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Human-Environment Relations. Editor's Introduction

Richard A. Walker

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The subject of natural resources and environmental under capitalism[2] is distinguished by its absence from the list of time-honored topics of inquiry on the left. I know of only a handful of academic contributions in recent years as part of a revival of Marxist and related radical scholarship (see e.g. Bluestone and England, 1971; DiNorcia, 1974; Edel, 1973; Enzenberger, 1974; Greer, 1974; Harvey, 1974; Hunt and Sherman, 1972; Mumy, 1974; Perelman, 1974; Schmidt, 1971; Williams, 1972, 1976; and others cited below).[3] Within geography, Peet (1977) has remarked that radicals have barely touched the subject of man (sic) – environment relations, even though it

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[2] The qualifier "under capitalism" is essential here, and I mean to exclude thereby all historical, anthropological, regional and underdevelopment studies concerned with pre-capitalist modes of production from my review. However, this simplification is misleading in that the study of capitalism on a world scale necessarily includes the articulation of this dominant mode of production with pre-capitalist modes and the ongoing processes of "primitive accumulation" [expropriation of resources to create conditions for profit-making by the few]. It allows me to pass over much of the literature and interests of those occupied with resource and environment questions in the Third World, a rather serious omission, indeed. My perspective here is admittedly from the center, and it is easy to see the resultant differences between me and Ben Wisner's approach to the same topic, although we agree on most of the essentials (Wisner, 1978).

[3] Some less scholarly, general presentations of the pollution problem from the left which are not so helpful now but were useful political tracts when published in the early 1970s are: Bookchin (1971); Coates (1972); Ridgeway (1971); Rothman (1972); Weisberg (1971).

occupies, alongside "space," an essential place in the discipline.[4] Most of the critical work in the environmental field has come from journalists, activists, natural scientists, and lawyers. While their contributions have provided and invaluable source of information and trenchant criticism, they have been limited by a lack of well-developed theoretical position. In other words, a great deal of intellectual work remains to be done.

On the other hand, what does conventional social science have to offer on the issue of natural resources and environment? In the following pages I will give a quick sketch of some principle currents in orthodox thought and my dissatisfaction with them. The discussion will be organized under three headings: parks, pollution, and natural resources. After that, I will set out what I regard as the essentials of a Marxist approach to the field.[5]

Parks: Nature for Personal Consumption

Under the terse heading "parks" I include wilderness and, indeed, all landscape preservation for purposes of recreational consumption outside of the mainstream of productive uses of nature.[6] Among our three [geographic] subfields, these topics have probably received the least exposure to scientific inquiry, even by conventional standards. In much of the literature uncritical advocacy reigns: parks and wilderness

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[4] See, however, Wisner's (1978) thoughtful and enlightening response to Peet. He also provides a (necessarily thin) bibliography of left geographic contributions which I will not repeat here. It omits, however, Overton (1976) and Regan and Walsh (1976).

[5] An essential caveat regarding our topic is in order from the outset. One necessarily makes concessions to convention in setting out on the path to defining, organizing and critiquing orthodox literature, and this means that certain conventional categories have to be adopted, though modified to fit new ones. The categories employed here for our title and three subfields are useful because they are short, familiar, and help organize current lines of thought. They are not meant to be enshrined or taken as Marxist categories. As will be seen, however, I mean considerably more by the heading "parks, pollution and natural resources" than may appear at first glance; I try to be more specific below. I have tried to be relatively consistent between the first and second parts of this essay. It will also become clear, in the concluding section, that our actual field of inquiry is no less than the *human appropriation of nature* under capitalism, principally the relation of *capital* and nature. This is not a topic readily confined to our three categorical boxes. I chose the title "natural resource and environment" [...] because it is more familiar to most people and has a less pretentious, philosophical ring about it [...]. The same objection weighs against the use of the titles "man-environment" or "human-environment relations," in addition to the sexist nature of the former and the infelicitous ring of the latter.

[6] Although in the modern age of what Abbey (1968) calls "industrial tourism," the line between recreation and industry becomes rather blurred. The distinction remains, however, in that the worker is engaged in individual consumption and reproduction of his/her faculties for re-entry into the workplace [...].

are seen as good, *per se*. The only question then is how best to preserve, design or manage such places. The most popular academic effort at an historical assessment of wilderness preservation, by Roderick Nash (1967), is a good example of where the uncritical view leads (see also Huth, 1957; Ise, 1961). It is less history than teleology – a story of how the truth of wilderness preservation was revealed over time, ending with the present high state of enlightenment among environmentalists. Nash ascribes the love of wilderness chiefly to rising affluence, which, as Mumy (1979) points out [...], is hardly a sufficient structural analysis of the origin of preferences.[7] Variants on this apologetic sort of analysis are that Americans have a heritage of contact with wilderness, that people naturally want to be near "nature," and so forth. [...]

[...] Jim Overton (1979) and the Olwigs (1979) are the best academic treatments of the ideology and social context of national ("wilderness") parks that I know of.[8] [...] No doubt these three [scholars], coming out of geography, have benefitted from exposure to traditional work within the discipline on landscape perception, the history of ideas about man (sic) and nature, and cross-cultural studies of landscape use. Geographers such as Clarence Glacken (1967), Linda Graber (1976), David Lowenthal (1961, 1962), and Yi Fu Tuan (1971) come readily to mind, and the list could easily be extended. These people have alerted us to the importance of perception, cultural differences, and changing ideas in the way we see, define and shape nature. Unfortunately, they remain strongly idealist in persuasion and therefore unable or unwilling to come to grips with the way social practice gives rise to certain tendencies of thought, or of the contradictions between ideology and practice.[9]

Outside of the geographic tradition a new area known as leisure research has been burgeoning. Part of the field is occupied by the denizens of revealed preference, occupying themselves busily in metaphysical calculations of "willingness to pay" for

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[7] Indeed, it is false on its face, as evidenced by the number of affluent people who show no interest whatsoever in wilderness, particularly the ruling classes outside of the United States.

