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POPULATION, RESOURCES, AND THE IDEOLOGY OF SCIENCE

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It would be convenient indeed if such a contentious issue as the relationship between population and resources could be discussed in some ethically neutral manner. In recent years scientific investigations into this relationship have multiplied greatly in number and sophistication. But the plethora of scientific investigation has not reduced contentiousness; rather, it has increased it. We can venture three possible explanations for this state of affairs: (1) science is not ethically neutral; (2) there are serious defects in the scientific methods used to consider the population-resources problem; or (3) some people are irrational and fail to understand and accept scientifically established results. All of these explanations may turn out to be true, but we can afford to proffer none of them without substantial qualification. The last explanation would require, for example, a careful analysis of the concept of *rationality* before it could be sustained [6]. The second explanation would require a careful investigation of the capacities and limitations of a whole battery of scientific methods, techniques, and tools, together with careful evaluation of available data, before it could be judged correct or incorrect. In this paper, however, I shall focus on the first explanation and seek to show that the lack of ethical neutrality in science affects each and every attempt at "rational" scientific discussion of the population-resources relationship. I shall further endeavor to show how the adoption of certain kinds of scientific methods inevitably leads to certain kinds of substantive conclusions which, in turn, can have profound political implications.

THE ETHICAL NEUTRALITY ASSUMPTION

Scientists frequently appear to claim that scientific conclusions are immune from ideological assault. Scientific method, it is often argued, guarantees the objectivity and ethical neutrality of "factual" statements as well as the conclusions drawn therefrom. This view is common in the so-called natural sciences; it is also widespread in disciplines such as economics and sociology. The peculiarity of this view is that the claim to be ethically neutral and ideology free is itself an ideological claim. The principles of scientific method (whatever they may be) are normative and not factual statements. The principles cannot, therefore, be justified and validated by appeal to science's own methods. The principles have to be validated by appeal to something external to science itself. Presumably this "something" lies in the realms of metaphysics, religion, morality, ethics, convention, or human practice. Whatever its source, it lies in realms that even scientists agree are freely penetrated by ideological considerations. I am not arguing that facts and conclusions reached by means of a particular scientific method are false, irrelevant, immoral, unjustifiable, purely subjective, or non-replicable. But I am arguing that the use of a particular scientific method is *of necessity* founded in ideology, and that any claim to be ideology free is *of necessity* an ideological claim. The results of any enquiry based on a particular version of scientific method cannot consequently claim to be immune from ideological assault, nor can they automatically be

regarded as inherently different from or superior to results arrived at by other methods.

The ideological foundation of the ethical neutrality assumption can be demonstrated by a careful examination of the paradigmatic basis of enquiry throughout the history of science (both natural and social) [7; 16; 27], as well as by examining the history of the ethical neutrality assumption itself [27; 40]. The ideological foundation can also be revealed by a consideration of those theories of meaning in which it is accepted that there cannot be an ethically neutral language because meaning in language cannot be divorced from the human practices through which specific meanings are learned and communicated [9; 42]. It is not, however, the purpose of this paper to document the problems and defects of the ethical neutrality assumption, critical though these are. I shall, rather, start from the position that scientific enquiry cannot proceed in an ethically neutral manner, and seek to show how the inability to sustain a position of ethical neutrality inevitably implies some sort of an ideological position in any attempt to examine something as complex as a population-resources system.

Lack of ethical neutrality does not in itself prove very much. It does serve, of course, to get us beyond the rather trivial view that there is one version of some problem that is scientific and a variety of versions which are purely ideological. For example, the Malthusian terms "overpopulation" and "pressure of population on the means of subsistence" are inherently no more or less scientific than Marx's terms "industrial reserve army" and "relative surplus population," even though there is a predilection among unsophisticated analysts to regard the former phrases as adequately scientific and the latter as purely ideological. Unfortunately, it is not very informative to aver also that *all* versions of a problem are ideological, and it is downright mislead-

ing to suggest that our views on the population-resources problem depend merely upon whether we are optimists or pessimists, socialists or conservatives, determinists or possibilists, and the like. To contend the latter is not to give sufficient credit to that spirit of scientific endeavor that seeks to establish "truth" without invoking subjective personal preferences; to say that there is no such thing as ethical neutrality is not to say that we are reduced to mere personal opinion.

We are, however, forced to concede that "scientific" enquiry takes place in a social setting, expresses social ideas, and conveys social meanings. If we care to probe more deeply into these social meanings, we may observe that particular kinds of scientific method express certain kinds of ethical or ideological positions. In something as controversial as the population-resources debate an understanding of this issue is crucial; yet it is all too frequently ignored. If, as I subsequently hope to show, the dominant method of logical empiricism inevitably produces Malthusian or neo-Malthusian results, then we can more easily understand how it is that scientists raised in the tradition of logical empiricism have, when they have turned to the population-resources question, inevitably attributed a certain veracity to the Malthusian and neo-Malthusian view. When they have found such a view distasteful such scientists have rarely challenged it on "scientific" grounds; they have, rather, resorted to some version of subjective optimism as a basis for refutation. This kind of refutation has not been helpful, of course, for it has perpetuated the illusion that science and ideology (understood as personal preference) are independent of each other when the real problem lies in the ideology of scientific method itself.

It is easiest to grapple with the connections between method, ideology, and substantive conclusions by examining the works of Malthus, Ricardo, and Marx,

for it is relatively easy to grasp the connections in these works and thereby to discern some important and often obscured questions that lie at the heart of any analysis of the population-resources relation.

MALTHUS

It is sometimes forgotten that Malthus wrote his first *Essay on the Principle of Population* in 1798 as a political tract against the utopian socialist-anarchism of Godwin and Condorcet and as an antidote to the hopes for social progress aroused by the French Revolution. In his introduction, however, Malthus lays down certain principles of method which ought, he argues, to govern discourse concerning such an ambitious subject as the perfectibility of man:

A writer may tell me that he thinks a man will ultimately become an ostrich. I cannot properly contradict him. But before he can expect to bring any reasonable person over to his opinion, he ought to show that the necks of mankind have been gradually elongating, that the lips have grown harder and more prominent, that the legs and feet are daily altering their shape, and that the hair is beginning to change into stubs of feathers. And till the probability of so wonderful a conversion can be shown, it is surely lost time and lost eloquence to expatiate on the happiness of man in such a state: to describe his powers, both of running and flying, to paint him in a condition where all narrow luxuries would be contemned, where he would be employed only in collecting the necessaries of life, and where, consequently, each man's share of labour would be light, and his portion of leisure ample [19, p. 70].

The method which Malthus advocates is empiricism. It is through the application of this empiricist method that the competing theories of the utopian socialists, the proponents of liberal advancement and the rights of man, and the advocates of "the existing order of things" can be tested against the realities of the world. Yet, the first edition of the *Essay*

is strongly colored by a priori deduction as well as by polemics and empiricism. Malthus sets up two postulates—that food is necessary to the existence of man and that the passion between the sexes is necessary and constant. He places these two postulates in the context of certain conditions; deduces certain consequences (including the famous law through which population inevitably places pressure on the means of subsistence); and then uses the empiricist method to verify his deductions. Thus Malthus arrives at a conception of method which we may call "logical empiricism." This method broadly assumes that there are two kinds of truths which we may call "logical truths" (they are correct deductions from certain initial statements) and "empirical truths" (they are correct and verifiable factual statements which reflect observation and experiment). Logical truths may be related to empirical truths by uniting the two kinds of statements into a hypothetico-deductive system. If empirical observation indicates that certain of the derived statements are "factually true," then this is taken to mean that the system of statements as a whole is true, and we then have a "theory" of, for example, the population-resources relationship. Malthus constructs a crude version of such a theory.

