
Man, Environment, and the Great Growth Debate

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In an admirable series of articles in the March, April and May issues of *Marxism Today*, Richard Clarke has given a thorough airing to the debate currently raging in scientific circles on the future of the planet Earth. He rightly protests against Marxist hostility or indifference to subjects of a purely technical concern, like the energy and mineral resources of the earth, the carrying capacity of the biosphere, and the long-term effects of population growth. He insists that these are issues of crucial importance to any future socialist society, and only a dogmatist would disagree with him.

In the great debate over whether growth of capital stocks and population can continue, and if so whether it is desirable, Clarke adopts a neutral stand. He says that Marxists cannot afford to be complacent about the environment and the future development of technology; equally he rejects the forecasts of "eco-doom", on the grounds that they pay inadequate attention to political and social dimensions, and that they are used as a stick to beat the workers with when they get too "greedy".

That is a very schematic summary of a lengthily-argued and logically coherent article. I should say at once that I wholeheartedly endorse Clarke's stand against Marxist complacency—if anything, I feel he understated the urgency of these questions.

Scientific Work of the Anti-Growth School

Already in the US we have glimpsed what urban break-down in a highly polarised, highly industrialised society can mean: apolitical and unorganised street violence, looting and arson. There is a world of difference between that sort of protest and the protest of a disciplined miners' union striking in support of its demands and bringing down a government.

We have also witnessed this decade four major famines in as many years, and the prospect of the future millions who are bound to starve to death is not a pleasant one. It is clear then that any strategy aimed at achieving long-term survival for our species must start with fundamentals like population control, food supply, shelter and control of disease. If certain Marxists claim that socialism will solve these problems automatically, they are deluding no-one but themselves.

What I will not endorse in Clarke's essay is his

attitude to the scientific work of the anti-growth school (as opposed to the propagandist work, which is often ill-informed and woefully wrong-headed). In his opening chapter, Clarke indicates to us what a "Marxist" approach might be to the science of demography (implying that the two are separate), and then he goes on to review the MIT work published under the title "The Limits to Growth". He finds the theoretical model employed too crude and oversimplified, too dependent on empirical observation and even guesswork to have any validity. It is too arbitrary in its choice of variables, and too pessimistic in its estimates of future supply of non-renewable resources. He concludes, along with the Science Policy Research Unit at Sussex University, that the model grossly under-estimates the adaptive power of social and technological changes, and finally dismisses it as a piece of "computer fetishism".

Well my judgment may seem a little harsh, but I think it is about time that this lofty, condescending and all-too-inquisitorial approach of "Marxists" to basic science be shown up for the sham it really is. The fact is that Clarke has completely misrepresented the MIT work, and has been so zealous in his denunciation of it, that he has blinded himself to its positive aspects. Let us examine the MIT global model ourselves, and then look again at Clarke's conclusions.

Meadows and his co-workers put forward three very simple, very basic theses. These were:

1. a theory (or model) of economic activity should be more concerned with *stocks* than with *flows*;
2. by their very nature, the growth of such specifically social stocks as population and capital tends to be exponential;
3. against a finite base of material and energy resources, exponential growth cannot continue forever.

Three Theses

The first thesis represents an assault on the comfortable assumptions of neo-classical economic theory, which is obsessed with flows of income and materials, and ignores the growth of stocks (and incidentally, dodging the issue of the *distribution* of these stocks amongst the population) or treats such

growth as "inevitable". As such, this thesis goes back to the spirit of classical political economy, to Ricardo and Marx, with their emphasis on the relationships between land, population, agricultural output and industrial output.

The second thesis goes back to Malthus, who first remarked that population growth proceeds in a geometric (or as we would now say, an exponential¹) manner. Meadows *et al* go further and argue that unconstrained population growth *must* be exponential, because the rate of reproduction at any time must depend on the number of reproducers. In other words, the bigger the population gets, the faster it seems to grow—and the same should apply to capital stock. Now it is a fact that Marx did not propose an exponential model of capital accumulation. Does this mean such a model is bound to be incorrect?

The third thesis is simply stating the obvious: the planet is a finite system of low-entropy matter and energy, and the accelerating degradation of this to high-entropy waste and heat cannot go on forever. This is all the thesis is saying. But it needs saying, because again neo-classical economics (which holds sway in universities the world over) is not concerned with the physical dimensions of its variables (categories such as income, output, profit, utility)—it simply endows them with "value" and sets them in the market-place. But all value has a material source, say the MIT modellers—in the same fashion that Ricardo and Marx insisted that all value has its source in labour.

Limits to Exponential Growth

It should be clear that the first and third theses have much in common with Marx—but the second thesis is an important addition. If unconstrained growth is exponential, then it can be *quantified*. A mathematical model can be set up. We start with a certain supply of material resources, and a certain stock of population and capital, and then we let the system run by simulation on a digital computer.