[8] [On] the topic of urban parks [...] I recommend the work of Thomas Bender (1975), Galen Cranz (1975), and Peter Schmitt (1968). See Walker (1977; 1978) for my views on the matter.

[9] Reference to the geographic tradition of environmental perception or evaluation of nature raises a problem. I do not agree with Wisner (1978) in continuing to hold this as a separate field of study, although the role of consciousness/ideology in human practice is unquestionably a vital part of all Marxist analysis (see text below, concluding section). Nonetheless, I prefer to see it included within the compass of each subfield of practice. This division is reasonable, given the tenet of historical materialism as to the close relation of consciousness formation and practical experience. Certainly it is true that capitalist ideology and practice divide the realm of production/reproduction of capital from (individual) consumption/reproduction of labor power, and along with it the perception of nature as object of individual versus productive consumption (see again text below, concluding section). Similarly, there is a (lesser) schism between the calculating view of capital toward nature as "natural resources" and the profligate view of the same natural environment as repository for the wastes of production and consumption.

parks, an unending quest for a surrogate for the market,[10] or in survey research of park users, of interest chiefly to government managers (see Overton's 1979 trenchant criticism of the latter). Another branch of leisure research is considerably more sophisticated and insightful, concerning itself with the social definition of leisure, varying class practices in leisure activities, and the relation between work and leisure (e.g., DeGrazia, 1962; Kando, 1975; Kando and Summers, 1971). Some of this work approaches closely the questions Marxists raise about leisure (cf., Harvey, 1978; Le Fabvre, 1971; Overton, 1979; Walker, 1977, 1978).

Pollution: Adverse Impacts of the Transformation of Nature

For me the subject of "pollution" encompasses most of the physical impacts of social activity – of production, circulation and consumption – including ecological changes, impacts on human health, and physical alteration of the land, air and water.[11] The emphasis is, naturally, on *adverse* impacts, though it is a necessary part of the inquiry to ask why an impact is to be regarded as adverse; otherwise we assume the same naïve position [of using] the term "environmental disruption", as if there were some natural ideal from which human practice has diverged. The definition of pollution is itself a product of social practice and class struggle.

Although geographers have taken a very real interest in pollution and pollution control (Detwyler, 1971), particularly with respect to comparison between the United States, the Soviet Union and China (Matley, 1966; Murphey, 1967; Pryde, 1972; Zimbrunnen, 1972),[12] the business of generating a suitable explanatory framework has by and large been passed to the economists. Marginalist economics has given us the popular theory of externalities and market failure, along with various strategies to reincorporate pollution into the market calculus through effluent charges, option demand, and so forth. The basic flaw in such models, as Mumy (1979) points out, is parallel to that of the market system on which the economists' model rests: just as residuals are emitted from a factory for reasons of capitalist convenience, all the difficult analytical problems which lie outside the scope of the "market" – concerning pollution's physical impact, its social effects (especially on consciousness), the role of the state, etc. – are treated as residual to the analysis, to be dealt with by other

[10] The progenitors of this sort of research are, I believe, Clawson and Knetsch (1966). See the criticisms of such metaphysical exercises in Mumy (1974) and Walker (1973).

[11] "Pollution" deals with *outputs* (products and by-products) of the commodity production process as a whole, while "natural resources" deals with *inputs* (see below, next section).

[12] [...] For more radical views on China, see Buchanan (1970), Kapp (1974) and Orleans and Stuttmeier (1970).

disciplines. Property rights divide up the environment and the socials sciences with equal facility, it seems.

Moreover, within the scope of "economics," narrowly defined, we see very little attention given to production. Characteristically, orthodox models treat the problem of pollution primarily in terms of exchange – i.e., the role of markets, prices, marginal cost and consumer preferences. Precisely because it is more "materialist" and directly concerned with the physical processes of production, the best conventional work on pollution is the one concerned with "materials balance" developed by the group around Allen Kneese at Resources for the Future (e.g., Kneese et al. 1970). Shorn of ideological niceties about what is not within the compass of the market, and how externalities may be converted into "internalities," their analysis points to the actual definitions of "waste" and "output" which emerge from the labor process and the techniques employed in it. The aggravating aspect of their work, however, is that it easily degenerates into vulgar materialism, a sort of "industrial determinism" that gives little weight to the impact of social relations on the organization of the labor process and choice of techniques (they have not read Sraffa, 1960, let alone Marx). This stands in contradiction to their major contribution to the theory of pollution control: providing intellectual verification of the actual flexibility of industrial processes and the potential for pollution reduction (e.g., Kneese and Bower, 1968; Kneese and Luf, 1968).

Given the lack of attention to problems of production in orthodox economics, it should not be surprising that amongst all the interest in pollution of the air, soil, and water, the physical abuse of workers' health from workplace exposure to hazardous substances has been almost wholly absent from academic discussion.[13] Nonetheless, the occupational safety and public health issue has become the leading edge of pollution control activism in the 1970s (e.g., Commoner, 1973). No doubt the failure of both conventional environmental groups and academicians to shift from problems of aesthetics and ecosystems to problems of the labor process has much to do with class position, as well as ideological blindness to the priority of production. Moreover, given the prevailing explanation of pollution in terms of externalities (effects outside the market calculus and outside the factory), how does one deal with pollution that is *internal* to the production process? Particularly, how does one maintain that fiction of equal exchange relationships in the face of the terrible health and safety experience of workers [in factories]? As Gersh et al. (1979) illustrate, it is more to the point to speak of what is internal and external to *capital* rather than to the market.

One must also mention, in passing, the popular nonsense which passes for "cultural" analysis of the origin of pollution that is usually associated with the name

[13] An exception to this rule is the somewhat eclectic, but nonetheless useful critique by Kapp (1950), who remains an obscure pioneer of radical economics in the field of pollution (see, however, Marx's somewhat earlier treatment of factory pollution and the abuse of workers in *Capital*, Volume I, Chapter 10).

