Geography, Marx and the Concept of Nature

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Although "nature" is one of the most commonly invoked concepts in science (natural or social), it has in recent years been the subject of surprisingly little methodological discussion. An understanding of nature is fundamental to the manner in which science sees and conducts itself, yet the concept is generally taken for granted. Even the current enthusiasm to write introspective philosophies, sociologies and histories, science has left the stone of "nature" unturned. The neglect is not too difficult to explain; it is wholly consistent with the contemporary practice and self-image of science. Though not exclusive, the positivist tradition dominates orthodox science, and positivism presupposes (among other things) that nature exists in and for itself, external to human activity. Thus we can know nature only by perceiving its facts and eventually discovering its laws. Nature is constituted as an external repository of facts that live according to autonomous natural laws. Mystery exists in nature only to the extent that science has not yet discovered these facts and laws.

The Concept of Nature in Social Science

With difficulty has social science adopted this rather stark conception of nature. Intimately connected with human *nature*, the nature that social scientists study is far harder to view as external. As social scientists internalize the positivist paradigm in larger and larger numbers, therefore, they gradually expose beneath the concept's calm exterior a turbulent core; beneath its taken-for-grantedness they reveal a dual conception of nature. On the one hand, nature is external, non-human reality, pure and god-given; on the other, nature is more abstract, incorporating human as well as non-human spheres of reality. In practice, this dual conception of nature is contradictory within positivism. At the same time as it is strictly non-human, "nature" is expected to be simultaneously human and non-human. Practicing scientists tend to adopt one or the other concept of nature, sometimes adopting both consecutively but rarely simultaneously.

The contradiction within the positivist conception of nature is usually dealt with in one of three ways:

1) Natural science studies nature, social science does not; it studies society which has nothing to do with nature. To talk of "human nature" or the *nature* of a certain society is therefore only metaphor or linguistic accident, according to this interpretation. But this is unsatisfactory because metaphors and linguistic "accidents" have a historical habit of referring to something objectively real. It is therefore no accident that we talk of "human nature" or the "nature of human societies."[1] Such usage of "nature" is not trivial. Is not human physiology every bit as "natural" as animal physiology, and are not human psychology and human physiology thoroughly intertwined making "human nature" a genuine rather than accidental concept? The contradiction within the positivist conception of nature cannot be ignored by banishing one side of it in theory while it remains in practice.

2) The second way of dealing with the contradiction is the assertion that social science like natural science does study nature but that the nature it studies is different from that studied by natural science. The "nature" of natural science is deemed autonomous from human activity while that of social science is seen as socially created. Insofar as the contradiction within the concept of nature is perceived, this is a popular solution, but it relies on displacing the contradiction from the concept itself into the nature to which the concept refers; nature as a unified concept refers to a bifurcated reality. Thus there remains a contradiction between this actual nature, which incorporates the separation of human and non-human, and the concept, "nature," which refers to this opposition as a unity.

3) The third solution dissolves human nature into external nature. According to this solution, human behavior is regulated according to the same body of laws as the lowest artropod. The difference between them is simply one of scale and complexity within a single nature. Social Darwinism and much contemporary behaviorism hold this view of nature. Such a "solution" dissolves the contradiction in nature theoretically, but leaves it unsolved practically. In practice, human societies prove themselves able to appropriate the "laws of nature" for their own purposes, and this appropriation along with its purposes are not ruled by "natural law."

Geography has been particularly resistant to sim-

plistic, contradictory concepts of nature. Mainly concerned with the relationship between human kind and nature ("Man-Nature" or "Man-Environment" relations, as they used to be called), geographers have generally been more sensitive to the complexity of "nature" and less willing to see it in simple dualistic terms. But even they, in recent years, have succumbed, as positivism tempted geographers with the promise of relevance, apparent sophistication, and the resulting social prestige. There have been exceptions, of course, among whom Glacken stands out. His *Traces on the Rhodian Shore* is a remarkable intellectual history of the idea of nature. Unlike Collingwood's earlier, better known, but less rich *The Idea of Nature*, it was never meant to include a programmatic exposition of the contemporary conception of nature. Indeed, Glacken ended his account with the eighteenth century. Like Collingwood, however, but in more sophisticated terms, Glacken rightly insisted that a proper understanding of nature is impossible unless integrated with an understanding of history.[2] The growth and transformation that nature experiences, however interpreted, can only be understood in conjunction with an understanding of concrete historical development, and vice versa. Isolated from each other, nature and history become empty ideas.

Writing explicitly about the *idea* of nature, Glacken was also concerned to relate the historical currency of these ideas to the concrete material relation of societies with nature. He notes that the Greeks were able, for the first time in history, to conceive of nature as modified by human activity because their productive forces were sufficiently developed to demonstrate human power over nature.[3] Nonetheless, intellectual history was Glacken's primary concern. It will be our purpose here to examine in part what Glacken left aside. First, we shall emphasize not the idea of nature, but the concrete relation of human beings with nature. For it is this alone which can give Glacken's history a material and historical grounding. Second, in contradistinction to Glacken, we shall look (however historically) at the contemporary period. For good reason, Glacken restricted his account to pre-eighteenth century societies; the coming of capitalism heralded a new relation of human society with nature. In Glacken's own words:[4]

> With the eighteenth century there ends in Western civilization an epoch in the history of man's relationship to nature. What follows is of an entirely different order, influenced by the theory of evolution, specialization in the attainment of knowledge, acceleration in the transformation of nature.