Another feature of empiricism is worthy of note. Empiricism assumes that objects can be understood independently of observing subjects. Truth is therefore assumed to lie in a world external to the observer whose job is to record and faithfully reflect the attributes of objects. This logical empiricism is a pragmatic version of that scientific method which goes under the name of "logical positivism," and is founded in a particular and very strict view of language and meaning.

By the use of the logical empiricist method Malthus arrives at certain conclusions supportive of those advanced by the advocates of "the existing order of

things," rejects the utopianism of Godwin and Condorcet, and rebuffs the hopes for political change. The diminution in polemics and the greater reliance on empiricism in the subsequent editions of the *Essay* may in part be regarded as a consequence of Malthus' basic discovery that scientific method of a certain sort could accomplish, with much greater credibility and power than straight polemics, a definite social purpose. The resort to empiricism was facilitated in turn by the growing body of information concerning the growth and condition of the world's population—a prime source, for example, was the work of the geographer Alexander von Humboldt [10].

Having shown that the "power of population is indefinitely greater than the power of the earth to produce subsistence," and that it is a "natural law" that population will inevitably press against the means of subsistence, Malthus then goes on to discuss the positive and preventive checks through which population is kept in balance with the means of subsistence. The subsequent evolution in Malthus' ideas on the subject are too well-known to warrant repetition here. What is often forgotten, however, is the class character with which he invests it. Glacken, for example, who treats Malthus in the penultimate chapter of his monumental study, *Traces on the Rhodian Shore* [5], ignores this aspect to Malthus entirely.

Malthus recognizes that "misery" has to fall somewhere" and maintains that the positive checks will necessarily be the lot of the lower classes [19, p. 82]. Malthus thereby explains the misery of the lower classes as the result of a natural law which functions "absolutely independent of all human regulation." The distress among the lowest classes has, therefore, to be interpreted as "an evil so deeply seated that no human ingenuity can reach it" [19, p. 101]. On this basis Malthus arrives, "reluctantly," at a set of policy recommendations with respect to the poor laws. By providing wel-

fare to the lowest classes in society, aggregate human misery is only increased; freeing the lowest classes in society from positive checks only results in an expansion of their numbers, a gradual reduction in the standards of living of all members of society, and a decline in the incentive to work on which the mobilization of labor through the wage system depends. He also argues that increasing subsistence levels to "a part of society that cannot in general be considered as the most valuable part diminishes the shares that would otherwise belong to more industrious and worthy members, and thus forces more to become dependent" [19, p. 97].

From this Malthus draws a moral:

Hard as it may appear in individual instances, dependent poverty ought to be held disgraceful. Such a stimulus seems to be absolutely necessary to promote the happiness of the great mass of mankind, and every general attempt to weaken this stimulus, however benevolent its apparent intention will always defeat its own purpose. . . .

I feel no doubt whatever that the parish laws of England have contributed to raise the price of provisions and to lower the real price of labour. They have therefore contributed to impoverish that class of people whose only possession is their labour. It is also difficult to suppose that they have not powerfully contributed to generate that carelessness and want of frugality observable among the poor, so contrary to the disposition to be remarked among petty tradesmen and small farmers. The labouring poor, to use a vulgar expression, seem always to live from hand to mouth. Their present wants employ their whole attention, and they seldom think of the future. Even when they have an opportunity of saving, they seldom exercise it, but all that is beyond their present necessities goes, generally speaking, to the ale-house. The poor laws of England may therefore be said to diminish both the power and the will to save among the common people, and thus to weaken one of the strongest incentives to sobriety and industry, and consequently to happiness [19, p. 98].

Thus, Malthus arrives at what we have now come to know as the "counter-intuitive solution"—namely, that the best thing to do about misery and poverty is to do nothing for anything that is done will only exacerbate the problem. The only valid policy with respect to the lowest classes in society is one of "benign neglect." This policy is further supported by a certain characterization of "typical" behaviors exhibited among the lower classes. Arguments such as these are still with us. They appear in the policy statements by Jay Forrester, Edward Banfield, Patrick Moynihan and others. In fact, welfare policy in the United States at the present time is dominated by such thinking.

Malthus' approach to the lower classes has, if it is to be judged correctly, to be set against his view of the roles of the other classes in society—principally those of the industrial and landed interests. These roles are discussed more analytically in *The Principles of Political Economy*. Here he recognizes that there is a problem to be solved in accounting for the accumulation of capital in society. The capitalist saves, invests in productive activity, sells the product at a profit, ploughs the profit back in as new investment, and commences the cycle of accumulation once more. There is a serious dilemma here, for the capitalist has to sell the product to someone if a profit is to be achieved, and the capitalist is saving rather than consuming. If the capitalist saves too much and the rate of capital accumulation increases too rapidly, then long before subsistence problems are encountered, the capitalists will find expansion checked by the lack of effective demand for the increased output. Consequently, "both capital and population may be at the same time, and for a period of great length, redundant, compared to the effective demand for produce" [20, p. 402].

Malthus placed great emphasis upon the effective demand problem and sought to convince his contemporary Ricardo

that in practice: "the actual check to production and population arises more from want of stimulant than want of power to produce" [14, p. 117]. Ricardo was not persuaded, and the idea of effective demand in relationship to capital accumulation and wage rates remained dormant until Keynes resurrected it in his *General Theory of Employment, Interest and Money*.

Malthus' solution to the problem of effective demand is to rely upon the proper exercise of the power to consume on the part of those unproductive classes—the landlords, state functionaries, etc.—who were outside of the production process. Malthus took pains to dissociate himself from any direct apologetics for conspicuous consumption on the part of the landed gentry. He was merely saying that if the capitalist, who was not giving in to what Adam Smith calls "mankind's insatiable appetite for trinkets and baubles," was to succeed in the task of capital accumulation, then someone, somewhere, had to generate an effective demand:

It is unquestionably true that wealth produces wants; but it is a still more important truth that wants produce wealth. Each cause acts and reacts upon the other, but the order, both of precedence and importance, is with the wants which stimulate industry. . . . The greatest of all difficulties in converting uncivilized and thinly peopled countries into civilized and populous ones, is to inspire them with the wants best calculated to excite their exertions in the production of wealth. One of the greatest benefits which foreign commerce confers, and the reason why it has always appeared an almost necessary ingredient in the progress of wealth, is its tendency to inspire new wants, to form new tastes, and to furnish fresh motives for industry. Even civilized and improved countries cannot afford to lose any of these motives [20, p. 403].

Effective demand, located in the unproductive classes of society and stimulated by need creation and foreign trade, was an important and vital force in stim-

ulating both the accumulation of capital and the expansion of employment. Labor might be unemployed, consequently, simply because of the failure of the upper classes to consume. This theory of effective demand does not sit easily with the theory of population. For one thing, it appears contradictory to assert via the theory of population that the power to consume be withheld from the lowest classes in society while asserting, through the theory of effective demand, that the upper classes should consume as much as possible. Malthus attempts to resolve this contradiction by arguing that the upper classes do not increase their numbers according to the principle of population—they consume conspicuously and regulate their numbers by prudent habits generated out of a fear of a decline in their station in life. The lowest classes imprudently breed. The law of population is consequently disaggregated into one law for the poor and another law for the rich. But Malthus also has to explain why an effective demand cannot be generated by an increasing power to consume on the part of the laboring classes. Such a possibility Malthus quickly dismisses as illogical for: “no one will ever employ capital merely for the sake of the demand occasioned by those who work for him” [20, p. 404].

