

Science, Social Science, and Socialist Science

REASON AS DIALECTIC

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The current crisis, social and intellectual

The current crisis in world affairs, in particular the economic and social crisis in those countries that dominate world affairs, the advanced industrial states of Europe and America, is reflected in an intellectual crisis, especially in those countries. As they move into the so-called 'post-industrial' phase, into 'technological society', their dominant form of theoretical knowledge, scientific knowledge, increasingly becomes a crucial economic resource, a factor of production; and the intellectual crisis reveals itself as a radical uncertainty about the nature and status of science. Europe invented modern science, and just as, during the centuries of European imperialism, Europe sought to dominate the rest of the world, so Europe's dominant form of knowledge, science, has been involved in the imperial conquest of other cultures. Thus the conflict between the advanced industrial states and the Third World, a conflict that is an essential component of the current world crisis, is reflected intellectually in a conflict between science and other forms of thought, for example between European medical science and such apparently unscientific forms of medicine as acupuncture.

As social institutions designed for the production and distribution of theoretical knowledge, the universities are of course deeply involved in the crisis, and it's not surprising that they have been centres of ferment in the last decade or so. They are the social points at which the intellectual aspect of the crisis gets its most explicit theoretical expression. Anthropologists have become hypersensitive about applying their own concepts of science and rationality to what used to be called 'primitive' cultures and belief systems. Psychologists and psychiatrists discuss and re-draw the distinction between sanity and madness. And at the most abstract level, philosophers - well, many English-speaking philosophers, I suppose, continue to do logic, philosophy of logic, and epistemology as if they inhabited the ivory tower of timeless Platonic forms, the Third World of Popper rather than of Che. But even ivory towers can't be completely insulated, and the general philosophical preoccupation with the distinction between reason and unreason has taken specific forms that relate more explicitly to the social situation. In particular, in English philosophy, two new sub-disciplines, not distinguished and named before, have emerged as growing points within and between the old philosophical specialisms, and both in that historical fact and in their own content have reflected intellectually the general social crisis: I mean the philosophy of science within the general field of epistemology, and between that and the old sub-discipline of political philosophy, bearing witness to the way in which political philosophy has been undermined by the dominance of science, the philosophy of the social sciences. The chief pre-occupation of these two new sub-disciplines has become the distinction between science and ideology.

In both fields one can trace in the analytical tradition a more or less gradual relaxation of the constraints thought to be implicit in the idea of science and reason. In the philosophy of science Popper sought to replace inductivism and verificationism with the less stringent requirement of falsificationism; Kuhn argued that even that was too stringent for revolutionary science; and Feyerabend has argued that all science is or ought to be revolutionary science, and in his article and book Against Method, as the title indicates, claims that the only rule of method in the acquisition of knowledge is 'Anything goes'. In a rather different way, the philosophy of the social sciences has similarly helped to soften up the idea of rationality: as a practising social scientist with an unusual degree of philosophical self-understanding, Chomsky has attacked behaviourist constraints imposed in the cause of scientificity; and the doctrine of the unity of science in Popper, implying that in methodology and logical structure the social sciences are indistinguishable from the natural sciences, has been opposed by the idea that the social sciences have their own special logic and methodology, a methodology, moreover, that in some writers, e.g. Winch, claims that societies under investigation may legitimately employ canons of rationality quite different from, but not inferior to, its own. We seem to be presented with a choice between equally unacceptable alternatives: on the one hand an empiricism that seems unable to account for much of the historical phenomenon of science; and on the other hand, a relativism that makes radical rational criticism impossible, and in doing so seems to be self-refuting.