As has been pointed out elsewhere, Marx was also concerned to view nature in historical terms.[5] More than any other historical period, capitalism wrenches history from its socket in nature, and vice versa. It is therefore of special importance to make their connection explicit:[6]

> In the whole conception of history up to the present this real basis of history [the material relations of human societies with nature] has either been totally neglected or else considered as a minor matter quite irrelevant to the course of history . . . The real production of life seems to be primeval history, while the truly historical appears to be separated from ordinary life, something extra-superterrestrial. With this the relation of man to nature is excluded from history and hence the antithesis of nature and history is created.

This unity (but not identity) of nature with history underlies all of Marx's work, which ought, for that reason alone, to be of critical interest to social scientists. But in addition, Marx offers an alternative, unified and non-contradictory conception of nature. Positivism's contradictory concept of nature was developed (most recently) out of eighteenth and early nineteenth century philosophical materialism, and Marx's critique of this tradition remains relevant in terms of contemporary positivism.

Glacken, succumbing to an all too common mythology, dismissed Marx as teleological.[7] Collingwood, for his part, was so concerned to dismiss Marx on the first page that he had to resort to a mechanical misinterpretation of Hegel's famous "owl of Minerva." This should offer itself as a recommendation not a deterrent.

The Concept of Nature in Historical Materialism

Marx provided no systematic theory of nature, but in his, as in every other, attempt at science, a concept of nature is implied. By way of a critique of classical political economy, his primary concern was to outline a theory of capitalist society. This theory is now generally referred to as historical materialism, and as its name suggests, it attempts a historical explanation of how capitalism works, focusing on the social structures the society creates for sustaining its material existence. It is in this context that Marx discusses

nature, but as an explication of "nature" *per se* these discussions remain fragmented and incomplete. At the same time, however, an understanding of "nature" is clearly central to Marx's project, and a concept is implied in his work though is never more than implicit. When teased out, elaborated and developed this concept reveals an insightful theoretical basis on which to build scientific theory.

Nature as a Unity: First and Second Nature

Nature separate from society had no meaning for Marx; nature is always related to societal activity. He meant this materially as well as ideally; the entire earth bears on its face the stamp of human activity. Writing as long ago as the 1840s, when Africa was still known as the Dark Continent, Marx and Engels could conclude that a "nature [which] preceded human history . . . no longer exists anywhere (except perhaps on a few Australian coral-islands of recent origin)."[8] Though somewhat iconoclastic 135 years ago, this idea is orthodox geographic wisdom today. Historically and practically, the relation with nature is at the centre of human activity since people rely on nature for the fulfillment of fundamental needs. Theoretically, therefore, to conceive of nature as separate from society is a false abstraction: "the idea of *one* basis for life and another for science is from the outset a lie."[9] In a more ideal sense, to posit nature as external to society is absurd since this very act of positting implies a prior awareness of our *knowledge relation* with nature. We cannot know nature as external; we can know it only by entering into a relation with it. This latter, rather ideal, assumption hardly tells us a lot, but is utterly practical in so far as it reminds us that science cannot in good faith treat nature as external. Yet this is exactly what positivism attempts: it ignores the inescapability of this relation with nature, assumes nature to be an external thing-in-itself, and then by proceeding to gather knowledge about this nature, contradicts itself at every turn.

Nature and society are not two totally separate parts of reality as, in common parlance, they are often assumed to be. Rather, there is a unity of nature that is differentiated within. Thus Marx views capitalism as operating according to "natural laws," and declares as the "ultimate aim" of *Capital* the attempt to "lay bare the economic law of motion of modern society." The laws of its own operation and development are embedded in the structure of capitalist society, and this society cannot, by purely individual or even legislative effort, remove "the obstacles offered by the successive phases of its normal development."[10] "Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past."[11]

The laws that regulate the development of Marx's "second nature" are not at all the same kind of laws that the physicist finds in the "first nature." They are not invariant and universal laws because the societies they describe are in flux, constantly changing and developing. According to Thomas, "Marx's analyses do not subordinate society to permanent laws like those of physics, because society is seen by Marx as being in transition, as moving toward a new arrangement in which the 'laws' of classical economics *will no longer apply*."[12]