Lynn White, Jr. (1967), to wit, that the Judeo-Christian ethic of domination of nature is responsible for our abusive practices. Even a non-materialist reading of Western intellectual history, such as that provided for us by the eminent geographer Clarence Glacken (1967), shows this view to be unsupportable. Fortunately, one hears less of this notion than one once did. Unfortunately, the same cannot be said of the economists' explanation for pollution.

The subject of environmental regulation – the chief product of anti-pollution mobilization in capitalist society – has typically been seen as an "external" question by the economists and hence to be relegated to study by lawyers and political scientists. One has to go to the copious outpourings of the law journals for any serious discussion of what has actually happened to environmental regulations, but since the lawyers are our practitioners-without-theory, par excellence, one has to look far and long for an explanation of what has taken place, outside of virtually tautological justifications in terms of the law itself. The [low] level of critical analysis of the state, social formation and capital found in these treatises is not inspiring.[14]

Mainstream political science has advanced beyond description of participants and emphasis on "the political process." While recognition of the process of law and regulation is essential, it makes all the difference in the world how one sees the workings of that process (see Gersh et al., 1979). The standard framework consists of interest groups, pluralism, Congressional organizations, budgeting, and bureaucratic behavior. Not by accident, the political scientists have reversed the proprietary achievement of the economists by making economics and other social consideration exogenous to their chosen object of study: the state and politics. In another parallel to economics, the orthodox theory of interest group pluralism offers a hidden-hand model of governmental decision-making analogous of Adam Smith's idealized vision of the market, in which the good of all is achieved by means of the opposition of conflicting (but equal) private interests.

Given such an ideology, how can regulatory failure, which is manifestly not in the best interests of all society, be explained? It must be jerry-rigged into the system. Failure of regulation – e.g., through agency capture by special interests – is typically introduced on the side as a nasty business which sullies the beauty of the system but does not undermine its basic tenets. Nonetheless, following Mumy's (1979) admonition to develop a "structural" analysis, we need to incorporate the role of the state as it operated within the actual "pressures and limits" of an economy and society in which it is embedded. This mode of analysis is suggested [...] by Gersh et al. (1979) and it is also taken up with respect to reclamation policy by Phil LeVeen (1979) and with respect to parks creation by Jim Overton (1979), in a somewhat more instrumentalist fashion. The point, of course, is to see regulatory success or failure as

[14] Nonetheless, some good articles can be found, e.g., Greenstone (1975), Kramer (1976), [...] Greer (1973), Mumy (1974) [...].

part of the same system that produces the pollution in the first place; and while the one way may overcome the other, this is by no means given. This is quite the same as trying to understand parks as part of a unified society, not in their form of appearance as "nature" apart from human activity. An exemplary model for regulatory analysis is, somewhat surprisingly, Marx himself, who set out a subtle and amusing history of the "regulatory process" under the Factory Act in Volume I of *Capital* (Marx, 1967, Chap. 10, §6)

Geographers will probably protest the omission here of any treatment of what they might call "landscape change" and environmental transformation, and the abuses which can be catalogued under these headings.[15] This is a somewhat different topic from the waste problems (chiefly chemical) which the term "pollution" ordinarily conjures up. But again we are dealing principally with the products and by-products of production, circulation of consumption, particularly those connected with natural resource extraction (discussed below) and construction of the built-environment.[16]

The subject of urban expansion and its impact on the landscape requires a different analysis than chemical pollution but not a different basic approach. It has not, however, been readily adapted to the standard externalities argument, probably because the interrelationships of land use are so obviously impossible to internalize into private property relations. Furthermore, the questions of urban growth, open space, and suburban sprawl which dominate the American discussion of landscape change are usually the province of planners and architects. Such spatial questions have not interested economists much. As a consequence, aesthetics and a different form of idealism have held sway, directing criticism toward divergence from the beautiful rather than from *pareto optimality* [when reallocation of a good benefits one individual, but not at the expense of another individual]. This gets us no closer to a dissection of the real and how to get there. When a little science enters the debate, it comes in the form of another idealism – objective instead of subjective. I am referring, or course, to the extremely influential *Design with Nature* by Ian McHarg (1969), which repeated the achievement of the economists and the political scientists in yet another realm: a vision of harmony through natural law, in which all parties may gain by following the "hidden hand" of nature. Of how landscapes are actually made – or ruined – and how the social process of city-building might be changed, we learn nothing beyond the obvious admonition to pay attention to natural conditions in

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[15] It is interesting how, in the American context, working agricultural areas or historical significant urban and industrial landscapes are treated as something quite apart from (and lower than) "real" parklands, which must have a certain imagined wilderness value or be picturesque.

[16] There are good reasons, however, to discuss landscape change and abuse in relation to parks and landscape preservation or to resource conservation. As might be expected, our topics run into each other – in this case, owing to the adverse impact of production-as-a-whole on recreational consumption of nature and natural resources extraction.

making plans. This could only seem profound in a society in which the drive to accumulate so blindly overrides even this minimal consideration.

Natural Resources: Nature as Input to Production

The third and traditionally most important area of resources and environmental field is the constellation of topics surrounding "natural resources" production, consumption, and availability (scarcity) – i.e., the role of nature as direct input into the production process.[17] Within this field there tends to be a schism between those working on mineral, timber and fisheries resources and those attending to agriculture proper. This is, as Marx insists, a mistake (see Perelman, 1979). However, we certainly want to be aware of differences between primary production based on organic processes and that based on inorganic materials; between the role of food and that of industrial raw materials; between extraction that is essentially mining nature and that which reinvests social labor and the social product to sustain or increase yields; and, finally, between extraction based on fully capitalist relations and that based on simply commodity or other pre-capitalist forms of production; these and other differences frequently mark off agriculture from the rest as a special topic of inquiry.