He adds that the only case in which this could occur would be if the laborers “produce an excess of value above what they consume.” He dismisses this possibility entirely. But even Ricardo, in annotating this passage, asks quite simply “why not?” and writes out a simple case to prove his point [36, p. 429]. And, of course, it is this idea, which Malthus rejects out of hand, that forms the foundation of Marx’s theory of surplus value, out of which the Marxist theory of relative surplus population stems.

Internal to Malthus’ own work there is a central contradiction. On the one hand, the “natural law” of population asserts a doctrine of inevitable misery for the mass of mankind, while the theory of effective

demand points to social controls to the employment of both capital and labor. Zinke suggests that Malthus did not need to reconcile these conflicting positions, for the principle of population applies in the long run, while the theory of effective demand is an explanation for short run cyclical swings [43]. Malthus does not appear to have thought this way about it. In the *Summary View of the Principle of Population*, published in 1830, Malthus attempts to reconcile these divergent views. Here he admits that “the laws of private property, which are the grand stimulants to production, do themselves so limit it as always to make the actual produce of the earth fall very considerably short of the power of production” [19, p. 245].

He then goes on to point out that under a system of private property “the only effectual demand for produce must come from the owners of property,” and that the control of effective demand so intervenes with respect to the principle of population that it prevents the visitation of misery on all sectors of mankind and “secures to a portion of society the leisure necessary for the progress of the arts and sciences”—a phenomena that “confers on society a most signal benefit.” Claims for social reform, and particularly any challenges to the principle of private property, are misplaced. To do away with a society based on competitive individualism regulated through the institutions of private property is to permit the principle of population to operate unchecked—an eventuality that will plunge all of mankind into a state of misery. The laws of private property, insofar as they have restricted the opportunities for the laboring classes, have artificially checked the operation of the principle of population and thereby reduced the aggregate misery of mankind. Malthus thus reconciles the principle of population with the theory of effective demand:

It makes little difference in the actual rate of increase of population, or the

necessary existence of checks to it, whether the state of demand and supply which occasions an insufficiency of wages to the whole of the labouring classes be produced prematurely by a bad structure of society, and an unfavourable distribution of wealth, or necessarily by the comparative exhaustion of the soil. The labourer feels the difficulty in the same degree and it must have nearly the same results, from whatever cause it arises [19, p. 247].

Malthus was, in principle, a defender of private property arrangements, and it is this ideology that underlies his formulation of the principle of population as well as the theory of effective demand. Private property arrangements inevitably mean an uneven distribution of income, wealth, and the means of production in society. Malthus accepts some such distributional arrangement and accepts its class character. Specific distributional arrangement may be judged good or bad, but there was no way in which a rational society could be ordered which did not incorporate necessary class distinctions. Malthus bolstered his arguments with analysis and materials blended together, particularly with respect to the theory of population, by appeal to a method of logical empiricism. In his writings on political economy, however, Malthus frequently made use of a method more characteristic of Ricardo. In part the contradictory character of much of Malthus' writings on population and effective demand stems from the disjunction of method used to examine the two phenomena. At this point, therefore, we must turn to that method of investigation most clearly exhibited in the cleanly spelled-out analytics of Ricardo.

RICARDO

Ricardo accepted Malthus' principle of population without any reservations and, it must be added, quite uncritically. But the population principle plays a quite different role and is also treated according to a quite different methodol-

ogy in Ricardo's work. Ricardo's method was to abstract a few basic elements and relationships out of a complex reality and to analyze and manipulate these idealized elements and relationships in order to discern the structure of the system under consideration. In this manner Ricardo built an abstract model of economic allocation through the market mechanism—a working model of capitalist society—that had little need for an empirical base. The function of such a model was to provide a tool for analysis which would both explain and predict change. Ricardo was not an empiricist in the sense that Malthus was in the *Essay on Population*, and he used facts sparingly, largely by way of illustration rather than with the intent to verify theory. The success and legitimacy of such a method depends, of course, entirely upon the reasonableness of the abstractions made. It is important to look, therefore, at the nature of the abstractions and idealizations built into Ricardo's model in order to understand both his substantive conclusions and his treatment of the population-resources problem.

At the heart of Ricardo's system we find a basic assumption concerning the nature of economic rationality: "economic man" is the model of rationality to which all human beings ought to aspire. Ricardo was, consequently, a normative rather than an empirical (positive) thinker. More deeply buried in Ricardo's work, however, is a doctrine of social harmony achieved through economically rational behavior in the market place. This doctrine of social harmony is frequently found in the political economy of the period, and its appearance in Ricardo's work is not unconnected with the use of an analytic, model-building methodology. A set of elements and relationships linked into a logical structure is bound to be internally consistent and to be internally harmonious. The model also generates equilibrium-type solutions to problems when it is subjected to manipulation and anal-

ysis. It is with respect to the social harmony concept that Ricardo's work contrasts most markedly with that of Malthus and Marx. The latter's work is expressive of the theme of class conflict throughout, whereas in Malthus' work the sense of class conflict is confused with social harmony (particularly in *The Principles of Political Economy*) as Malthus seeks to combine results arrived at by means of logical empiricism with those arrived at by means of an abstract model of the economy. Class conflict can scarcely be found in the harmonious analytics of Ricardo's market system, although the analytical results are used for class purposes, namely, the defeat of the landed interest and the subservience of wage labor to the interests of the industrial entrepreneur.

Under these conditions it is surprising to find that Ricardo so easily accepted Malthus' principle of population. In part, the simplicity of Malthus' deductive argument must have appealed to him, but there is a much more significant reason for Ricardo's wholehearted endorsement of the principle. Only by means of it could Ricardo keep his system harmonious and in equilibrium. The analytic problem for Ricardo was to explain the equilibrium wage rate. Wages, he argued, were basically determined by two factors: scarcity and the costs of subsistence. In Ricardo's system labor was regarded abstractly as a commodity like any other, and a growing demand for it ought to elicit a supply so that wages would, in the long-run, tend to the level of a "natural wage" set by the costs of subsistence. The mechanism that Ricardo appropriated from Malthus to achieve the balance between the supply and demand for labor was, of course, the principle of population, through which the laboring population would automatically increase their numbers:

When, however, by the encouragement which high wages give to the increase of population, the number of labourers is increased, wages again fall to their natur-

al price, and indeed from a re-action sometimes fall below it [35, p. 94].

In the short run and under favorable circumstances, the rate of accumulation of capital could exceed that of the power of population to reproduce, and during such periods wages would be well above their "natural" price [35, p. 98]. But such periods are bound to be short-lived. Also, when a population presses against the means of subsistence, "the only remedies are either a reduction of people or a more rapid accumulation of capital." Consequently, the laws determining wages and "the happiness of far the greatest part of every community" were dependent upon a balanced relationship between the supply of labor, via the principle of population, and the accumulation of capital. Population, Ricardo argued, "regulates itself by the funds which are to employ it, and therefore always increases or diminishes with the increase or diminution of capital" [35, p. 78]. Even Malthus, however, objected to this use of his population principle, observing that it took at least sixteen years to produce a laborer, and that the population principle was far more than just an equilibrating mechanism [20, pp. 319-20].