The "economic laws of motion" which Marx sought were the laws (themselves historically mutable) which were responsible for this social transition. It is a law of capitalist society, for example, that to survive, individual capitalists must expand and accumulate larger and larger quantities of capital. But as a side effect of this *individual* necessity to expand, capitalism *as a whole* produces the conditions for its own decline and transformation into something different. By this "Marx does not intend to prove that the process was historically necessary. On the contrary: only after he has proved from history that in fact the process has partially already occurred, and partially must occur in the future, he in addition characterizes it as a process which develops in accordance with a definite dialectical law."[13] Obviously, Marx's dialectic is a quite different mode of thought from the formal logic of positivist science, and it is symptomatic of the narrow-mindedness of the latter that its adherents often cannot even conceive of different logics. Logic for them is simply logic, just as nature is nature; when Marx discusses natural laws in connection with the second nature, the positivist consciousness imagines these as *identical* with natural laws about the first nature (laws of physics, for example) and therefore imagine Marx to be a determinist of one shade or another. But when Marx discusses natural law, there is no implication of determinate inevitability, that much is a projection of the positivist consciousness. What Marx alludes to in calling social laws natural is not the society in and for itself, but the internal relationship between society and the people living under it. Thus Engels concludes that "the laws of economics confront men in all . . . planless incoherent production as objective laws over which they have no power, therefore in the form of laws of nature."[14] Far from being inevitable, these laws are socially created and can be socially abolished. While they remain, people are constrained in their social actions; they can abolish the laws responsible for this constraint not by isolated individual action but only by deliberate, collective social action.

Dialectics of Nature?

The idea of second nature is not new. Glacken

traces it back to Cicero, and it reappears in more modern guise in Hegel. For them, the idea of a second nature was connected with the idea of a designed nature.[15] It was left for Marx to separate the concept from this teleology, and in so doing he "stood Hegel's dialectic on its feet." But this dialectical comprehension of the second nature, together with Marx's insistence on a unified conception of nature, misses the question first posed by Engels of the role of the dialectic in comprehending the first nature. Engels posed the question as follows:[16]

> Empirical natural science has accumulated such a tremendous mass of positive material for knowledge that the necessity of classifying it in each separate field of investigation systematically and in accordance with its inner interconnection has become absolutely imperative.

Establishing these "inner inter-connections" required converting the formal logic of natural science into the dialectic. This Engels did by trying to show that the dialectic was inherent in nature, a property of all material relations, and his "dialectic of nature" became an integral part of Soviet ideology under Stalin. But ultimately, Engels commits the same metaphysical sin as the scientists whose theory he attempts to inject with the dialectic. He treats nature as something external, existing in itself, and quite separate from its human appropriation. If in Lukacs' philosophical language we accept the dialectic to be a relation of Subject and Object, it is clear that by separating nature from its human appropriation, Engels has attempted to find the dialectic within the Object itself.[17] The so-called "dialectic of nature" is not inherent in nature but rather, as we shall see, it is embedded in the human relation with nature. The dialectic, separate from human beings, has no meaning.

Alfred Schmidt's Concept of Nature

Alfred Schmidt's exposition of *The Concept of Nature in Marx* is an ambitious attempt to make explicit in Marx a concept that is only implicit. It is often quoted but has not been critically appreciated or assessed. Stressing the unity of nature and the unity of nature with history in Marx, Schmidt begins by distinguishing Marx's conception of nature from that of the contemporary philosophical materialism. He then identifies the first and second natures in Marx but distinguishes him from Hegel, for whom the second nature is not at all like the first. "Hegel described the first nature, a world of things outside men, as a blind conceptless occurrence. The world of men as it takes shape in the state, law, society, and the economy, is for him 'second nature,' manifested reason, objective Spirit."[18] For Marx, as we saw, second nature is to be viewed like the first. Schmidt than identifies two historical dialectics in Marx: "pre-bourgeois" and bourgeois. In the earlier historical period "men are absolutely identical with nature," and the Object (external nature) dominates the Subject (labour); human beings are very much part of and at the mercy of external nature. With the advent of the bourgeois period, however, "men succeeded in universally mastering nature . . . [and] nature congeals into an abstract in-itself external to men;" the Subject now dominates the Object. There is not *one* concept of nature in Schmidt, therefore, but two: nature as external to human activity and object to that activity (first nature); and nature as "the totality of everything that exists" (the first and the second natures).[19] Although these are asserted to be single reality, in practice -- in the rest of the book -- Schmidt tends to treat them as separate, and this allows him to discuss, among other things, the historical necessity of "man's domination of nature." That this accurately reflects Marx's conception of nature is doubtful, but it does provide Schmidt with a platform from which to accuse Marx of being utopian.[20] For Marx did not accept the eternal necessity of this "domination of nature" that Schmidt introduces.

The "domination of nature" has been a consistent theme among the Frankfurt School critical theorists, of whom Schmidt is one.[21] Yet it is a vague notion, to say the least, and one that tends to promote the crude, binary opposition of society and nature or, as in Schmidt's case, "man and nature." Behind "man's domination of nature" is a concrete mechanism but one which is deemphasized by the Frankfurt School to a greater or lesser extent. Paradoxical as it sounds, this inner mechanism is in capitalist society the exploitation of one class by another. William Leiss, a student of Herbert Marcuse of the Frankfurt School, points succinctly to this mechanism beneath the mystifying phrase, "the domination of nature:"[22]

> If the idea of the *domination* of nature has any meaning at all, it is that by such means — that is, through the possession of superior technological capabilities — some men attempt to dominate and control other men. The notion of a common domination of the human race over external nature is non-sensical . . . 'Man' as such is an abstraction which . . . only conceals the fact that in the actual violent struggles among *men* technological instruments have a part to play.