There is also a demonstrable split between the study of the actual mechanics of the extractive industries and the treatment of conservation of natural resources as a special problem, particularly with respect to agriculture. This division is not entirely without logic, since one side is concerned with primary production and the other with the reproduction of the natural resource base, as Wisner (1978) suggests. The former is in many ways simply a distinctive branch of industrial studies. Given this, and since I am not in a position to discuss the literature on agriculture and other extractive industries here, I will focus on the two issues that have occupied the traditional center of attention under the heading "natural resources": conservation and resource scarcity.

Although the conservation tradition has a rich literature of criticism, reaching back to George Perkins Marsh's (1864) *Man and Nature* and beyond, most of the formal academic presentations of conservation have been rather sterile. They have focused, among economists especially, on discussions of the optimal time distribution of output of raw materials or, more recently, on the need to cope with external effects in extraction (see Ciriacy-Wantrup, 1952; Gray, 1913; McDonald, 1971). The actual experience with natural resources under the capitalist form of development is considerably more shocking than these scholastic accounts would ever lead one to

[17] "Natural resources" means chiefly "raw materials." Strictly speaking, Marx defined raw materials as natural resources that have already undergone a labor process, i.e., been extracted from the earth (Marx, 1967, Volume I, 178-9). Hence the mining industry has no raw materials. I am using the term "natural resources" to include all the substances of nature which enter as production inputs [...].

believe.[18] Indeed, shock and political struggle against the predatory tendencies of capital were what forged the classic conservationist movement in the first place, just as it has galvanized a new generation of environmentalists in the present day.[19]

Natural scientists have played an important role in past and present conservation movements owing to their appreciation of certain realities of natural systems, but have not been too helpful in furthering an understanding of why nature is so poorly used by timber companies, fisheries, or farmers. Most have concentrated their efforts on urging the use of "scientific management" – particularly on the idea of sustained yield. The assumption here is that the misuse of natural resources is a problem of ignorance and that good science will produce good policy; most scientists remain painfully oblivious to the social relations governing the exploitation of nature – and of science. Economists have successfully pointed out the futility of managing the fish scientifically without similar attention to the [unregulated competition] of fishermen. In addition, some ecologists have taken issue with their brethren for an undue idealization of ecological "stability" and "climax" behind the common conception of scientific management and sustained yield (see Walker, 1973, 1974, and references therein).

As new horizons of world expansion opened up to American capital[ists] after World War II, concern with wise management of domestic resources gave way to an interest in assessing the availability of global raw materials (Dean, 1971). The Paley Commission was established in 1951 to look into the matter and, in 1952, at William Paley's behest, a permanent research institute on the lines of Brookings was established by the Ford Foundation to carry the work of assessment and policy formation. This was *Resources for the Future* [RFF]. It has proven enormously successful as a source of ideas to guide social science and public policy (Alpert and Markusen, 1977; Alpert and Zabel, 1977).

As the controversies associated with the contemporary environmental movement burst one after another into the public arena in the 1960's and 1970's – e.g., wilderness preservation, water policy, land use control, pollution control, energy – RFF was always there, generating research and pronouncements which made it the center of liberal thought on all these matters. The achievement is remarkable, and, I might add, the failure of geographers to [get involved] in the RFF circle, for whatever reasons, has no doubt contributed to their absence from the main stage of natural resources and environmental policy debate. Any critique of the conventional wisdom must begin by grappling with RFF contributions.

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[18] See Petulla (1977), for a good overview, and Nash (1976), for original accounts and a good bibliography.

[19] The best history of the Progressive conservation movement is by Hays (1959), who provides valuable insights into the genesis of scientific management in resource affairs. [...]

One of the ironies of the history of ideas about natural resources is that in contrast to the fear of resource scarcity of the late 1940's which prompted the formation of the Paley Commission, the prodigal son, RFF, produced the modern, neo-classical gospel of anti-Malthusian thought, Barnett and Morse's (1963) *Scarcity and Growth*.[20] Caught up in the euphoria of the time concerning limitless capitalist expansion, Barnett and Morse argued that factor substitution, technical progress and foreign trade had more than compensated for any exhaustion of natural resources in the American economy, resulting in long-term declining prices for raw materials (cf., Olson, 1971). [... T]heir argument (which included an extensive reconsideration of the positions of Malthus, Ricardo and the progressive conservationists on scarcity) had the merit of pointing out the enormous flexibility of capital and its powers to overcome scarcity[. However], it overlooked certain salient aspects of capitalist practice: (1) that short-run scarcities (price rise and supply bottlenecks) of certain materials inevitably plague capital accumulation; that is, the adjustment/innovation process which produces a long-run downward price trend is by no means smooth or crisis-free; (2) that irrational and/or unbalanced resource use and production by capital helps to generate such scarcities; and (3) that there are contradictions to certain capitalist solutions to natural resource scarcity: for instance, what Barnett and Morse euphemistically call "trade" is typically imperialism; technical change frequently has unpleasant consequences such as the toxic substances associated with synthetics manufacture; and that substitution of inputs is all too often the abandonment of one depleted piece of land, whether eroded soil or clear-cut stumpage, for another without any rationalization of production whatsoever.

The circumstances of the 1970s certainly gave the lie to Barnett and Morse's [optimistic] view, as fuel prices soared, the devastation of modern timbering practices generated widespread erosion and public opposition, toxic substances and environmental cancer were recognized as major health threats, nuclear power staggered under the blows of critics and the weight of its own preposterous economics, and so forth.[21] Not only were the contradictions of natural resource production and consumption apparent to a new and active generation, those contradictions were also visited in a dramatic fashion, either directly through the market or indirectly through the state, on capital. Hence they could not be ignored.

