was too abstract to

contemplate at the moment; he was too involved in the cotton crisis (Engels to Marx, 9 September 1862; in Marx and Engels 1973: xxx, p. 284).

By August of 1862, Marx wished that he knew how to start a business (Marx to Engels; 20 August 1862; in Marx and Engels 1973: xxx, p. 280). He continued, paraphrasing Faust, "Gray, dear friend, is all theory, and only business is green" (Ibid.). Before the end of the year, he informed his friend, Dr. Kugelmann that he had tried to obtain a job with a railway office, but his handwriting was inadequate (Marx to Kugelmann, 28 December 1862; in Marx and Engels 1973; xxx, p. 640). By the beginning of the next year, Marx's family lacked coal to warm the house and enough clothing to go outdoors (Marx to Engels, 24 January 1863; in Marx and Engels 1973; xxx, pp. 314-16).

In the midst of the cotton crisis, Marx intensified his economic research. During this period, his thinking took a decidedly different turn. Previously, he had not paid much attention to the theory of rent. In the middle of 1862, about the same time Marx reversed his previously optimistic prognosis for capitalist agriculture, Marx began his intensive researches into the theory of rent (see Marx to Engels, 2 August 1862; in Marx and Engels 1975, pp. 120-23). Significantly, in his description of constant capital -- "raw material, auxiliary materials, machinery, etc." -- raw materials were given first place (Ibid., p. 120). In addition in 1862, Marx first associated crises and raw materials shortages his notebooks:

A crisis can rise... through changes in the value of the elements of productive capital, particularly of raw materials, for example when there is a decrease in the quantity of cotton harvested. Its value will thus arise.... More must be expended on raw materials, less remains for labor. [Marx 1963-1971, Pt. 2, p. 515; see also pp. 517 and 533].

After 1862, Marx gave raw-materials, and cotton in particular, far more prominence in his work. From that time on, when addressing the increasing difficulties in producing enough raw-material for industrial production, more often than not he brought up the example of cotton. Given the importance of the cotton crisis, this change is not surprising.

Cotton and Environmental Limits

The cotton industry bore out Marx's conviction that raw materials production would have difficulty keeping pace with demand. For example, in the brief period between 1830 and 1837, as industry had outstripped agricultural production, cotton prices doubled, only to fall again (Temin 1969, p. 92). Later, during the Civil War in the United States, when Capital was being written, cotton again became scarce. This pattern moved Marx to observe: It is in the nature of things that vegetable and animal substances whose growth and production are subject to certain organic laws and bound up with definite natural time periods, cannot be augmented in the same degree as ... other fixed capital... , whose reproduction can, provided the natural conditions do not change, be rapidly accomplished in an industrialised country. It is therefore quite possible, and under a developed system of capitalist production even inevitable, that the production and increase of the portion of constant capital consisting of fixed capital, machinery, etc. [measured in physical terms, M.P.], should considerably outstrip the portion consisting of organic raw materials so that demand for the latter rises more rapidly than supply....

The greater the development of capitalist production ... , so much more frequent the relative underproduction of vegetable and animal raw materials, and so much more pronounced the previously described rise of their prices and the attendant reaction. And so much more frequent are the convulsions caused as they are by the violent price fluctuations of one of the main elements in the process of reproduction. [Marx 1967; 3, pp. 118-19]

On the one hand, cheap raw-materials present themselves as a natural fertility of capital (Marx 1967: iii, p. 106; see also p. 651). On the other hand, high raw-materials prices threaten to hinder accumulation, because the resulting increase in raw materials prices severely cuts into profit margins. After all, Marx was certain that raw materials were the most important component of constant capital, at least on a flow basis (Marx 1967: iii, p. 106).

Even though the value of raw-materials might be less than the value of the stock of fixed capital, a rise in raw material prices can make itself felt as a decline in the profit rate, with serious consequences for accumulation: If the price of raw materials rises, it may be impossible to make it good fully out of the price of commodities after wages are deducted. Violent price fluctuations, therefore, cause interruptions, great collisions, even catastrophes, in the process of reproduction. It is especially agricultural produce proper, i.e., raw materials taken from organic nature, which -- leaving aside the credit system for the present -- is subject to such fluctuations in values in consequence of changing yield, etc. [Marx 1967: iii, p. 117]

By this stage in his development, Marx had abandoned the notion that capitalism could master nature. Instead, environmental limits presented a barrier which capitalism seemed unlikely to overcome. Marx went further. He rejected the notion that these barriers were natural. To a large extent, they were the product of the capitalist mode of production.

So What Does Agrarian Mean?

Marx once observed: "The foundation of every division of labour, which has attained a certain degree of development and has been brought about by the exchange of commodities, is the separation between town and country" (Marx 1977, p. 472). This separation is both real and imaginary.