Marxism as scientific socialism

The place of Marxism in this discussion is distinctive and instructive. Its failure to fit the dominant empiricist model in the philosophy of science is even more striking than the failure of other, more generally accepted, theories and phases of modern science: within the European conception of science it's a genuine peculiarity. Yet Winch's relativism doesn't obviously save it, even as relativistically rational. Marxism is, after all, a European product, conceived explicitly as heir to the great tradition of natural science that Europe invented: it's not a form of thought characteristic of a foreign society, defining a conception of rationality necessarily alien to our language and culture, and therefore apparently uncriticisable from our European point of view. On the contrary, to the extent that Marxism characterises other cultures it does so as one of those cultural exports that Europe's imperial capitalism didn't, so to speak, bargain for, and which it now faces as an alien threat.

Endogenous to Europe, then, Marxism has been typically criticised by European intellectuals within the analytical tradition, especially philosophers of science and of social science, as unscientific, as muddled about the nature of science and its own relation to it: those with an explicit demarcation criterion, such as Popper, have put it firmly in its place as pseudo-science. But this general difficulty of appreciating Marxism's claim to be a science is not

1 This is a version of a paper discussed at the Radical Philosophy Conference at Oxford in January. Many people have commented on it - too many for me to name. But I am grateful to them for their criticisms and suggestions.

peculiar to analytical philosophers and those scientists whose understanding of science has been articulated and shaped by analytical philosophy. It's not even peculiar to non-Marxists in general. The difficulty has been deeply felt and wrestled with within Marxism itself. There is in fact one specific form of the problem that is common to Marxist and non-Marxist discussions. I mean the form given to the problem by Marxism's self-description as 'scientific socialism'. Marxism presents itself as both social science and political movement, as both scientific theory and revolutionary practice: as something concerned not only to understand the world but also to change it. Discussions within Marxism about whether the socialism is distinguishable from the science, and if so how these two elements are related, reveal that certain conceptions of science and reason are deeply entrenched as common property on both sides of the divide between Marxists and non-Marxists.

These common conceptions involve a family of shared ideas about the distinctions between fact and value, theory and practice, description and prescription, science and morality. Contemporary English-speaking discussion of these ideas has a characteristic parochialism, and seems to suggest that apart from anticipations by Hume ('is' and 'ought') and perhaps Mill (science as indicative and art as imperative), their history belongs to 20th-century analytical philosophy, from Moore's 'naturalistic fallacy' through the emotivism of Ayer and Stevenson to Hare. But it's clear that the European mainland shared much of this thinking and made its own contribution to the history of the distinctions as they developed under the impact of science and capitalism from the 17th century onwards. Kant, Comte, Weber, and Poincaré, as well as Mach and the Vienna Circle, all struggled to digest philosophically the phenomenon of science, and in the process distinguished it logically and epistemologically from value, or practice, or morality. Here, for instance, is Poincaré making the point in a way that contemporary English philosophers are familiar with, though from another source:

'It is not possible to have a scientific ethic, but it is no more possible to have an immoral science. And the reason is simple; it is, how shall I put it? for purely grammatical reasons. 'If the premises of a syllogism are both in the indicative, the conclusion will equally be in the indicative. In order for the conclusion to be put in the imperative, it would be necessary for at least one of the premises to be in the imperative. Now, the principles of science, the postulates of geometry, are and can only be in the indicative; experimental truths are also in this same mode, and at the foundations of science there is not, cannot be, anything else. Moreover the most subtle dialectician can juggle with these principles as he wishes, combine them, pile them up one on the other; all that he can derive from them will be in the indicative. He will never obtain a proposition which says: do this, or do not do that; that is to say a proposition which confirms or contradicts ethics.'