Ricardo accepted that:

the pernicious tendency of the poor laws is no longer a mystery since it has been fully developed by the able hand of Mr. Malthus and every friend of the poor must adamantly wish for their abolition [35, p. 106].

Like Malthus he argues that:

The principle of gravitation is not more certain than the tendency of such laws to change wealth and power into misery and weakness; to call away the exertions of labour from every object, except that of providing mere subsistence; to confound all intellectual distinction; to busy the mind in supplying the body's wants; until at last all classes should be infected with the plague of universal poverty [35, p. 108].

Further, he warns that:

if we should attain the stationary state, from which I trust we are yet far distant, then the pernicious nature of these laws become more manifest and alarming [35, p. 109].

Ricardo's evocation here of an ultimate stationary state is of interest. The analytic model-building methodology that he employed naturally suggests, as we have seen, harmony and equilibrium, and it is understandable that Ricardo should infer from his model that there must inevitably be some kind of equilibrium or stationary state. (J. S. Mill came to the same sort of conclusion using a similar methodological framework [28, pp. 752-7].) Ricardo is here arguing also that under such an equilibrium condition, in which the demand and supply of labor are equated and the prospects for further capital accumulation eliminated, there would appear to be a choice between conditions of universal poverty (everybody receiving a mere subsistence wage) or conditions in which rational thought and civilization itself could survive, at least among an elite. Ricardo is also suggesting that social welfare provision will become particularly pernicious in non-growth situations. Again, this argument is still with us and we will return to it later.

Ricardo found Malthus' arguments with respect to effective demand "quite astonishing" however, and commented that: "A body of unproductive labourers are just as necessary and useful with a view to future production as a fire which should consume in the manufacturer's warehouse, the goods which those unproductive labourers would otherwise consume" [36, p. 421].

Ricardo would have no truck with Malthus' defense of the landed interest and it is clear from his remarks and policies with respect to the corn laws, rent, and the like, that Ricardo's sympathies lie entirely with the industrial entrepreneur who alone, in Ricardo's

system, epitomized economic rationality. Ricardo was in fact offended by the role the landed interest played, and since he discounted the problem of effective demand entirely, Ricardo came to regard the landed interest as a mere barrier to progress and to the achievement of social harmony.

Ricardo's model building analytics permitted him to argue positively for change. He was not deterred by empirical evidence, and he had no sense of debt to history. His normative analytics allowed him to see the possibility for changing and improving reality, rather than just understanding and accepting it. Like August Lösch (another great normative thinker) Ricardo could take the view that "if my model does not conform to reality then it is reality that is wrong" [18, p. 363]. Ricardo could project upon the world a working model of capitalist society constructed in the image of an idealized social harmony achieved through the beneficence of rational economic man. Ricardo sought to change reality to fit this image, and in the process he played an important and vital role in furthering the progress of industrialization in nineteenth century England.

MARX

Marx argues that both Ricardo and Malthus were projecting ideological assumptions without admitting or even perhaps being aware of them:

[Malthus's theory] suits his purpose remarkably well—an apologia for the existing state of affairs in England, for landlordism, "State and Church" . . . parsons and menial servants, assailed by the Ricardians as so many useless and superannuated drawbacks of bourgeois production and as nuisances. For all that, Ricardo championed bourgeois production insofar as it signified the most unrestricted development of the social productive forces. . . . He insisted upon the historical justification and necessity of this stage of development. His very lack of a historical sense of the past meant

that he regarded everything from the historical standpoint of his time. Malthus also wanted to see the freest possible development of capitalist production . . . but at the same time he wants it to adapt itself to the "consumption needs" of the aristocracy and its branches in State and Church, to serve as the material basis for the antiquated claims of the representatives of interests inherited from feudalism and the absolute monarchy. Malthus wants bourgeois production as long as it is not revolutionary, constitutes no historical factor of development, but merely creates a broader and more comfortable basis for the "old" society [25, pp. 52-3].

The contrasts between Malthus, Ricardo, and Marx are usually portrayed in terms of their substantive views on such issues as the population-resources problem. The more fundamental contrast, however, is surely one of method. Marx's method is usually called "dialectical materialism," but this phrase conveys little and conceals a lot. Fully to understand it requires some understanding of German critical philosophy and in particular that branch of it which most fully developed a non-Aristotelian view of the world—the most eminent representatives in this tradition being Leibniz, Spinoza, and Hegel. The nature of this non-Aristotelian view requires exposition.

Marx's use of language is, as Ollman has pointed out, relational rather than absolute [29]. By this he means that a "thing" cannot be understood or even talked about independently of the relations it has with other things. For example, "resources" can be defined only in relationship to the mode of production which seeks to make use of them and which simultaneously "produces" them through both the physical and mental activity of the users. There is, therefore, no such thing as a resource in abstract or a resource which exists as a "thing in itself." This relational view of the world is fundamentally different from the usual and familiar Aristotelian view (characteristic of logical empiricism or Ricardian

type model building) in which things are thought to have an essence of some sort and are, therefore, regarded as definable without reference to the relationships they have to other things.

On this basis Marx evolves certain fundamental assumptions regarding the way in which the world is structured and organized. Ollman suggests that: "The twin pillars of Marx's ontology are his conception of reality as a totality of internally related parts, and his conception of these parts as expandable relations such that each one in its fullness can represent the totality" [30, p. 495]. There are different ways in which we can think of such a totality. We may think of it as an aggregate of elements—a mere sum of parts—which enter into combination without being fashioned by any pre-existing relationships within the totality. The totality can alternatively be viewed as something "emergent"; it has an existence independent of its parts while it also dominates and fashions the parts contained within it. But Marx's non-Aristotelian and relational view permits him a third view of the totality in which it is neither the parts nor the whole, but the relationships within the totality which are regarded as fundamental. Through these relationships the totality shapes the parts to preserve the whole. Capitalism, for example, shapes activities and elements within itself to preserve itself as an on-going system. But conversely, the elements are also continually shaping the totality into new configurations as conflicts and contradictions within the system are of necessity resolved.

Marx rarely used the word totality to refer to everything there is. He usually focused on the "social" totality of human society, and within this totality he distinguished various structures. Structures are not "things" or "actions," and we cannot establish their existence through observation. The meaning of an observable act, such as cutting a log, is established by discovering its relation

to the wider structure of which it is a part. Its interpretation will depend upon whether we view it in relation to capitalism or socialism, or whether we place it in relation to some quite different structure, such as the ecological system. To define elements relationally means to interpret them in a way external to direct observation; hence the departure from empiricism accomplished by relational modes of thought.

Within the social totality Marx distinguishes various structures [6]. The "economic basis" of society comprises two structures—the forces of production (the actual activities of making and doing) and the social relations of production (the forms of social organization set up to facilitate making and doing). Marx thus distinguished between a technical division of labor and a social division of labor. In addition, there are various superstructural features: the structures of law, of politics, of knowledge and science, of ideology, and the like. Each structure is regarded as a primary element within the social totality and each is capable of a certain degree of autonomous development. But because the structures are all interrelated, a perpetual dynamism is generated out of the conflicts and interactions among them. For example, Marx sees a major contradiction between the increasing socialization of the forces of production (through the intricacies of the division of labor) and the private-property basis of consumption and ownership in capitalist society. Within this system of interacting structures, however, Marx accorded a certain primacy of place to the economic basis. In arguing thus, Marx usually appealed to the fact that man has to eat in order to live and that production—the transformation of nature—therefore has to take precedence over the other structures in a conflict situation. There is a deeper reason for the significance which Marx attached to the economic basis; it is here that the relationship between the natur-

al and social aspects of life become most explicit.