It is obvious with respect to oil prices or nuclear power that capital accumulation has been jeopardized, but how many of us are familiar with the crisis in water policy? As Phil LeVeen (1979) shows, the combination of fiscal crisis in the

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[20] Only a historical materialist inquiry can unravel the origins of such changing currents of thought regarding natural resources and scarcity (see, e.g., LeVeen, 1979; Perelman, 1979).

[21] Some recommended reading in these areas: on the energy crisis, see Blair (1976); Tanzer (1974); Commoner (1976); on timbering, see Coats (1976); on toxics and cancer, see Berman (1978) and Epstein (1978); on nuclear power, see Pector (1978).

reclamation program, environmental opposition to further development, and competition between agribusiness and other sectors of capital has western water development in turmoil, and requires a major shift in federal policy. It is significant that, in contrast with this analysis, conventional treatments of water resources programs have never been able to go beyond description of projects and criticism of illogical benefit-cost and repayment practices. Unfortunately for the latter, the problem was never one of logic, but of practical political economy (Hanke and Walker, 1974). Because neo-classical economics has no concept of *material* contradictions and no way of grasping the social context of state policy, it simply views the use of power to shape an illogical rationale of water development as an aberration to be corrected by hefty injections of its own brand of economic theory. This sort of "theory" to explain water policy practices has proved useful as a political tool – legitimizing and supporting environmental and budgetary opponents of reclamation – but it can hardly be called social science.

Resource Scarcity and Malthusianism – An Essential Digression

Beset by problems of flagging accumulation, apparent natural resource scarcity and political attacks, the bourgeoisie ultimately takes refuge in Malthusianism (see Harvey, 1974; Perelman, 1979). Natural resources are said to be running out owing to their limited natural supply. This supposedly accounts for the scarcities which people experience in their daily lives as higher heating bills, unemployment or water rationing. In place of the parson, however, we have today the Club of Rome group, Garrett Hardin, Paul Ehrlich and their ilk. It is sad to see so many reputable scholars leading the Malthusian charge, but there is some satisfaction in noting that they are usually natural scientists and mathematical technicians making a pretense of understanding social phenomena. Yet despite the crudity of their arguments, their opinions prevail by virtue of their timeliness, as Perelman notes with respect to Malthus. Malthusian doctrine diverts attention from social causes of scarcity and shifts the blame onto nature's broad back. Moreover, it is a council of despair, for it says that nature is actually in the saddle, riding humanity, and that human progress is necessarily limited. The power of humanity to transform nature – and even society – in order to overcome scarcity is denied. This ideology is wholly a form of "capital fetishism," which means, following Marx, that human creative powers are projected onto (and experienced as) the powers of capital.[22] Given this inversion in practice and in

[22] Most Marxists refer to this as "commodity fetishism," after Marx's discussion of the phenomenon in Chapter 1, section 4 of *Capital*, Volume 1. Nevertheless, the fetishism of commodities is just the beginning step in the fetishism of capital. Marx's analysis must be understood as only the starting point for the study of capital (see Marx, 1967, Volume 1, 71-84; then, on the fetishism of money, see Volume 1, 92-93; on capital, see Volume 1, 310, 621, Volume 3, 25, 34-39, 42-48; also, cf., Gurley, 1975).

consciousness, it is a short step to the conclusion that if capital cannot solve certain problems of scarcity then these must be a fixture of the human condition (cf., Marx, 1967, Volume 3, 242).

A variant of capital fetishism is implicit in the conventional view, as exemplified by Barnett and Morse, that a disembodied force called "technological progress" is the source of our power to overcome natural scarcity. While it is certainly true that the developing forces of production serve this end, the conventional formulation begs the question of the origins of technical progress and gives us only the dry bones of the real flesh-and-blood process of evolving human creativity and social labor. Furthermore, the possibility of altering the social relations of production, distribution, and consumption, as a means of developing the forces of production, lowering resource demand, etc., is not considered. Political solutions to resource scarcity are quite unimaginable to those in the grasp of capital fetishism.

Obliviousness to the role of social relations in generating resource scarcity leads to an intellectual confusion on several fronts. In the first place, a simple equation of individual consumer wants with the natural supply of certain materials is meaningless because the consumer's relations to nature is mediated by layers and layers of social fabric – a network of real production processes, transportation systems, social roles, behavioral and ideological socialization, and so forth.[23] Geographers, at least, have long recognized the irreducible social element in natural resource use; as Carl Sauer put it, resources are a "cultural appraisal of nature." It is clear enough from cross-cultural studies that one cannot universalize about the social use and evaluation of nature, nor can one find any common tendency for societies, however primitive their forces of production, to press against the natural limits of their environments. But the insights of cultural geographers and anthropologists on the relations of people and nature have not been readily transferred to the study of modern economies, which the amorphous and idealist concept of "culture" does little to explain.[24]

Given the layers of mediation, what we actually live on are the products of social production, distributed, evaluated, and consumed according complex social practices. [25] That is, our principle *personal* relation is to *social* resources, such as housing, food, heating oil, etc. That lack has little to do with the state of nature and is, in fact, experienced all the time by those at the lower end of the class structure, by

[23] Even what appears to be a relatively "direct" consumption of nature, visits to parks, proves on closer inspection to be a thoroughly social and socially-mediated act, as Verton (1979) and the Olwigs (1979) demonstrate.

[24] See Slater (1977) for a discussion of the Marxist approach to natural resources, using the concept of mode of production.

[25] And these are, as Wisner (1978) and others have pointed out, subjects of class struggle.

virtue of their inability to command access to the most crucial social resource of all, the means of production/means of employment.