In this way we calculate how long these stocks can grow exponentially before their resource base is exhausted. In other words, we calculate the limits to exponential growth. And it turns out that we can say with a fair degree of accuracy that growth cannot continue unchecked for more than a further 100 years. Since this is a very short time, we are

forced to the conclusion that if there is to be the necessary swing away from exponential growth towards a steady-state, it will only come about as a result of drastic social changes both in the industrialised west and in the Third world.

This then is what the MIT calculations show: that without a drastic shifting of social priorities *now*, exponential growth will continue unchecked, and will come up against physical limits much sooner than we expect (restraints on population like war, pestilence and famine). Indeed it seems that the model was set up precisely for this purpose—to argue the case for social change *now*, before it is too late. In a different terminology, their conclusion is this: the forces of production have grown to the point where they are now in open contradiction with the social relations of production. Something must give somewhere. Does the message sound familiar? Of course it does—it is Marx returned from the grave.

In the Name of Marxism

So why does Clarke feel called upon to denounce these arguments in the name of Marxism? Again and again he bemoans the fact that politics and economics are left out of the MIT model. He informs us that the model "totally under-estimates the potential of technology and completely ignores certain key adaptive technological, social and political feed-back loops that, when introduced, radically alter the behaviour of the model". *But these factors were explicitly left out in order to show how far-reaching the social adaptation would have to be.* The MIT work was not a *prediction*, but a rather complicated calculation that was in no way feasible before the advent of computers. If social change is to be *incorporated* in the model, how is it to be quantified?

We either assume, arbitrarily and in the teeth of all evidence to the contrary, that technology expands exponentially, thus keeping up with population and capital, and staving off collapse. Or else we assume that it will not expand exponentially, but that there will be discontinuities in the model whenever collapse is imminent that for want of a better term we call revolutions.

Either way our calculation of the limits to growth is made meaningless. Clarke goes along with the facile Sussex criticism of the MIT work that such social adaptations as the price mechanism working through a free market would sufficiently ration natural resources to prolong collapse indefinitely. Yet Meadows *et al* specifically pointed to the lags involved in market mechanisms, and for this reason characterised their model as an "overshoot and collapse" mode of system behaviour. And what evidence does Clarke offer that technology would be able to overcome the curse of decreasing returns?

¹ But not "super-exponential", as Clarke suggests in his comments on demography. He should know that the exponential function $y = y_0 e^{xt}$ increases faster than any possible polynomial of the form $y = y_0 + x^n t$, precisely because its rate of change varies with its instantaneous magnitude: this is the mathematical description of constant proportional growth. "Super-exponential" growth is a mathematical absurdity.

Nothing but a quote from one Frederick Engels, a 24 year old writing in 1844 on a subject he clearly knew nothing about:

“... science increases as fast as population; the latter increases in proportion to the size of the previous generation and science advances in proportion to the body of knowledge passed down to it by the previous generation. That is, in the most normal conditions it also grows in geometrical progression—and what is impossible for science?”^{2,3}

Apparently nothing. No matter how much of a mess we make of things, science will clean it up for us. And what is odd is that here we have a Marxist telling these MIT upstarts that the social relations of production will keep nicely in step with the forces of production through the laudable resources of the market and technological change.

The Results are Neutral

But these are quibbles. I fully share Clarke's fear that the MIT calculations may be used in some quarters as support for a policy of “cleaning up” the environment, i.e. as support for a *technical* solution to a *political* problem. But he is attacking the wrong people. Is it not obvious that they can equally well be used to support an exclusively political solution? The results offer no apology for any one nation, industry or class—they are completely neutral and firmly rooted in the universalist traditions of the finest science. But once they are in the public arena they can be picked up by anyone. And who is picking them up and distorting them in their own interests? None other than the most reactionary elements in every advanced industrial nation. They point to the necessity for growth to eventually stop, and argue that unfortunately the Third World must give up the idea of industrialising. They point to the need for a radical re-orientation of policy, and argue that this is no time to tolerate dissent: law and order must at all costs be enforced, so that the authorities can get on with the job of saving humanity.

And where are the socialists opposing these specious arguments? Where indeed. Most of them are too busy attacking the credentials of the MIT modellers, or wishing away the limits to growth, or quoting fragments of Marx and Engels, or even eulogising the market as a means of survival, Surely

it is clear that the socialists should be out there campaigning harder than ever, pointing out that time is now precious: if there is not a drastic redistribution of wealth both on a global scale and within nations, coupled to a drastic overhaul of political institutions, the species *Homo sapiens* faces extinction.

A Science or a Dogma?