Marx's conception of the man-nature relation is complex [38]. At one level the human being is seen as a part of nature—an ensemble of metabolic relations involving constant sensuous interaction with a physical environment. At another level, human beings are seen as social—each as an ensemble of social relations [22]—and capable of creating forms of social organization which can become self-regulating and self-transforming. Society thereby creates its own history by transforming itself, but in the process the relationship with nature is also transformed. Under capitalism, for example:

Nature becomes for the first time simply an object for mankind, purely a matter of utility; it ceases to be recognized as a power in its own right; and the theoretical knowledge of its independent laws appears only as a strategem designed to subdue it to human requirements, whether as the object of consumption or as the means of production. Pursuing this tendency, capital has pushed beyond national boundaries and prejudices, beyond the deification of nature and the inherited self-sufficient satisfaction of existing needs confined within well-defined bounds and [beyond] the reproduction of traditional ways of life. Capital is destructive of all this and permanently revolutionary, tearing down the obstacles that impede the development of productive forces, the expansion of need, the diversity of production and the exploitation and exchange of natural and intellectual forces [24, p. 94].

Marx saw the capitalist law of accumulation always pushing society to the limits of its potential social relations and to the limits of its natural resource base—continuously destroying the potential for "the exploitation and exchange of natural and intellectual forces." Resource limitations could be rolled back by technological change, but the tide of capitalist accumulation quickly spreads up to these new limits.

Marx also argued that capitalism had

successfully brought society to the point where mankind could be free of nature in certain important material respects. Human beings are now in a position to *create* nature rather than mindlessly to alter it. Through the creation of nature—a creation that has to proceed through a knowledge and understanding of nature's own laws—human beings could be freed to discover their own essentially human nature within the system of nature. There is, for Marx, an enormous difference between this unalienated creation of nature and the mindless exploitation under capitalism which, in the haste to accumulate, is always concerned, as Engels has it, “only about the first tangible success; and then surprise is expressed that the more remote effects of actions directed to this end turn out to be of a quite different, mainly of an opposite, character” [3, p. 296].

In the final analysis, the conflict and contradiction between the system of nature and the social system could be resolved only by the creation of an appropriate and entirely new form of human practice. Through such a practice, human beings will “not only feel, but also know their unity with nature” and thereby render obsolete “the senseless and anti-natural idea of a contradiction between mind and matter, man and nature, soul and body” [3, p. 293].

Marx's methodology allows that knowledge and the processes of gaining understanding are internal to society. Subject and object are not regarded as independent entities but as relationships one to the other. This conception is very different indeed from that of traditional empiricism in which the subject is presumed to be “instructed by what is outside of him,” or from that of a priorism and innatism (clearly implied in Ricardo's method) in which the subject “possesses from the start endogenous structures which it imposes on objects” [34, p. 19]. Marx in fact fashions a methodology similar to the constructivism advanced by Piaget: “Whereas other

animals cannot alter themselves except by changing their species, man can transform himself by transforming the world and can structure himself by constructing structures; and these structures are his own, for they are not entirely predestined either from within or without” [33, p. 118]. The subject is thus seen as both structuring and being structured by the object. As Marx puts it, “by thus acting on the external world and changing it, [man] at the same time changes his own nature” [23, Vol. 1, p. 175].

The thinking subject can create ideas in the imagination. But ideas have at some stage to leave the realms of abstract knowledge and to enter into human practice if they are to be validated. Once incorporated into human practice, concepts and ideas can become (via technology) a material force in production and can alter the social relations of production (through the creation of new modes of social organization). Although many ideas remain barren, some do not—“at the end of every labour process we get a result that already existed in the imagination of the labourer at its commencement.”

Ideas are therefore regarded as social relations through which society can be structured and reconstructed. But concepts and categories are also produced under specific historical conditions which are in part internal to knowledge (the categories of thought handed down to us) and in part a reflection of the world in which knowledge is produced. The categories of thought available to us are, as it were, our intellectual capital which it is open to us to improve (or destroy). If, however, ideas are social relations, then it follows that we can gain as much insight into society through a critical analysis of the relations ideas express, as we can through a study of society as object. The analysis of ideas in Marx's work is as much directed to understanding the society that produced them as it is to understanding what it is they tell us about the reality they purport to de-

scribe. Marx is, thus, adopting a methodological framework that is perpetually revolving around the question: what is it that produces ideas and what is it that these ideas serve to produce?

Marx's substantive conclusions on the "population problem" are in part generated out of a vigorous criticism of writers such as Malthus and Ricardo. Marx set out to transform the categories handed down to him, for he saw that to do so was necessary if the realities of life were to be transformed. Marx traced the structure of Malthus' and Ricardo's thought back to their respective theories of value. Out of a criticism of these and other theories of value, Marx arrived at the theory of surplus value. Surplus value, he argued, originated out of surplus labor, which is that part of the laborer's working time that is rendered gratis to the capitalist. In order to obtain employment, a laborer may have to work ten hours. The laborer may produce enough to cover his own subsistence needs in six hours. If the capitalist pays a subsistence wage, then the laborer works the equivalent of four hours free for the capitalist. This surplus labor can be converted through market exchange into its money equivalent—surplus value. And surplus value, under capitalism, is the source of rent, interest, and profit. On the basis of this theory of surplus value, Marx produces a distinctive theory of population.

If surplus value is to be ploughed back to produce more surplus value, then more money has to be laid out on wages and the purchase of raw materials and means of production. If the wage rate and productivity remain constant, then accumulation requires a concomitant numerical expansion in the labor force—"accumulation of capital is, therefore, increase of the proletariat" [23, Vol. 1, p. 614]. If the labor supply remains constant, then the increasing demand for labor generated by accumulation will bring about a rise in the wage rate. But a rise in the wage rate means a diminu-

tion of surplus value, falling profits, and, as a consequence, a slower rate of accumulation. But:

this diminution can never reach the point at which it would threaten the system itself. . . . Either the price of labour keeps on rising, because its rise does not interfere with the progress of accumulation. . . . Or accumulation slackens in consequence of the rise in the price of labour, because the stimulus of gain is blunted. The mechanism of the process of capitalist production removes the very obstacles that it temporarily creates [23, Vol. 1, p. 619].

Under these conditions, the "law of capitalist production" that is at the bottom of the "pretended natural law of population" reduces itself to a relationship between the rate of capitalist accumulation and the rate of expansion in the wage-labor force. This relationship is mediated by technical change, and the increasing social productivity of labor can also be used as "a powerful lever of accumulation" [23, Vol. 1, p. 621]. The use of this lever permits an expansion of surplus value through a growing substitution of capital for labor in the production process. Marx then proceeds to show how these processes combine to create a "law of population peculiar to the capitalist mode of production," adding that "in fact every special historic mode of production has its own special laws of population, historically valid within its limits alone" [23, Vol. 1, pp. 632-33]. Here we can see a major departure from the thought of both Malthus and Ricardo who attributed to the law of population a "universal" and "natural" validity.