Therefore, the study of social scarcity is by no means the same thing as the study of natural resource scarcity, although this basic confusion of apples and oranges has been a hallmark of bourgeois ideology since Malthus. The same should be said of the topic of population dynamics and relative overpopulation. The causes of population change are exceedingly complex and rooted in the social fabric, not in natural drives; hence they comprise a whole separate object of scientific study which touches but infrequently on the subject of natural resources. When I teach a course called "natural resources and population," inherited from a predecessor, I am, in one sense, giving two courses in one. The two halves do, however, prove to be linked by one overriding theme: the common relation of natural resources and population to social structure, in particular to the capitalist mode of production and the dynamics of capital accumulation. These hold sway over both human reproduction and the use of natural materials.

Undoubtedly there are other topics which might be placed under the heading of "natural resources and environment under capitalism," which I have not touched on here. Two things not included deserve comment. First, many geographers would protest the absence of "natural hazards research," a specialty to which our discipline lays claim. Nonetheless, I am not convinced that this can legitimately be called a field of scientific study. Large natural events and their impact on human beings may indeed by an object of study, but "natural hazards" as conventionally defined are not, since their hazardous character does not exist apart from social practice (see Wisner, 1978). Insofar as the field deals with the perception of hazards it falls under "environmental perception" and the study of consciousness in general. Insofar as its practitioners pretend to deal with the material conditions that lead to exposure to hazards and their impact on people, they are engaged in the study of natural resource and environmental use in general. Both aspects call for a sophisticated analysis of political economy, particularly of development and underdevelopment, which is painfully absent from the existing literature.

The subject of land use and land use change is another likely candidate for inclusion here, but I find the term "land use" to be a much abused misnomer for other things. The greater part of what is studied under this heading refers to the spatial pattern of urbanization, agriculture, or back-country activities. In that case, it belongs to the great tradition of spatial inquiry in geography, lying outside one's purview here. What remains are questions of non-spatial impacts and utilization of the physical environment, which I have already included under the headings pollution (and

landscape change) and natural resources as raw materials. In other words, the field of land use does not really exist in its own right.[26]

Toward a Marxist Analysis

It is odd that Marxists have for so long ignored questions of natural resources and environment under capitalism, since they appear so frequently in Marx's own writing (see Perelman, 1975, 1979). Why the interest shown by Marx in the relation of human beings to nature? To begin with, the role of human labor – practical activity – is the cornerstone of the materialist conception of history. Hence, Marx approached the analysis of history in terms of modes of production and his study of capitalist society centers on the social relations and social practice of capitalist production. In Volume I, Chapter 7, of *Capital*, Marx lays out clearly his idea of the significance of the labor-process and its basic constituent elements:

> Labor is, in the first place, a process in which both man and nature participate, and in which man of his own accord starts, regulates, and controls the material reactions between himself and Nature. He opposes himself to Nature as one of her own forces, setting in motion arms and legs, head and hands, the natural forces of his body, in order too appropriate Nature's productions in a form adapted to his own wants (Marx, 1967, Volume 1, 177).
>
> The labor-process, resolved as above into its simple elementary factors, is human action with a view to the production of use-values, appropriation of natural substances to human requirements; it is the necessary condition for effecting exchange of matter between man and Nature; it is the everlasting Nature-imposed condition of human existence, and therefore is independent of every social phase of that existence, or rather, is common to every such phase (Marx, 1967, Volume 1, 183-4).

He goes on to state that the "elementary factors of the labor-process are 1) the personal activity of man, i.e., work itself; 2) the subject of that work; and 3) its instruments" (Marx, 1967, Volume 1, 178). The "universal subject of labor" is nature (Marx, 1967, Volume 1, 178) and it also provides certain instruments of labor (Marx, 1967, Volume 1, 179, 180, 183) and the environmental conditions under which labor takes place

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[26] Of course, in both this area and natural hazards research a "field" *does* exist simply by virtue of the fact that a number of people are writing about it. This literature must be addressed and criticized. Also, a whole area of "land use controls" has grown up as the common name for the set of regulatory practice having to do with the allocation of land to different use and site selection, and, to a lesser extent, with the actual physical use of the land. This is a more legitimate field of study than the amorphous topic "land use," and one that has hardly been touched by Marxists and other scholars on the left (see Gersh et al., 1979).

(Marx, 1967, Volume 1, 180, 512-3). Finally, material substances are, in their original or a transformed state, the objects of individual consumption (use-values) as well as of productive consumption (the labor-process) (Marx, 1967, Volume 1, 183). From all the above, it follows that the study of *all* social appropriation of nature is fundamental to the Marxian project.

Of course, the labor process in the abstract is not the same as the labor process under the conditions of capitalism, as Marx pointed out clearly (1967, Volume 1, 184-6). Hence the bulk of Volume 1 of *Capital* is devoted to two tasks: (1) unveiling the social conditions under which the labor process takes place in the capitalist mode of production, i.e., class relations of control over the means of production, command over the labor process and product of labor, the appropriation of surplus labor as surplus value; and (2) detailing the implications of these relations for the evolution of the social labor process, particularly the changes brought about by the pursuit of surplus value in its absolute and relative forms (longer hours of work and greater productivity, respectively).

Because Marx was a consummate student of the labor process and of the technical development of production, he fully realized the centrality of practical issues surrounding the physical use of nature (including the person of the worker) in production. It is in the chapters on the capitalist development of the labor process (Volume 1, Chapters 10-15) that his most frequent remarks on the use of raw materials, the work environment and the character of the product are to be found. His critical observations read, as Perelman puts it, "like some of the best modern literature of the environmental movement" on occupational health, food additives and soil depletion. Whenever Marx returns to the immediate issues of production, throughout *Capital*, he has insightful comments to make on the use and abuse of natural resources and the environment: in Volume 2 he discusses natural processes as a necessary part of the labor process, while distinguishing the "working period" from the total "production period" (Marx, 1967, Volume 2, Chapter 12 and 13); in Volume 3 he demonstrates a perfectly good understanding of materials balance and the production of waste products (Marx, 1967, Volume 3, 79-81); later, he notes the implications of landed property and rent on resource extraction (Marx, Volume 3, 617, 776, 780-1, 807, 812-3).