Unfortunately, Leiss is also unable to use this insight to produce a unified rather than dualistic concept of nature. For "domination of nature" he substitutes "mastery over nature," claiming with some justification that it has "different connotations," and ends up

with an even cruder distinction than Schmidt's between "internal" and "external" nature. Though he talks of "the subtle interplay of internal and external nature," this is a subtlty in words rather than practice; it is a subtlty foisted onto the rather unsubtle separation of internal from external.[23]

Despite his intentions, Schmidt was unable to avoid a dual conception of nature. Throughout he abstracted the labor process from the specific historical mode of production under which it occurred, preferring to talk of labor *per se*. The "labour-process," for Schmidt, "does not undergo any [historical] change radically dividing the stages of production from each other." Thus he proposes to investigate the relation with nature as mediated through the labor process, without at first characterizing "the relations of production within which that process takes place."[24] To this extent he denies his own assumption that nature cannot be considered separately from history. The nature of the labor process, which mediates the relation of history with nature, is no exception. As we shall see, it is precisely this exploitation of labor power which, under capitalism, ties nature together as a unity, both practically and conceptually.

It is not difficult to read Marx (as Schmidt has implicitly done) as though he too were offering a dual conception of nature. After all, Marx never provided a systematic theory of nature and many of the references and discussions he provides are ambiguous on this point. And as Schmidt discovered, it is necessary to complement Marx's statements about nature with a broader overall understanding of his project. But it is precisely here that Schmidt fails, for if anything he is too pedantic. He understands the close-grained details of Marx's word, phrases, and sentences, but has trouble focusing on these as a whole. Otherwise, he could never have substituted an historical version of the labor-process, even in the context of his search for a Marxist concept of nature. A more rigorous and consistent reading of Marx will allow us to comprehend nature as historically unified through the labor process, for "industry," according to Marx "is the historical relationship of nature with man."[25] But to do so we will have to alter our perspective. It will be necessary to look not for a "concept of nature" *per se*, but for an understanding of the *relation* of human societies with nature.

Production in General

In his initial, abstract introduction to the topic in *Capital*, Marx depicts production as a process by which the form of nature is altered. The producer "can work only as nature does, that is by changing the form of matter. Nay more, in this work of changing the form he is constantly helped by natural forces." By "his industry," the producer "changes the forms of the materials furnished by nature, in such a way as to make them useful to him. The form of wood, for instance, is altered, by making a table out of it. Yet, for all that, the table continues to be that common, everyday thing, wood."[26]

In so far as labor produces useful commodities that fulfill human needs, "it is an eternal nature-imposed necessity, without which there can be no material exchanges between men and nature, and therefore no life."[27] But labor effects more than just a simple change in the form of matter; it produces a simultaneous change in the labourer, and it is from this abstract definition of the relation with nature that a unified marxist theory of nature can be constructed.

> Labour 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 re-actions 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 to appropriate nature's productions in a form adapted to his own wants. By thus acting on the external world and changing it, he at the same time changes his own nature.[28]

Like Adam Smith, but unlike contemporary neo-classical economists for whom utility and value are synonymous, Marx distinguished two ways of viewing a commodity: as an embodiment of useful attributes and qualities which supply the commodity with a *use-value*; and as an embodiment of a certain quantity of labor time, which supplies it with an *exchange-value*. Use-values are the material substratum of exchange-values, and in so far as nature can be equated with the realm of use-values as Schmidt claims, we can view it in similar terms. Nature then becomes the material which has its form altered by productive labor, becoming also the material embodiment of exchange value; the wood is made into a commodity, the table. Things are produced, we assume, because they are needed, and the "relation with nature" is thereby a use-value relation. Natural material is qualitatively altered by being brought into human productive activity, and human activity is simultaneously worked into natural material outside itself.

Since Marx was initially concerned to explain the inner workings of the capitalist economy, he tended to abstract from the sphere of use-values, focusing on exchange-values. Thus his notion of nature did not explicitly proceed beyond this rather abstract equation of nature with use-value. Given this abstract formulation it is possible to see how a dual conception of nature

could be read into Marx, since like Schmidt, he has only at this point asserted the unity of nature without deriving it practically, i.e., logically and historically. In reality, Schmidt has failed to go beyond Marx in any substantive way; what he has articulated is a rationalization for the dual conception he implicitly reads into Marx. Yet this dual conception contradicts Marx's larger project.

Production for Exchange

Few contemporary societies do not produce goods for an exchange economy, and given such an arrangement, our understanding of the "relation with nature" can be further refined. In short, it can no longer be seen as a purely use-value relation since if things are produced for exchange, direct need is no longer the sole determinant of what is produced. Exchange-value is what the immediate producer seeks when he or she produces for exchange. This exchange-value generally appears in material form as money which mediates the exchange of commodities.