Marx largely confines attention to the law of population operative under capitalism. He points out that the laboring population produces both the surplus and the capital equipment, and thereby produces the means "by which it itself is made relatively superfluous" [23, Vol. 1, p. 632]. He then goes on to say:

If a surplus labouring population is a

necessary product of accumulation or of the development of wealth on a capitalist basis, this surplus population becomes, conversely, the lever of capitalist accumulation, nay a condition of existence of the capitalist mode of production. It forms a disposable industrial reserve army, that belongs to capital quite as absolutely as if the latter had bred it at its own cost. Independently of the limits of the actual increase of population, it creates for the changing needs of the self-expansion of capital, a mass of human material always ready for exploitation [23, Vol. 1, p. 632].

This relative surplus population has, however, another vital function—it prevents wages rising and thereby cutting into profits:

The industrial reserve army, during the periods of stagnation and average prosperity, weighs down the active labour army; during the periods of overproduction and paroxysm, it holds its pretensions in check. Relative surplus population is therefore the pivot around which the law of supply and demand of labour works. It confines the field of action of this law within the limits absolutely convenient to the activity of exploitation and to the domination of capital [23, Vol. 1, p. 632].

The production of a relative surplus population and an industrial reserve army are seen in Marx's work as historically specific, as internal to the capitalist mode of production. On the basis of his analysis we can predict the occurrence of poverty no matter what the rate of population change. Marx explicitly recognizes, however, that a high rate of capital accumulation is likely to act as a general stimulus to population growth; it is likely that laborers will try to accumulate the only marketable commodity they possess, labor power itself [23, Vol. 3, p. 218]. Marx was not arguing that population growth per se was a mechanical product of the law of capitalist accumulation, nor was he saying that population growth per se did not affect the situation. But he was arguing

very specifically, contra the position of both Malthus and Ricardo, that the poverty of the laboring classes was the inevitable product of the capitalist law of accumulation. Poverty was not, therefore, to be explained away by appeal to some natural law. It had to be recognized for what it really was—an endemic condition internal to the capitalist mode of production.

Marx does not talk about a population problem but a poverty and human exploitation problem. He replaces Malthus' concept of overpopulation by the concept of a relative surplus population. He replaces the inevitability of the "pressure of population on the means of subsistence" (accepted by both Malthus and Ricardo) by an historically specific and necessary pressure of labor supply on the means of employment produced internally within the capitalist mode of production. Marx's distinctive method permitted this reformulation of the population-resources problem, and put him in a position from which he could envisage a transformation of society that would eliminate poverty and misery rather than accept its inevitability.

METHODOLOGY AND THE POPULATION-RESOURCES RELATION

The contrasts between Malthus, Ricardo, and Marx are instructive for a variety of reasons. Each makes use of a distinctive method to approach the subject material. Marx utilizes a non-Aristotelian (dialectical) framework which sets him apart from Ricardo and Malthus who, in turn, are differentiated from each other by the use of abstract analytics and logical empiricism, respectively. Each method generates a distinctive kind of conclusion. Each author also expresses an ideological position, and, at times, it seems as if each utilizes that method which naturally yields the desired result. The important conclusion, however, is that the method adopted

and the nature of the result are integrally related.

It is surprising, therefore, to find so little debate or discussion over the question of method for dealing with such a complex issue as the population-resources relation. Here the ethical neutrality assumption appears to be a major barrier to the advance of scientific enquiry, for if it is supposed that all scientific methods are ethically neutral, then debates over methodology scarcely matter. The materials on the population-resources relation published in recent years suggest that the Aristotelian legacy is dominant: we still usually "think Aristotle" often without knowing it. Yet the Aristotelian cast of mind seems ill-suited for dealing with the population-resources relation, and so there has been a methodological struggle internal to the Aristotelian tradition to overcome the limitations inherent in it. There has been, as it were, a convergence toward Marx without overthrowing the Aristotelian trappings. Marx accepts that the appropriate method to deal with the population-resources relation has to be holistic, system-wide in its compass, capable of handling dynamics (feedbacks in particular), and, most important of all, *internally dynamic* in that it has to be capable of producing new concepts and categories to deal with the system under investigation and, through the operationalization of these new concepts and categories, change the system from within. It is this last feature that gives to Marx's work its dialectical quality. Most contemporary investigations of the population-resources relation recognize all of Marx's requirements save the last, and rely upon systems theory for their methodological foundation. Systems-theoretic formulations are sophisticated enough (in principle) to do everything that Marx sought to do except to transform concepts and categories dialectically, and thereby to transform the nature of the system from within. Some examples will bear out this point.

Kneese *et al.* [15] adopt what they call a "materials balance" approach to the population-resources relation which is, in effect, a two-stage input-output model. The first stage describes the flows within the economy; the second stage describes the flows within the ecological system; and the two systems are linked by the physical principle that matter can neither be created nor destroyed. The model is descriptive in the sense that the coefficients have to be estimated from empirical data, but experimentation on the model is possible by examining the sensitivity of results to changes in the coefficients.

In the study by Meadows *et al.* [26] methods derived from systems dynamics are used; a system of difference equations is simulated to indicate future outcomes of population growth, industrial expansion, resource use (both renewable and non-renewable), and environmental deterioration. The system in this case incorporates feedbacks (both positive and negative) and is, in contrast to that of Kneese *et al.*, oriented to development through time. The Meadows model has come in for a great deal of criticism and a team from the University of Sussex [2] has examined the model in detail. They reformulated it in certain important respects; showed some of the problems inherent in the data used to estimate the equations; and concluded that some unnecessarily pessimistic assumptions were injected into the Meadows model.

The essential point to note, however, is that *all* of these formulations lead to neo-Malthusian conclusions: strongly voiced in the Meadows model; somewhat muted in the case of Kneese *et al.* (who speak of the *new* Malthusianism); and long run in the case of the Sussex team's investigation (rather like Ricardo they seem to suggest that the stationary state is inevitable but a long way off).

The neo-Malthusian results of these studies can be traced back to the Aristotelian form in which the question is

posed and the answers constructed. And it is, of course, the ability to depart from the Aristotelian view that gets Marx away from both the short run and long run inevitabilities of neo-Malthusian conclusions. Marx envisages the production of new categories and concepts, of new knowledge and understanding, through which the relationships between the natural and social system will be mediated. This relational and dialectical view of things comes closest to impinging upon traditional concerns with respect to the problem of technological change. It has, of course, long been recognized that Malthus was wrong in his specific forecasts because he ignored technological change. Ricardo saw the possibilities of such change, but in the long run he saw society inevitably succumbing to the law of diminishing returns. The difference between the Meadows model and the Sussex team's refashioning of it is largely due to the pessimism of the former and the optimism of the latter. In all of these cases, technological change is seen as something external to society—an unknown that cannot be accounted for. But, for Marx technological change was both internal to and inevitable within society; it is the product of human creativity, and stems from the inevitable transformation of the concepts and categories handed down to us. Only if we let ourselves be imprisoned within the system of knowledge handed down to us will we fail to innovate. Further, it is unnecessarily restrictive to think that human inventiveness and creativity apply only in the sphere of technology—human beings can and do create social structures as well as machines. This process Marx regards as essential and inevitable precisely because man could and would respond to the necessities of survival. The only danger lies in the tendency to place restrictions on ourselves and, thereby, to confine our own creativity. In other words, if we become the prisoners of an ideology, prisoners of the concepts and categories handed

down to us, we are in danger of making the neo-Malthusian conclusions true, of making environmental determinism a condition of our existence.