(from an essay of 1913, 'Morality and Science')

Given such a general climate of opinion, Marxism seems to be faced with some difficult choices: as social science it can't be socialism, and as socialism it can't be social science; the two elements might be conjoined, but not logically connected or unified. 'Value-free' science can, of course, have a practical application as technology, but technology can only specify means to ends and must therefore

be supplemented with a choice of ends or objectives that can't be settled scientifically. This is roughly the view of the Austro-Marxist Rudolf Hilferding, in his book Finance Capital, and of most of the orthodox Marxism of the Second International. In his neo-Kantian version of Marxism in his lecture on 'Kant and Marx' (1904), Karl Vorlander identifies the values of Marxism as ethical: 'socialism cannot free itself from ethics historically or logically, neither on the theoretical level nor in fact'. But ethical socialism is Utopian, and in practice reformist rather than revolutionary, i. e. it's liberal and social-democratic rather than Marxist; and it's well known that Marx himself was contemptuous of morality and treats it theoretically as essentially ideological. Under these constraints scientific socialism came to be represented, predominantly at the Third International and in Stalinism, as a theory specifying laws of inevitable social change, and between this and the alternative of ethical socialism Marxism as a programme of revolutionary action was effectively squeezed out of the picture of coherent possibilities.

This ideological emasculation no doubt reveals the almost inexhaustible capacity of the status quo to protect itself under threat. But is that emasculation avoidable from a rational point of view? I want to make some suggestions to that end: suggestions that are both fairly simple and very general because they re-theorise (by developing arguments originally put forward in my Reason in Theory and Practice, Hutchinson, 1969) the overall structural relations between the relevant basic and very general categories. From this perspective the conception of science from which the emasculation results is itself ideological, in fact a crucial part of the European ideology out of which Marxism developed as a radical innovation and critique. As ideology, this conception reflects important, but relatively superficial, aspects of science, aspects that mask and contradict its deeper nature and potential. Historically speaking, it's this embryonic reality within the womb of European science that Hegel and Marx, heirs and critics of the Enlightenment, between them develop and deliver as social science. As such, the Marxist conception of science is both continuous with and radically different from the prevailing conception. The question of the scientificity or otherwise of Marxism can't therefore be answered by noting its failure to conform to Enlightenment standards of science articulated by Hume and Kant and developed by their modern followers. On the contrary, the question is whether Marxism embodies a different conception that supersedes its rivals.

Science and reason as dialectic

The conception of science and reason that Marxism explicitly offers in distinguishing itself from the Enlightenment is: dialectic. It's this Hegelian inheritance that is contrasted with the 'metaphysical' conception of science shaped in 'the mechanical philosophy'. Mechanistic science is allowed to have both a necessary historical role and a continuing validity in certain areas of investigation. But dialectic, it's claimed, is essential for the 'historical sciences'. Moreover, to focus on the present topic, Marxists have frequently claimed that it's this conception of science as dialectic that is required to solve the problems set by the idea of scientific socialism. The deformations of both ethical socialism and Stalinism involve mechanistic conceptions of science.

It's this view that I want to explore and give support to. But first it has to be said that there's an easy way out that in fact settles nothing. A dialectic-

al conception, it might be said, is a view that conceives of opposites as in unity: scientific socialism is such a unity, since it unites fact and value, theory and practice, science and political revolution. That, of course, only sets the problem. It doesn't solve it. The problem precisely is how to conceive of science in such a way that value and practice can be seen as involved in it.

I'll try to outline a solution of this problem in terms of the idea of contradiction, which is central to dialectic. The idea of contradiction is also, of course, central to analytical philosophy. But on this matter the two traditions face each other with blank incomprehension. For both, contradiction is a concept, or rather a category, of logic; and it's in the philosophy of logic of each tradition that the differing conceptions of science have their roots.

Roughly and briefly, the Hegelian view is that reality is in a constant process of change, and that this temporal, historical process of change is due to the contradictions within the essence of things. These contradictions oppose each other, and change is the resolution of that opposition and the replacement of those contradictions by other contradictions on a higher plane, so that change through resolution continues. Now Hegel was, of course, an idealist, and though analytical philosophers claim to see some truth in the claim that ideas can be contradictory, the Marxist dialectic is materialist, not idealist, and from the analytical point of view the doctrine that there are contradictions in material reality seems nothing short of outrageous. In such a context, the concept of contradiction, it seems, must lose its specifically logical content and cease to be a category of logic: it can only mean something like 'conflict' or 'opposition between forces'. Marx himself sometimes speaks of 'collisions' rather than 'contradictions'; and many Marxist writers when discussing dialectic seem satisfied with this evacuation of the specifically logical content of the idea of contradiction, or at least fail to take up the point seriously, as if they have no understanding of the basic position from which the objection is made.