With an exchange system we begin to see not a homogeneous relation with nature, but rather the production of a second nature out of the first, the development of a set of social institutions to carry out and regulate this exchange. Although the second nature is composed of (and circulates) products produced out of the first nature, it is for the most part only indirectly related to it through the production process. This separation of first and second natures Schmidt conveys well because his intellectual mentors (Kant and Hegel prodominantly) lived and wrote in a time when precapitalist exchange economies had developed fully and were in the process of giving birth to capitalism. The unreconciled dualisms in Schmidt's concept of nature, particularly the idea of a second versus a first nature, are more truly and practically representative of this historical period — a period of developing exchange economies — than any other. Schmidt set off to "determine more exactly the position of Marx between Kant and Hegel," and this is precisely what he has done. He has abstracted from the historically different mode of production that has developed since Kant and Hegel, and which preoccupies Marx. He has treated Marx as an amalgamation of, rather than a movement beyond, Kant and Hegel.[29]

Capitalist Production

Based on private property, capitalism differs from other exchange economies in this: it produces on the one side a class which possess the means of production for the whole society yet who do no labour, and on the other side a class that possess only their own labor power, which they must sell to survive.[30] Compared to its predecessors, the capitalist mode of production is inherently progressive and revolutionary. As it developed internationally, capitalism swept before it all other modes of production. These were forcibly subordinated to the dictates of capitalism which, since it had achieved a higher level of productiveness than all preceeding modes of production, had the political and military, as well as the economic, wherewithall to enforce its expansion. Hence the growth of colonial empires among the more advanced capitalist nations of Europe and the fierce competition between these nations leading to sporadic imperial wars.

Under capitalism, the relation with nature is a use-value relation only in the most subordinate sense. Before anything else it is an exchange-value relation. "Expansion," "growth," "progress" and "development" refer primarily to economic change (the necessary accumulation of greater and greater quantities of capital) upon which all other kinds of change are made dependent. At a day to day level, these changes are particularly apparent in the spheres of reproduction and consumption. Witness, for example, the constant barrage of nostalgia for uncommercialized art and culture, or the perpetual Christmas time complaints about the commercialization of religion. This commercialization is in reality a *capitalization*, an extension of the capitalist commodity structure into realms of life and experience that had previously been "sacred," that is, had survived independently in the realm of use values. Now, however, art, religion and culture are in the process of becoming commodities much as scientific knowledge already is, and their exchange-value label (price) comes to dominate their use-value.

But it is not just this "second nature" that is increasingly produced as part of the capitalist mode of production. The "first nature" is also produced. Indeed the "second nature" is no longer produced *out of* the first nature, but rather the first is produced *by* and within the confines of the second. Whether we are talking about the laborious conversion of iron ore into steel and eventually into automobiles or the professional packaging of Yosemite National Park, nature is produced. In a quite concrete sense, this process of production transcends the ideal distinction between a first and a second nature. The form of all nature has been altered by human activity, and today this production is accomplished not for the fulfillment of needs in general but for the fulfillment of one particular "need:" profit.

Over forty years ago, this exchange-value relation with nature was intuitively recognized and unwittingly encapsulated by that great imperial geographer, Isaiah Bowman, who declared that human beings "cannot move mountains" — not, that is, without first "floating a bond issue."[31]

To say that nature is produced does not imply that every atom of some tree, mountain or desert is humanly created, any more than that every atom of the Empire State Building is humanly created; matter is neither created nor destroyed. It does mean the human activity is responsible to a greater or lesser extent for the form of matter; the size and shape of the buildings, the hybrid or location of the tree, the physignomy of the mountain, the spatial extent of the desert. The abstract difference between Schmidt's first and second natures is transformed into a difference of degree, and the unity of nature becomes practically realized in production. Behind the vague and mechanical "domination of nature" we find in reality the *production* of nature.

There will be those who see this theory of nature centered on the nature of production as a crude violation of the inherent beauty, sanctity and mystery of nature. The meaning of nature to them is not only sacred; it transcends such vulgar considerations as production. Yet those are the same people who drive their campers to Yellowstone to see Yogi Bear, who gladly use the beauty salon in the wilderness of Yosemite, and who capture the wildest nature on film so they can *reproduce* in their living room. No less than nature itself, the cultural meaning of nature is socially produced. This is not to diminish the genuine insights that an imaginative phenomenology (as opposed to humanism) can offer; rather it is to understand the limits as well as the possibilities of this form of discourse.[32] The "realm of freedom actually begins only where labour which is determined by necessity . . . ceases." The "true realm of freedom . . . can blossom forth only with this realm of necessity as its basis."[33]

Implications

Science

"We know only a single science," wrote Marx and Engels, "the science of history. One can look at history from two sides and divide it into the history of nature and the history of men. Both sides are dependent on each other so long as men exist."[34] This unity of science was not an abstract principle for Marx but the eventual product of a concrete social development: "Natural Science will in time subsume the science of man just as the science of man will subsume natural science: there will be *one* science."[35] Or as Wilbur Zelinsky rather unwittingly explains: "I entertain the wicked suspicion that when our vision of science has graduated to a higher level, we shall discover, to our surprise, that the precociously adolescent natural sciences must be consumed within a larger, essentially social science of which they form a peculiar special subset." This after describing Marxism as a luxuriating religion.[36]

On the basis of this historical understanding of the unification of science, it is possible to recast Engels' unfortunate attempt to inject the dialectic into nature. Contemporary "natural science" is an historical relic. It originated in the sixteenth and seventeenth centuries with the need to appropriate nature through industry, and reflects this need concretely by continuing to posit nature as wholly external to human activity. By so doing, science could provide capitalism with the technology through which nature could be socialized. At the precise moment when nature was being theorised as external, however, the last vestiges of this externality were being practically destroyed; nature became increasingly produced. The unity of science therefore demands nothing so simple as the injection of nature with the dialectic. That dialectic already exists in the *relation* to nature exemplified by natural science. The issue is not to inject the dialectic but to retrieve it.