The point of Marx's arguments is to show how the social relations of production shape the ways the labor process is carried on, i.e., how they mould the fundamental relation to nature. Of particular importance, once the class nature of capitalist production relations is established, are the implications of the pursuit of surplus value and the accumulation of capital as the principal aims of capital – a characteristic which distinguishes capitalism from all earlier class systems. It is not enough to state that exploitation of labor takes place and leave it on the plane of moral judgment. The question is how the extraction of surplus value and the capitalist use of labor-power under competitive conditions drive social production and reproduction, and consequently determine the social appropriation of nature. The logic of capital is

"production for production's sake, accumulation for accumulation's sake" (Marx, 1867, Volume 1, 595) and Marx was fascinated by the implications of this logic for the organization of human use-values.

Because Marx's main purpose in *Capital* was to reveal the structural role of the production and reproduction of capital-as-surplus-value in the metabolism of capitalist society, it is perhaps understandable that so many Marxists have grasped this idea only to forget the concrete *use-value* side of things. Nonetheless, Marx's method was constantly to play off the two sides of capitalist production against each other, from the moment he introduced the dialectic of use-value and exchange-value in Chapter 1's discussion of the commodity. Unfortunately, since most issues of natural resources and environment are concrete, physical problems arising on the use-value side of things, they have been given short-shrift among Marx's followers.[27]

Marx's main revolutionary purpose in writing *Capital* was to try to uncover the principle contradiction within capitalist reproduction, including those inherent in the use-value/value dialectic. That is, how did the pursuit of surplus value shape (and distort) the labor-process, as a means of producing use-values or as the distribution and consumption of use-values? One of the most important contradictions brought out is the way capital's thirst for absolute surplus value leads to terrible abuse of labor-power and ultimately generates intense class struggle over the length of the working day. The appalling *physical* toll on the worker is an integral part, extensively documented, of Marx's discussion (Marx, 1967, Volume 1, Chapter 10, 240-64 especially). Again, Marx's followers have tended to focus on the necessity of class struggle owing to the (value) exploitation of workers and to slight analysis of the concrete (use-value) conditions in which it is bred. Moreover, the tendency to abuse labor-power is paralleled by a tendency to misuse the forces of nature and thereby undermine the productivity of labor, as in the case of soil exhaustion (see Perelman, 1979). Indeed, Marx explicitly juxtaposes these two cases of the use-value effects of capital accumulation, in reference to the Factory Acts:

> Apart from the working-class movement that grew more threatening, the limiting of factory labor was dictated by the same necessity which spread *guano* [fertilizer] over the English fields. The same blind eagerness for plunder that in the one case exhausted the soil, had, in the other, torn up by the roots the living force of the nation (Marx, 1967, Volume 1, 239).

Capital does three things simultaneously: it unveils the structure and tendencies of the capitalist mode of production, it critiques bourgeois ideology for its fetishistic explanations for the phenomena of political economy, and it probes for the inherent

[27] The distinction between value and use-value relations, and the primacy of the concrete phenomena of the latter, is also central to an analysis of space.

contradictions of capital which generate accumulation crisis and class (social) struggle against the rule of capital. A fundamental advance Marx made in writing *Capital* is given by its title: that is, that the fundamental structuring relation, or network of internal relations, under the present mode of production, is to *capital*.[28] Thus, if we are to understand the use of nature in today's world economy, we must continually investigate the central relation between nature and capital, not people and nature in the abstract.

That investigation requires the use and development of the method of *Capital*. *First,* we must analyze the way capitalist production as a whole structures the human labor process, and, as a use-value or technical question, how it regulates the input of raw materials and output of waste products as production develops in pursuit of absolute and relative surplus value (Volume1, Chapters 7-15). Complementary to this, but only suggested by Marx, would be to study the vital circuit of reproduction of labor-power, including problems from the physical abuse of people's bodies to the social consumption of nature in recreational landscapes (Volume 1, Chapters 10-15, 25). Similarly, the movement of natural resources through production and consumption can best be seen, like the reproduction of labor or of capital, as a distinct *circuit*, consisting of physical substances whose principal end product is the reproduction of natural systems themselves, until nature encounters capital. In this opposition of circuits lies the source of contradictions, as it does in the opposition between the circuits of capital (M-C-M) and labor-power (C-M-C).[29]

To expand the analysis of capital, one must next take up the problem of the flow of production, transportation, exchange between sectors, fixed capital and turnover time, and all of this in a spatially-specific and geographically expanding context (Harvey, 1975; Marx, 1967, Volume 2). Finally, issues surrounding the distribution of the means of production and of the social surplus product must be discussed for their impact on the movements of capital – encompassing such topics as rent, the rate of profit, and the credit system (Volume 3). Finally, these issues must be put into the context of a capitalist-dominated world market which subsumes non-capitalist modes of production and which embraces nation-states, not to mention

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[28] My understanding is that the secret of surplus value, in its essentials, was discovered by Marx much earlier, and that the basic tenets of historical materialism were established by Marx and Engels earlier still, although both were sharpened in the writing of *Capital*. Among other advances, Marx went beyond the scope of his original plan for a "critique of political economy" and developed greater insight into the labor process and the class struggle emerging from that process.

[29] [Editors' note: M-C-M and C-M-C denote the purchase and selling of C, commodities, through M, money, or the transformations of capital from and to commodity and money forms, which enable wealth to be accumulated in a capitalist system] Marx indicates quite clearly in several places that labor-power has a different logic in its utilization of capitalist commodities, one which emphasizes use-values (cf., Harvey, 1978), and also that nature has laws regulating its metabolism which operate quite independently of the laws of capitalist production (see Schmidt, 1971).

diverse physical environments. And, of course, since the analysis of *Capital* is concerned chiefly with the production, circulation and distribution of capital as value, we must undertake quite separate studies of the "circuit of labor-power" and the "circuit of nature" as they interact with the circuit of capital, and are impacted by things such as property rights in land and extraction of rent.