It is from this standpoint that Marx's method generates quite different perspectives and conclusions from those generated by simple logical empiricism, Ricardian type normative analytics, or contemporary systems theory. Let me stress that I am not arguing that the latter methods are illegitimate or erroneous. Each is in fact perfectly appropriate for certain domains of enquiry. Logical empiricism has the capacity to inform us as to what is, given an existing set of categories. Insofar as we make use of this method, we are bound to construct what I have elsewhere called a *status quo* theory [7]. The Aristotelian manner in which normative, analytical model building proceeds yields "ought-to" prescriptive statements, but the categories and concepts are idealized, abstracted, and *stationary* tools imposed upon a changing world. Systems theory is a more sophisticated form of modelling relying upon various degrees of abstraction and a varying empirical content. Dialectical materialism, in the manner that Marx used it, is "constructivist" in that it sees change as an internally generated necessity that affects categories of thought and material reality alike. The relationships between these various methods are complex. The methods are not, obviously, mutually exclusive of each other; but different methods appear appropriate for different domains of enquiry. And it is difficult to see how anything other than a relational, constructivist, and internally dynamic method can be appropriate for looking into the future of the population-resources relation, particularly when it is so evident that knowledge and understanding are such important mediating forces in the construction of that future. Results arrived at by other means may be of interest, only if they are set within the broader interpretive power provided by

Marx's method. All of this would be a mere academic problem (although one of crucial significance) were it not for the fact that ideas are social relations, and the Malthusian and neo-Malthusian results arrived at (inevitably) by means of other methods are projected into the world where they are likely to generate immediate political consequences. And it is to these consequences that we now turn.

THE POLITICAL IMPLICATIONS OF POPULATION-RESOURCES THEORY

At the Stockholm Conference on the Environment in 1972, the Chinese delegation asserted that there was no such thing as a scarcity of resources and that it was meaningless to discuss environmental problems in such terms. Western commentators were mystified and some concluded that the Chinese must possess vast reserves of minerals and fossil fuels the discovery of which they had not yet communicated to the world. The Chinese view is, however, quite consistent with Marx's method and should be considered from such a perspective. To elucidate it we need to bring into our vocabulary three categories of thought:

(1) *Subsistence*. Malthus appears to regard subsistence as something absolute, whereas Marx regards it as relative. For Marx, needs are not purely biological; they are also socially and culturally determined [31]. Also, as both Malthus and Marx agree, needs can be created, which implies that the meaning of subsistence cannot be established independent of particular historical and cultural circumstances if, as Marx insisted, definitions of social wants and needs were produced under a given mode of production rather than immutably held down by the Malthusian laws of population. Subsistence is, then, defined internally to a mode of production and changes over time.

(2) *Resources*. Resources are materials available "in nature" that are capable

of being transformed into things of utility to man. It has long been recognized that resources can be defined only with respect to a particular technical, cultural, and historical stage of development, and that they are, in effect, technical and cultural appraisals of nature [4; 39].

(3) *Scarcity*. It is often erroneously accepted that scarcity is something inherent in nature, when its definition is inextricably social and cultural in origin. Scarcity presupposes certain social ends, and it is these that define scarcity just as much as the lack of natural means to accomplish these ends [32]. Furthermore, many of the scarcities we experience do not arise out of nature but are created by human activity and managed by social organization (the scarcity of building plots in central London is an example of the former; the scarcity of places at university is an example of the latter). Scarcity is in fact necessary to the survival of the capitalist mode of production, and it has to be carefully managed, otherwise the self-regulating aspect to the price mechanism will break down [7].

Armed with these definitions, let us consider a simple sentence: "Overpopulation arises because of the scarcity of resources available for meeting the subsistence needs of the mass of the population." If we substitute our definitions into this sentence we get: "There are too many people in the world because the particular ends we have in view (together with the form of social organization we have) and the materials available in nature, that we have the will and the way to use, are not sufficient to provide us with those things to which we are accustomed." Out of such a sentence all kinds of possibilities can be extracted:

(1) we can change the ends we have in mind and alter the social organization of scarcity;

(2) we can change our technical and cultural appraisals of nature;

(3) we can change our views concern-

ing the things to which we are accustomed;

(4) we can seek to alter our numbers.

A real concern with environmental issues demands that all of these options be examined in relation to each other. To say that there are too many people in the world amounts to saying that we have not the imagination, will, or ability to do anything about propositions (1), (2), and (3). In fact (1) is very difficult to do anything about because it involves the replacement of the market exchange system as a working mode of economic integration; proposition (2) has always been the great hope for resolving our difficulties; and we have never thought too coherently about (3) particularly as it relates to the maintenance of an effective demand in capitalist economies (nobody appears to have calculated what the effects of much reduced personal consumption will have on capital accumulation and employment).

I will risk the generalization that nothing of consequence can be done about (1) and (3) without dismantling and replacing the capitalist market exchange economy. If we are reluctant to contemplate such an alternative and if (2) is not performing its function too well, then we have to go to (4). Much of the debate in the western world focusses on (4), but in a society in which all four options can be integrated with each other, it must appear facile to discuss environmental problems in terms of naturally arising scarcities or overpopulation—this, presumably, is the point that the Chinese delegation to the Stockholm Conference was making.

The trouble with focusing exclusively on the control of population numbers is that it has certain political implications. Ideas about environment, population, and resources are not neutral. They are political in origin and have political effects. Historically it is depressing to look at the use made of the kind of sentence we have just analyzed. Once connotations of absolute limits come to sur-

round the concepts of resource, scarcity, and subsistence, then an absolute limit is set for population. And what are the political implications (given these connotations) of saying there is "overpopulation" or a "scarcity of resources"? The meaning can all too quickly be established. Somebody, somewhere, is redundant, and there is not enough to go round. Am *I* redundant? Of course not. Are *you* redundant? Of course not. So who is redundant? Of course, it must be *them*. And if there is not enough to go round, then it is only right and proper that *they*, who contribute so little to society, ought to bear the brunt of the burden. And if we hold that there are certain of *us* who, by virtue of our skills, abilities, and attainments, are capable of "conferring a signal benefit upon mankind" though our contributions to the common good and who, besides, are the purveyors of peace, freedom, culture, and civilization, then it would appear to be our bound duty to protect and preserve ourselves for the sake of all mankind.

Let me make an assertion. Whenever a theory of overpopulation seizes hold in a society dominated by an elite, then the non-elite invariably experience some form of political, economic, and social repression. Such an assertion can be justified by an appeal to the historical evidence. Britain shortly after the Napoleonic Wars, when Malthus was so influential, provides one example. The conservation movement in the United States at the turn of this century was based on a gospel of efficiency that embraced natural resource management and labor relations alike. The combination of the Aryan ethic and the need for increased lebensraum produced particularly evil results in Hitler's Germany. The policy prescriptions that frequently attach to essays on the problems of population and environment convey a similar warning. Jacks and Whyte [11], writing in the twilight years of the British Empire,

could see only one way out of the scarcity of land resources in Africa:

A feudal type of society in which the native cultivators would to some extent be tied to the lands of their European overlords seems most generally suited to meet the needs of the soil in the present state of African development. . . . It would enable the people who have been the prime cause of erosion [the Europeans] and who have the means and ability to control it to assume responsibility for the soil. At present, humanitarian considerations for the natives prevent Europeans from winning the attainable position of dominance over the soil [11, p. 276].