By holding nature as external to society, the Object as wholly outside the Subject, natural science constitutes itself as rigorously non-dialectical. It makes itself deliberately blind to the other side of its relation with nature. Yet as it maintains this externality of nature, it at the same time appropriates nature, brings it within itself, in order to produce knowledge of it. This very project is clearly contradictory; nature is assumed external but made internal. This and other contradictions arise from the way natural scientists relate to nature, but they are ignored or rather displaced and externalized. They do not long remain external, however; they resurface in quite tangible form and are becoming more and more difficult to conceive as externalities: the production of deficient soils and the general degradation of much agricultural land; the production of culturally deficient landscapes; pollution, and the erratic availability of resources; the politics of nuclear energy; internal scientific revolutions.[37]

Burgess notes appropriately that "geographical theory, at the heart of which must stand a concept of nature, oscillates between a generality that would appall even a diplomat and an ecelecticism that would frighten a scientologist."[38] The foregoing sketch of a theory of nature offers a more coherent focus for scientific research. It suggests two things: first, the relation of human societies and individuals with nature is the inescapable context or problematic for science; second, the unity of this relation is contradicted by the arbitrariness of disciplinary boundaries. Geography is

not unique in its concern to produce a "science of man's relation to nature;" all science is concerned to a greater or lesser extent with this relation.

It is possible to illustrate this argument more concretely with reference to natural hazard research. Typically, this research displays the three major ways of dealing with the contradiction within the positivist conception of nature (see page 1 above). Thus the physical science paradigm deems nature as totally separate from human activity, and it is this interpretation that dominates natural hazards research.[39] The hazard event (landslide, flood, earthquake, etc.) is seen as the result of the natural and inevitable operation of internal physical processes ranging from the geological to the climatological. This interpretation accepts hazards as natural, meaning in effect that they are "acts of God" — beyond the realm of societal influence. It is not surprising, then, that most government research money is channeled into the search for "natural" causes, rather than an examination of human vulnerability in hazards, for the assumption of the autonomy of nature provides plausiable depoliticized explanations for the distribution of the disaster's effect throughout the population. And these "act of God" explanations are then used by insurance companies to avoid liability — an astute use of feudal scientific categoreis by finance capital.

A second approach to natural hazards has been pioneered by geographers, who have likewise asserted the separation of natural and social events, but who place this separation under a larger umbrella concept of nature; natural and social science study different natures. At best this interpretation understands disaster occurrence as an inter-face between a vulnerable population and an extreme event. This dualism does not surpass the subject-object distinction of nature and society and so reduces scientific inquiry to an examination of two forms whose essential *natures* are given. More frequently, disaster vulnerability is analysed as if nature is neutral so that the environment is hazardous *only* when it "intersects with people."[40] But behind this positted neutrality of nature with respect to society is a clear technocratic agenda that seeks to control "natural" hazards by extending the human domination of a supposedly external nature.

The third approach to hazards which reflects the third method for dealing with the contradiction in the positivist concept of nature, amounts to the dissolution of human nature into external nature. Virtually Malthusian in outlook , this approach notes that the poor are worst affected in most disasters, and attributes this not only to the lack of resources commanded by the poor, but especially to a tendency for the poor to breed too fast. This approach is a classic example of blaming the victim, and the policy recommendations accompanying it make this clear. The Malthusian logic leads to a triage policy — the "logical" selection of which victims should be assisted after the event.[41]

In capitalist society, it is the material production of nature that unifies the previously separate social and natural realms, but it does so without, at the same time, making them identical — without dissolving one into the other. This offers a superior framework within which to view disasters. It emphasizes not nature or society as such, but primarily the relation *with* nature (first *and* second nature); it is this relation that is responsible for shaping both nature and society in the production process. It is a social relation which in capitalist society means a class relation. Thus vulnerability to disaster is, as the Malthusian approach recognizes, a class relation, but the reasons for this are not to be found in the individual incapabilities of the working class, peasantry or whatever: "*nature* does not produce on the one side owners of money or commodities, and on the other men possessing nothing but their own labour power. This relation has no natural basis, neither is its social basis one that is common to all historical periods."[42] The division of labor, which achieves a qualitatively different significance with the coming of capitalist society, ensures differential access to nature, and this is equally the case with so-called natural disasters. Exposure to the environment produced under capitalism is universal, but the consequence of this exposure are far from uniform.

Space

Just as geographers cannot seriously claim "the relation with nature" as theirs alone, nor can they claim space as their exclusive turf; since space is the product of concrete material relations, all science is concerned with space. The geographer can claim space as his or her own only by abstracting space from its material and social context, thereby granting it a metaphysical existence or ontological autonomy it does not deserve.

In recent years, Marxists have criticized geographers for their "fetishism of space." This fetishism makes "relations between people, social groups or classes appear as relations between areas or places."[43] So far as it goes, this critique is appropriate, but the Marxist literature has not yet developed an alternative means for discussing space.[44] The theory of nature outlined schematically above offers insights into the composition of this alternative understanding of space.