Second, we must develop a critique of the ideology of "man (sic) and nature," as Marx critiqued the categories of political economy. This means not only a strenuous combat with Malthusian and other fetishistic concepts which have nature determining social relations and social activity – a combat which Perelman shows Marx to have engaged in – but more specific investigations of how people's real experience within capitalist-dominated social systems generates certain culturally distinct perceptions of nature and consumptive uses of nature, as the Olwigs (1979) and Overton (1979) have begun to do in their work on parks.[30] A fundamental starting point here is the practical separation of production and consumption (work and leisure, factory and residence, city and back-country) which shapes the common view of nature as "landscape," wilderness, a thing apart from the sullied world of society (Harvey, 1978, Walker, 1978). Parks may not seem at first glance to be a subject of much importance or general interest, but it may be our best way of getting a handle on the whole ideology of a relation to nature that lies wholly outside production. On the other hand, Marxists must also confront the ideology of the productive consumption of nature under capitalism, which regards nature in an instrumentalist fashion as objects to be manipulated as natural resources, private property, or abused as waste dumps, without regard either to the reproduction of natural systems or their significance to people for reasons other than the accumulation of capital (Leiss, 1974; Marx, 1967, Volume 1, 513; Schmidt, 1971).

In general, the language of nature-images, which is a basic element of any ideological system, reveals more about society than it does about nature – conceptions of how society works (e.g., natural law), what kind of society people would like (especially whether they prefer change or the status quo) and what they feel is wrong with society. Nature provides a vast dappled mirror of our own social face.

Third, it is necessary to probe the contradictions of the capitalist relationship to, and use of, nature – as raw materials, as waste-dump, as parks. This does not mean coming up with idealist contradictions between "irrational" and "rational" uses of nature, although this can be useful for political work, but unraveling the material contradictions within capitalist society which jeopardize the reproduction of capital, the reproduction of labor-power and the reproduction of natural systems. As Perelman

[30] This investigation must frequently focus on contradictions *between* modes of production as capitalism expands; this sort of problem arises in the two cases studied by Overton (1979) and the Olwigs (1979).

(1979) notes, Marx was always looking for the weak spots in capital's armor which might be exploited by the opposition.

Irrationality in the use of nature is not a logical problem or a deviation from some ideal norm. How could it be when our knowledge continues to change and grow, and hence we can never know what is truly rational? *Material* irrationality, on the other hand, is measured with respect to the ability of society to reproduce itself, or, more precisely, to the ability of classes to reproduce themselves and of capital to reproduce itself on an ever-expanding scale; in other words, it is tied to definite class and societal interests. It is this kind of irrationality, and the historical movement to which it gives rise which matters, as Mumy (1979) argues in his critique of metaphysical puzzles about "environmental efficiency" posed by neo-classical analysis.

Phil LeVeen (1979), for example, does a good job of stating the dilemmas that western water development has encountered after a period of great success – in terms of the class of landowners-farmers. The consequent "crisis of reclamation policy" reveals the irrationalities, or contradictions, of past policy and demands a counteracting rationalization of the state and of irrigated agriculture. A "rationalized" future is likely to look quite different from the immediate past, and [is] also likely to generate its own irrationalities, eventually. Of course, both the irrationality and the rationalization of water development are measured principally in terms of capital's ability to expand. But there is always an active social struggle over whose definition of "rationality" will prevail.

The crisis of reclamation policy is not one that you and I necessarily feel. Our personal crisis may be experienced as the disappointment of seeing a stretch of white water flooded by another dam. Water, like other natural resources is misused in any number of ways all the time, but the experience of crisis (or scarcity) requires a concrete encounter with an altered nature. When do these experiences count? Historically they have no meaning unless they propel people into action, i.e., initiate political struggle. As Mumy (1979) points out, we want to analyze precisely why people are or are not so moved, and what this has to do with their experience and consciousness. Even then, action only begins to matter in this society when it starts to impact capital. When the accumulation of capital is jeopardized through a falling rate of profit, political obstruction, or otherwise, then we feel the earth move.

In conclusion, one is tempted to elevate contradictions of the relation to nature, i.e., adverse effects on social reproduction of the social use of nature, to a fundamental place in Marxist analysis, beneath only competition and class struggle as sources of capital's instability and eventual transcendent demise.[31] "Contradictions of nature"

[31] A fundamental but difficult question for Marxist analysis with respect to raw materials supply is whether this can be a source of general accumulation crisis or whether difficulties in raw materials supply are subordinate to, or actually caused by, other contradictions in accumulation of a more social

figure rather differently from fully social contradiction, however. Nature is not the subject of history; it does not care how it is used and cannot mobilize in pursuit of its own interests. But people do and can. Insofar as changes and failures of the circuit of physical processes impact capital accumulation and the daily life of various classes, it will generate crisis, struggle, and historical change.

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nature. For example, how important are the oil price hikes in the economic malaise of capitalism in the 1970s? Obviously they contribute considerably, although my feeling is that they are a secondary cause in a major structural crisis. Nonetheless, a determination of the role of natural resources in such a crisis can not be made *a priori*. It requires an open-minded scientific study of the situation. Such a study includes consideration of the Marxist theory of crisis, of course. While Marx evidently thought that the primary source of crisis was to be found in the rising organic composition of capital (the inverse of capital's tendency to increase the productivity of labor through mechanization), he did not have the mono-causal view of the origin of the crisis that many of his followers have attributed to him (see Harvey, 1975; Lebowitz, 1976; Mandel, 1975). It follows from an appreciation of the way Marx constantly probed capital for its contradictions in his analysis that natural resource problems cannot be shunted aside as unfit for Marxist inquiry or taken to be merely the foolish preoccupation of "petty bourgeois environmentalists."

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