Comrade Clarke is out there campaigning for Marxism. In his chapter one, he lamented that there is a great deal of awareness and concern in the conservationist movement “awaiting a positive lead”; in his chapter three he quotes Barry Commoner with approval warning all those who propose to cure the environmental crisis that “they undertake thereby to change the course of history”.

It is Marxism, he argues, that must show the way: only Marxism can temper people's concern for the environment with an understanding of society. Okay, but what is Marxism anyway, if not a rigorous science of society, a science which makes no apologies for the status quo, or for any vested interests? It is either a science or a dogma—and I would emphatically reject any interpretation of Marxism as the Holy Law of the Founding Fathers, to be tampered with at our peril.

If it is a science, then it must be in a constant state of flux, bringing new concepts to bear on the task of understanding society in order to change it. Certainly “Marxists” do not have a monopoly on this science of society: in fact their influence in the past has often been negative and obstructive of further progress in the understanding of social mechanisms. But others have pushed forward, some of them bringing new life to economic and demographic disciplines (like the MIT team), and others concentrating on the purely political overtones of a necessary end to growth. And if Clarke failed to grasp completely the implications of the MIT work, he has willfully misunderstood some of the theoreticians of the “steady-state economy”.

Consider what he says of Garrett Hardin's “The Tragedy of the Commons”: “a neat tidy parable that conveniently explains away the problem”, “an argument that has interesting similarities to that which castigates the ‘greedy workers’ wanting ‘too large a slice of the economic cake’”.

Technology of Social Co-ordination

No, comrade Clarke, you are not getting away with that. Again we must reconsider Hardin's comments for ourselves. He is concerned, like many another US economist from Kenneth Boulding onwards, to draw out the logic of free enterprise, and to show how it necessarily interacts with the environment. He demonstrates conclusively that an economy of free entrepreneurs despoiling the planet

² Engels, F.; *Outlines of a Critique of Political economy* (1844).

³ More substantial evidence would have to be along the following lines. Productivity (rigorously defined) varies directly with level of technology. Therefore a constant growth rate in productivity implies exponential growth of level of technology. But are these statements true? Is there historical evidence that productivity has a constant growth rate?

for private gain is incompatible with a finite resource base. Private calculation, on the scale of modern industry, leads to public disaster.

This is what Garrett Hardin is arguing through his analogy of herdsmen on the common, all increasing their private flocks to the point of total collapse and destruction. He is arguing for social control—the sort of control that would give political stability to a stable economy. In other words he is arguing for socialism. Now I do not know Garrett Hardin personally, and in private life he may well be the raving elitist and racialist that Clarke portrays, but his public pronouncements are most definitely in favour of socialism.

All of these “steady-state” theorists have faced up to the fact that a non-expanding economy *necessitates* collective control of population level, resource depletion, waste disposal and the like.⁴ Some of their ideas are ingenious. For instance Kenneth Boulding has advocated a system of birth control vouchers, freely exchangeable on the open market. Herman Daly has thought up a scheme for government auction of resource depletion vouchers. The explicit aim of these schemes is to ensure macro-stability while maximising micro-freedom. I would call them all contributions to a *technology of social co-ordination*: a technology that must largely be inspired by its underlying rigorous science of society. Such a technology should bear little resemblance to the primitive system of laws, constitutions, markets, pressure groups, parties and kinship groupings that we currently labour under. Its elaboration must be seen as a vital objective in this decade. Its programme will be the programme of Marxism: change through understanding; but its content will not be the chapter headings of *Capital*.

Questions of Great Importance

So much for this brief review of what I considered to be the shortcomings in Richard Clarke’s arguments. It remains for me to applaud his boldness in laying bare the issue of the environment as a key area of future party policy. Where for instance do communists stand on the future of nuclear power? Comrade Clarke in his discussion of energy resources insists that Britain’s future nuclear industry should be based on the home produced Advanced Gas

Cooled Reactors or the earlier Magnox gas-cooled reactors.

On the other hand a special correspondent in the *Morning Star* has dismissed these UK reactors as expensive delusions, and argues in favour of buying the US-built light-water reactors. Who is right? What is the policy of our comrades in the power supply industry? What about party policy on food supply?

My own feeling is that we should be pressing for more efficient biological energy conversion from sunlight to carbohydrate in vast oceanic algae farms, then use this carbohydrate to harvest protein from equally vast fish farms. Certainly I would categorise the tendency towards manufacturing food from petroleum in such a way that every pound of protein produced uses up more calories than it supplies as an expensive and dangerous folly. And finally, where do we stand on the future of industrial organisation and urban planning?

It might have been alright for Marx to conceptualise capitalism as an abstract system of social relations working to *contain* the forces of production; he assumed that when these forces were liberated by social revolution, they would usher in a period of abundance for all. A century later, we can no longer be so optimistic. In fact the evidence is overwhelming that the sort of energy-intensive industry that we are familiar with leads inevitably to the creation of urban death-traps and to an over-integrated economy in which a single breakdown can lead to system collapse.