If space is seen not as a fixed thing but as an aspect of the relations between concrete pieces of matter (i.e., if we view space as relational), the theory of nature holds within it an integral theory of space. We need no longer view space as an "abstract universal," whatever this means, but can now see it as historically altered along with the human alteration of nature. The *pro-*

duction of space, by which is meant the alteration of spatial relations brought about by the simultaneous alteration of the form of concrete pieces of matter, is an integral part of the production of nature. Thus, with respect to "natural" disasters, the spatial pattern of famine changed fundamentally with the rise of capitalism. Once random, famine became systemic and spatially systematic, striking the underdeveloped world most severely. Without stating the theory explicitly Marx hints at a similar notion of the production of space:[45] while capital must on one side strive to tear down every spatial barrier to intercourse, i.e., to exchange, and conquer the whole earth for its market, it serves on the other side to annihilate this space with time, i.e., to reduce to a minimum the time spent in motion from one place to another.

An abstract theory of the production of space would be as limited as an abstract theory of nature (above, pp. 3-4), and would risk the same philosophical contradictions that eventually plagued Schmidt. As with nature, a sophisticated understanding of how space is produced depends on an equally sophisticated understanding of the capitalist mode of production. Space and place are produced as part of this mode of production.[46] An understanding of *uneven development* is therefore central.

Conclusion

The capitalist mode of production can continue to produce nature — and, as a by-product, space — only so long as it can continue to produce its own "natural" basis: Labor on the one side, Capital on the other. To grasp scientifically this relation with nature, it will be necessary to do as Marx did: "through the critique of . . . Science to bring . . . science to the point where it can be presented dialectically."[47] By thus retrieving the dialectic, science will also retrieve the politics of class struggle which rightfully permeate its subject-matter, but which, under orthodox bourgeois conceptions of science, are ideologically displaced.

NOTES

1. For a sketchy account of the way in which "nature" came historically to be applied to the social realm, see Louis Althusser's discussion of Montesquieu in *Politics and History*, (London: New Left Books, 1972). Paradoxically, the concept of nature is conspicuously absent from the rest of Althusser's work.

2. Clarence Glacken, *Traces on the Rhodian Shore*, (Berkeley: University of California Press, 1967); R.G. Collingwood, *The Idea of Nature*, (London: Oxford University Press, 1965). See also C. Glacken, "Changing Ideas of the Habitable World," in W.L. Thomas, ed., *Man's Role in Changing the Face of the Earth*, (Chicago: Chicago University Press, 1956).

3. Glacken, *op. cit.*, footnote 2, p. 117.

4. Glacken, *op. cit.*, footnote 2, p. 705.

5. Neil Smith, "Geography, Science and Post-Positivist Modes of Explanation: A Critical Review," *Progress in Human Geography*, 3, 3 (September, 1979), pp. 356-383.

6. Karl Marx and Friedrich Engels, *The German Ideology*, (New York: International Publishers, 1970 edn.), p. 59.

7. Glacken, *op. cit.*, footnote 2, pp. 550, 649.

8. Marx and Engels, *op. cit.*, footnote 6, p. 63.

9. Karl Marx, *Early Writings*, (Hamondsworth: Penguin, 1975), p. 355.

10. Karl Marx, *Capital*, (New York: International Publishers, 1967 edn.), Vol. 1, p. 10.

11. Karl Marx, *The 18th Brumaire of Louis Bonaparte*, (New York: International Publishers, 1963 edn.), p. 15.

12. Paul Thomas, "Marx and Science," *Political Studies*, Vol. 24, (1976), pp. 1-23. 20. Alfred Schmidt, *The Concept of Nature in Marx* (London: New Left Books), Ch. 4.

13. Friederich Engels, *Anti-Duhring*, (London: Lawrence and Wishart, 1975 edn.), p. 161.

14. Engels, quoted in Schmidt, *op. cit.*, footnote 12, p. 43.

15. *Glacken, op. cit.*, footnote 2. Glacken never discusses Hegel's second nature but see G.W.F. Hegel, *The Philosophy of Right*, (London: Oxford University Press, 1952 edn.), p. 20.

16. F. Engels, *The Dialectics of Nature* (Moscow: Progress Publishers, 1972 edn.), p. 42.

17. Georg Lukacs, *History and Class Consciousness*, (Cambridge, Mass: MIT Press, 1971).

18. Schmidt, *op. cit.*, footnote 12, p. 43.

19. Schmidt, *op. cit.*, footnote 12, pp. 82, 27.

20. Schmidt, *op. cit.*, footnote 12, Ch. 4.

21. For the Frankfurt School on "the domination of nature," see Herbert Marcuse, *One Dimensional Man*, (London: Abacus, 1972); Max Horkheimer and Theodor Adorno, *The Eclipse of Reason*, (New York: Columbia University Press, 1947); Jurgen Habermas, *Toward a Rational Society*, (Boston: Beacon Press, 1970).

22. William Leiss, *The Domination of Nature*, (Boston: Beacon Press, 1974), pp. 123, 122.

23. Leiss, *op. cit.*, footnote 22, pp. 120, 198.

24. Schmidt, *op. cit.* footnote 12, pp. 91, 93.

25. Marx, *op. cit.*, footnote 9, p. 355.

26. Marx, *op. cit.*, footnote 10, pp. 43, 71. In this edition of *Capital* "Nature" is sometimes capitalized in translation, but we have decided to retain the lower case, since it is always capitalized in the German original by dint of its being a noun and for no other apparent reason. This is in keeping with other translations.