The English legal historian, Frederic William Maitland, once wrote "those who would study the early history of our towns ... have fields and farms on their hands" (Maitland 1897, p. 9) -- alerting his readers that town and country are not really separate entities that can be considered apart from one another. Even today, dichotomies between town and country or between agrarian and urban remain, at least in part, abstractions. After all, each interpenetrates the other in many ways.

For example until the second half of 19th century, poor people in the cities commonly kept pigs. One survey of the urban pigs reported:

So many hogs roamed the area around 125th Street in Harlem at mid-century that the area came to be known as Pig's Alley. City authorities in New York and other urban areas, meanwhile, continued to tolerate pigsties as late as the 1870s, with some tenement residents even boarding them in their rooms, demonstrating the importance the poor attached to the animal. [Steinberg 2002, p. 161]

These pigs converted garbage into food while supplying manure to help replenish the fertility of the countryside -- the sort of closed loop that Carey proposed, although I suspect that he might have preferred a more commercial relationship. Hendrik Hartog described how in the early nineteenth century New York Mayor Cadwallader Colden, sitting in his traditional role as judge of the quarter sessions court, as well as the chief administrator of the city, went to great lengths to stretch the law to eliminate this residual element of the countryside from the city. The mayor charged an individual for keeping pigs, even though the city had no law prohibiting the keeping of animals, as he admitted to the jury. The judge/mayor assured the jurors that the punishment would be only nominal (Hartog 1985, p. 919).

The mayor's concern was to establish a legal principle that would eventually make the poor accept his vision of what a city should be. Part of his charge to the jury was the value of making urban dwellers more dependent on the cash economy, echoing the primitive accumulationists of previous centuries (Hartog 1985, p. 910).

Just as Mayor Colden decried the presence of pigs in the city, Cary McWilliams protested against degraded conditions of proletarianized migrant farmworkers California in the 1930s. He entitled his book Factories in the Field to dramatize the commonality between the farmworkers and their industrial counterparts (McWilliams 1939). Once again, the worlds of town and country were interpenetrating each other. Perhaps the major difference between the urban proletariat and the farmworkers was the latter's difficulties in creating organizations of collective power, at least until the recent period in which union power began to rapidly evaporate.

The blurring of agrarian and urban is not restricted to those occupying the lower rungs of society. One might ask, in what sense are modern farmers riding in their own tractors costing nearly a half million dollars, while looking at the screen for the latest quotations from the futures market, anything like a peasant toiling with a hoe?

In many cultures, status still depended more on land holdings than on money, even with the spread of capitalism. Marx wrote about how people were pushed off their land to make way for deer parks to entertain aristocratic hunters, creating a much more attractive landscape than a bunch of peasants eking out a living in poverty.

Today, the geographic boundary between urban and agrarian becomes even fuzzier when posh subdivisions nestle between working farms. Affluent hedge fund operators spend weekends on their luxurious vineyards. Ted Turner, the largest private owner of land in the country whose holdings are about half as large as the state of Connecticut, offers an even more extreme example the ambiguity of the concept of agrarian (Weiner 2007).

Conclusion

The basic commonality between the town and the country that runs through this paper is that people in both locations depend upon one another and upon the limited endowment of resources -- mostly located in the

countryside. Concerns about a looming scarcities of petroleum and water have become rather commonplace, but shortages of supplies of many minerals are possibly even closer on the horizon -- especially those rare minerals, such as indium, hafnium, terbium, and gallium, which are essential to modern high technology (Cohen 2007).

Finding ways to both preserve and share these resources equitably is perhaps the greatest challenge facing mankind today. The past record in this respect is not reassuring. Even so, as the resource base is becoming increasingly strained while the means of raining violence down upon one another is so abundant, complacency is a luxury nobody can afford. Without radical changes, the quality of life may suddenly deteriorate and disasters may become commonplace. Part of the solution will necessarily be the creation of a new level of cooperation between town and country, in a way that makes a more attractive quality of life -- something more than -- increased access to consumer goods -- available to the less affluent people both in the town and country.

All of the central figures in this paper -- Jacobs, Mumford, Carey, Liebig, and Marx -- addressed the problems discussed here in different ways. Jacobs and Mumford paid most attention to design. Carey looked at inequities in international relations. Liebig brought science to center stage. Marx was concerned with social relations. In a larger sense, his overarching theme was the development of human potential, making Marx's approach is probably most relevant.

After all, to turn the world around will require as much intelligence and creativity as society can muster. Putting a stop to this ongoing squandering of human potential by virtually consigning large classes of people to mind-numbing and degrading work will certainly help in this regard.

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