Far more attention will have to be given to how we may best live off our solar income—the only really “free good” we enjoy. And solar energy, or tidal energy and wind energy (which ultimately derive from the rotation of the earth) implies a decentralised mode of industrial production using “intermediate” technology. And that implies a radical break with our industrial past. To my mind all of these questions are of paramount importance: they deserve a party conference in the near future when some guidelines for a policy can be thrashed out.⁵

⁵ I would like to express my thanks to Bob Rowthorn for his comments on a preliminary draft of this article.

⁴ Of course collective control of population level, control of resource depletion, etc. equally imply a non-expanding economy (or perhaps it would be better to say a *stable* economy, i.e. an economy that is not expanding relative to its niche in the biosphere). It goes without saying that if communism means anything, it means this: a stable, collectively controlled economy. We would not expect human ingenuity to decline under such conditions—on the contrary we should witness a flowering of science and invention, with a concomitant rise in standards of living.

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happened to Phase 3, with the continuing rise in world commodity prices (even before the oil price rises), the failure of the UK terms of trade to improve, and the continuing high level of world interest rates. Counter-inflation policies such as Phases 1, 2 and 3 represent an attempt to make the British working people pay the prices of the weakness of British capitalism and the intensification of inter-imperialist rivalry.

Partisanship and Objectivity in Theoretical Work

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I would like to make a few remarks on Maurice Cornforth's interesting article in *Marxism Today* of January 1974, which made a number of very important points on questions of great relevance for comrades engaged in theoretical work. As a polemic against certain ideas on this topic (ideas emanating not only from the ruling class but also held by some sections of our own movement), his article is certainly opportune. There are, nevertheless, weaknesses in his mode of argument, which, I think, might well obscure some of the correct conclusions.

In a previous *Marxism Today* article, Cde. Cornforth argued against the use of "antitheses" in Marxist thinking. I agree that it is of no use to pose "black and white alternatives", since this often involves us in a spurious choice. But historical materialism is full of "dialectical pairs", such as use value/value or constant/variable capital, which are dialectical in the sense that the relation between the terms is not a simple negation, but much more complex; a relation which it is Marxism's task to *investigate*. We should not shy away from such "antitheses" as I think Cde. Cornforth is liable to do; rather we should look more closely at them. One of these is Althusser's distinction science/ideology. I think that Comrade Cornforth is insufficiently clear on the exact meaning of this distinction, and is guilty of setting up an "Aunt Sally" which it is very easy to knock down.

Ideology and Science

The word "ideology" is much used in marxist jargon; indeed, it is used far too much. Think of all the different things that this word covers in everyday socialist parlance: art, culture, theory, propaganda, consciousness, philosophy. These terms all denote different things, and it is clearly confusing to use one word to cover them all. Especially so, since Marx himself used the term "ideology" to mean something quite specific. He used it to denote a set of ideas, or a viewpoint on reality, derived from one's *lived relation* with the world, one's practice. These ideas are spontaneous, immediate; that is, they do not come from con-

sidered reasoning, but as a "reaction" to experience.

This definition has one especially significant consequence: namely, ideology is *not* a deliberate falsification of reality to delude people. For two reasons. First, there is no "subject" whose evil scheme is mystification; the acquisition of ideology is an objective process springing from practical contact with the world. Secondly, ideology is not necessarily "false", but can, and often does, contain elements which correspond to reality. Against this, Althusser poses the concept of *science*. A science, like an ideology, is a set of ideas; what distinguishes it from an ideology is the way in which these ideas are arrived at.

(a) Science is not spontaneous, but a complex, considered process of creation, of "theoretical practice", whose specific form depends on the particular science being studied.

(b) Science is objective; it gives knowledge of a particular *object* in the real world, which exists independently of the investigator, so scientific results are not dependent on the whim of the theorist—whereas ideology has no *real* object at all.

(c) The relationship of theory to reality is *tested* by particular scientific techniques—in the case of the natural sciences, experiment and observation—whereas ideology is more often *assumed*. (In Althusser's words, for ideology the *practico-social* function dominates over the *knowledge-giving* function.) I am aware that this point raises very great difficulties; a scientific experiment involving observation through a telescope itself depends on the theory of optics, so science is by no means as self-contained as immediately appears. However, in such cases it is possible to trace back to the theoretical results upon which our experiments rest; it is then possible to investigate scientifically the very foundations of science. This is not so with ideology, which is self-contained (or, in Cornforth's words, closed) in another sense; in that questioning its presuppositions leads to a circularity, or to problems which *cannot* be posed within the ideological system. (Althusser develops