27. Marx, *op. cit.*, footnote 10, p. 43.

28. Marx, *op. cit.*, footnote 10, p. 177.

29. Schmidt, *op. cit.*, footnote 12, p. 12.

30. Marx, *op. cit.*, footnote 10, p. 570.

31. Isaiah Bowman, *Geography in Relation to the Social Sciences*, (New York: Charles Scribner, 1974).

32. For an assessment of phenomenology in geography and the dis-

tinction between humanism and phenomenology see Smith, *op. cit.*, footnote 5.

33. Marx, *op. cit.*, footnote 10, Vol. 3, p. 820. For a more elaborate version of this argument, see Smith, N. 'The Production of Nature' John Hopkins. Mimeo.

34. Marx & Engels, *Feuerbach*, (London: Lawrence and Wishart, 1973), p. 15.

35. Marx, *op. cit.*, footnote 9, p. 355.

36. Wilbur Zelinsky, "The Demigod's Dilemma," *Annals of the Association of American Geographers*, Vol. 65, (1975), pp. 140, 125. c.f. also: "the natural sciences are in a pre-social state," David Harvey, *Social Justice and the City*, (Baltimore: Johns Hopkins University Press, 1973, 1973), p. 127.

37. On the degradation of cultural landscapes see E. Relph, *Place and Placelessness*, Pion, London, 1976. On science's reaction to its own occasional sterility, consider the reaction to Thomas Kuhn's *The Structure of Scientific Revolutions*, U. of Chicago Press, 1962. That this book was so ecstatically received is due to the relatively sophisticated way in which Kuhn explained scientific revolutions as the product of a dialectical process of development within science. But he managed to do so purely as an exercise in intellectual history, without threatening the cherished autonomy of science from other human activity. Neither did he impose external social reality on the transubstantial psyches of practicing scientists, nor did he for a moment entertain the dangerous idea that the dialectic had a place in natural scientific inquiry itself, as opposed to the history of it.

38. Rod Burgess, "The concept of Nature in Geography and Marxism," *Antipode*, Vol. 10.2, (1978), p. 4.

39. For a statement of this approach see E.A. Keller, *Environmental Geology* (Columbus: Merrill, 1976).

40. The paradigmatic work in this approach is I. Burton, R.W. Kates, and G.F. White, *The Environment as Hazard*, (New York: Oxford University Press, 1978).

41. Among adherents to this approach see Garrett Hardin, "The Tragedy of Commons," *Science*, Vol. 162, (1968), pp. 1243-8. For a critique of Malthusian population doctrine see David Harvey, "Population, Resources, and the Ideology of Science," *Economic Geography*, Vol. 50, (1974), pp. 256-77.

42. Marx, *op. cit.*, footnote 10, Vol. 1, p. 169 (emphasis added). After the 1976 earthquake in Guatemala City there occurred an interesting illustration of the class relation with nature. Residents stopped talking of an earthquake and called it a "classquake." See also P. Susman, P. O'Keefe, and B. Wisner, "Global Disasters: A Radical Approach," in K. Hewitt, ed., *Approaches to National Hazard*, (Waterloo, Ontario: Wilfred Laurier University Press), forthcoming.

43. Jim Anderson, *The Political Economy of Urbanism*, (London: Department of Planning, Architectural Association, 1975).

44. By 1978, Edward Soja could write: "Thus what could prove to be the most significant implications of Marxian spatial analysis for both theory and practice are, I contend, being obfuscated through the well-intended but short-sighted efforts of radical scholars to avoid the fetishism of space." Edward W. Soja, "The Socio-Spatial Dialectic: *Annals* AAG, Vol. 70, 2 (1980), p. 208.

45. Marx, *Grundrisse*, (Hammondsworth: Penguin, 1973), p. 539. See also David Harvey, "The Geography of Capitalist Accumulation: A Reconstruction of the Marxian Theory," *Antipode*, Vol. 7.2, (1975), pp. 9-21; reprinted in Richard Peet, ed., *Radical Geography*, (Chicago: Maroufa Press, 1977), pp. 263-92.

46. Henri Lefebvre has pioneered the attempt to devise a theory of the production of space, but it should be clear that his theory relies on a negation of nature and its replacement with "space", rather than on a theory of the production of nature. Despite the fact that he focuses on the *production* of space, Lefebvre ends up with a somewhat similar dual conception to the one we found in Schmidt; except Lefebvre's is a dual conception of space. On the one hand, space is a primordial realm like time or matter; on the other it is concrete and produced. Lefebvre is unable to reconcile this dual conception because he introduces space within the problematic of reproduction not production. The production of space is subordinated to the reproduction of social relations. Henri Lefebvre, *The Survival of Capitalism*, Alison and Busby, London, 1976. See also Soja, *op. cit.*, footnote 44.

47. Marx in a letter to Engels, February, 1858, quoted in Schmidt, *op. cit.*, footnote 14, p. 52.

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