Such direct apologetics for colonialism sound somewhat odd today.

Vogt, whose book *The Road to Survival* appeared in 1948, saw in Russian overpopulation a serious military and political threat. He argued that the Marshall Plan of aid to Europe was the result of an unenviable choice between allowing the spread of communism and providing international welfare, which would merely encourage population increase. He also points to the expendability of much of the world's population:

There is little hope that the world will escape the horror of extensive famines in China within the next few years. But from the world point of view, these may be not only desirable but indispensable. A Chinese population that continued to increase at a geometric rate could only be a global calamity. The mission of General Marshall to this unhappy land was called a failure. Had it succeeded, it might well have been a disaster [41, p. 238].

It is ironic indeed that this prediction was published in the very year that Mao Tse-tung came to power and sought, in true dialectical fashion, to transform China's problem into a solution through the mobilization of labor power to create resources where there had been none before. The resultant transformation of the Chinese earth (as Buchanan [1] calls it) has eliminated famine, raised living

standards, and effectively eliminated hunger and material misery.

It is easier to catch the political implications of overpopulation arguments in past eras than it is in our own. The lesson which these examples suggest is simply this: if we accept a theory of overpopulation and resource scarcity but insist upon keeping the capitalist mode of production intact, then the inevitable results are policies directed toward class or ethnic repression at home and policies of imperialism and neo-imperialism abroad. Unfortunately this relation can be structured in the other direction. If, for whatever reason, an elite group requires an argument to support policies of repression, then the overpopulation argument is most beautifully tailored to fit this purpose. Malthus and Ricardo provide us with one example of such apologetics. If a poverty class is necessary to the processes of capitalist accumulation or a subsistence wage essential to economic equilibrium, then what better way to explain it away than to appeal to a universal and supposedly "natural" law of population?

Malthus indicates another kind of apologetic use for the population principle. If an existing social order, an elite group of some sort, is under threat and is fighting to preserve its dominant position in society, then the overpopulation and shortage of resources arguments can be used as powerful ideological levers to persuade people into acceptance of the status quo and of authoritarian measures to maintain it. The English landed interest used Malthus' arguments thus in the early nineteenth century. And this kind of argument is, of course, even more effective if the elite group is in a position to create a scarcity to demonstrate the point.

The overpopulation argument is easily used as part of an elaborate apologetic through which class, ethnic, or (neo-) colonial repression may be justified. It is difficult to distinguish between arguments that have some real foundation

and arguments fashioned for apologetic reasons. In general the two kinds of arguments get inextricably mixed up. Consequently, those who think there is a real problem of some sort may, unwittingly, contribute strength to the apologists, and individuals may contribute in good faith to a result which, as individuals, they might find abhorrent.

And what of the contemporary ecology and environmental movement? I believe it reflects all of the currents I have identified, but under the stress of contemporary events it is difficult to sort the arguments out clearly. There are deep structural problems to the capitalist growth process (epitomized by persistent "stagflation" and international monetary uncertainties). Adjustments seem necessary. The welfare population in America is being transformed from a tool for the manipulation of effective demand (which was its economic role in the 1960s) into a tool for attacking wage rates (through the work-fare provision)—and Malthus' arguments are all being used to do it. Wage rates have been under attack, and policies for depressing real earnings are emerging in both America and in Europe to compensate for falling rates of profit and a slowdown in the rate of capital accumulation. There can be no question that the existing social order perceived itself to be under some kind of threat in the late 1960s (particularly in France and the U.S.A., and now in Britain). Was it accidental that the environmentalist argument emerged so strongly in 1968 at the crest of campus disturbances? And what was the effect of replacing Marcuse by Ehrlich as campus hero? Conditions appear to be exactly right for the emergence of overpopulation arguments as part of a popular ideology to justify what had and what has to be done to stabilize a capitalist economic system that is under severe stress.

But at the same time there is mounting evidence (which has in fact been building up since the early 1950s) of

certain ecological problems that now exist on a world-wide as opposed to on a purely local scale (the DDT example being the most spectacular). Such problems are real enough. The difficulty, of course, is to identify the underlying reason for the emergence of these difficulties. There has been some recognition that consumption patterns induced under capitalism may have something to do with it, and that the nature of private enterprise, with its predilection for shifting costs onto society in order to improve the competitive position of the firm, also plays a role [12]. And there is no question that runaway rates of population growth (brought about to a large degree by the penetration of market and wage-labor relationships into traditional rural societies) have also played a role. But in their haste to lay the origin of these problems at the door of "overpopulation" (with all of its Malthusian connotations), many analysts have unwittingly invited the politics of repression that invariably seem to be attached to the Malthusian argument at a time when economic conditions are such as to make that argument extremely attractive to a ruling elite.

Ideas are social relations; they have their ultimate origin in the social concerns of mankind and have their ultimate impact upon the social life of mankind. Arguments concerning environmental degradation, population growth, resource scarcities, and the like can arise for quite disparate reasons and have quite diverse impacts. It is therefore crucial to establish the political and social origins and impacts of such arguments. The political consequences of injecting a strongly pessimistic view into a world structured hierarchically along class and ethnic lines and in which there is an ideological commitment to the preservation of the capitalist order are quite terrifying to contemplate. As Levi-Strauss warns in *Tristes Tropiques*:

Once men begin to feel cramped in their geographical, social and mental

habitat, they are in danger of being tempted by the simple solution of denying one section of the species the right to be considered human [17, p. 401].

CONCLUSIONS

Twentieth century science in the western world is dominated by the tradition of Aristotelian materialism. Within that tradition, logical empiricism, backed by the philosophical strength of logical positivism, has provided a general paradigmatic basis for scientific enquiry. More recently the "model builders" and the "systems theorists" have come to play a larger role. All of these methods are destined to generate Malthusian or neo-Malthusian results when applied to the analysis of global problems in the population-resources relation. Individual scientists may express optimism or pessimism about the future, while the results of scientific investigation may indicate the inevitable stationary state to be far away or close at hand. But, given the nature of the methodology, all the indicators point in the same direction.

The political consequences that flow from these results can be serious. The projection of a neo-Malthusian view into the politics of the time appears to invite repression at home and neo-colonial policies abroad. The neo-Malthusian view often functions to legitimate such policies and, thereby, to preserve the position of a ruling elite. Given the ethical neutrality assumption and the dominant conception of scientific method, all a ruling elite has to do to generate neo-Malthusian viewpoints is to ask the scientific community to consider the problems inherent in the population-resources relation. The scientific results are basically predetermined, although individual scientists may demur for personal "subjective" reasons.

It is, of course, the central argument of this paper that the only kind of method capable of dealing with the complexities of the population-resources relation

in an integrated and truly dynamic way is that founded in a properly constituted version of dialectical materialism.

This conclusion will doubtless be unpalatable to many because it *sounds* ideological to a society of scholars nurtured in the belief that ideology is a dirty word. Such a belief is, as I have pointed out, ideological. Further, failure to make use of such a method in the face of a situation that all regard as problematic, and some regard as bordering on the catastrophic, is to court ignorance on a matter as serious as the survival of the human species. And if ignorance is the result of the ideological belief that science is and ought to be ideology free, then it is a hidden ideology that is the most serious barrier to enquiry. And if, out of ignorance, we participate in the politics of repression and the politics of fear, then we are doing so largely as a consequence of the ideological claim to be ideology free. But then, perhaps, it was precisely that participation that the claim to be ideology free was designed to elicit all along.

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