The analytical view: dialectic not logic

We can see the analytical side of this lack of comprehension starkly represented in Popper's critique of the idea of dialectical logic in his 'What is Dialectic?' (Mind, 1940, reprinted in Conjectures and Refutations). Popper claims that dialectic is most plausible as an empirical theory about the temporal or historical development of thought. But under that interpretation, it precisely cannot be logic, and this for three general reasons that can be identified in Popper's argument and its background of modern philosophy of logic:

(1) There are no contradictions in reality. Popper approvingly quotes the words of the mathematical logician Hilbert: 'The thought that facts or events might mutually contradict each other appears to me as the very paradigm of thoughtlessness'. Now it might be supposed that this doctrine is true of material reality and thus undermines the Marxist dialectic, dialectical materialism. But, it might be argued, it could be taken to be true of the whole of reality only if the common philosophical contrast between thought and reality misled us into believing that thought itself is not a part of reality; and of course, thought is a part of reality, and in that part of reality there can be contradictions. However, to the extent that it's admitted that there can be contradictions in thought, the concession is heavily qualified. For the argument that there can be no contradictions in real-

ity seems to apply in some sense to any part of reality, thought included. The argument is that if the proposition 'p' contradicts the proposition 'q', the proposition 'p & q' must be false, i. e. nothing in reality can correspond to it. In other words, if the proposition 'p' contradicts the proposition 'q', it is logically impossible that both p and q: there can be no state of affairs corresponding to a contradiction.

(2) As this argument presupposes, logical relations are truth-value relations between propositions. In the paper 'What is Dialectic?' Popper speaks of sentences, but whatever the word used they are denizens of what Popper now refers to as the Third World.

(3) Logical relations are atemporal, not chronological relations. Logic, unlike dialectic, is not concerned with temporal or historical change, with processes. In particular, it is not concerned with the origins of processes or with genetic or causal explanations of them. It is not developmental (or any other kind of) psychology, or history, or sociology.

These three doctrines are the basis of the philosophy of logic characteristic of twentieth century analytical philosophy, and constitute a central part of the self-reflective theorising involved in the development of the special discipline of modern logic, and with it the logic and methodology of science, between Frege and Popper.

An analytical model of science

With this in mind, I want now to reconstruct a simple but influential model of science incorporating these ideas, and show how it relates both to our original question of science, values, and action, and to the connected question of dialectic. The relevant aspects of the model are articulated in Wittgenstein's Tractatus. The logic and methodology of science represents science as a body of propositions between which hold certain truth-relations (including, perhaps, probability-relations). The basic notion of truth is essentially concerned with the relation of a proposition to the reality it is about, the relation of a proposition to its subject-matter - to what, in view of the tradition, we had better call its object. It's often said that the aims of science are to describe, explain, and predict. In the philosophy of science these aims are represented in the claim that scientific theories are descriptive, explanatory, and predictive. But it's essential to ask: descriptive, explanatory, and predictive of what? The answer is that these categories of description, explanation, and prediction characterise ways in which scientific theories relate to their object; or perhaps better, as in Popper's account (with description replaced by testing) these three characterise aspects of the single way in which scientific theories relate to their object. At any event, scientific theories are propositions that describe, explain, and predict the reality they are about. Guided by the central importance of this distinction and relation between theory and reality, or what a different tradition would have called subject and object, we realise that if a theory is self-contradictory it is logically impossible for reality to be truthfully described by it. There can be no contradictions in reality.

Science as practical: technology

It seems to be a consequence of the structure of this model that in being descriptive, explanatory, and predictive of reality, scientific theories cannot be evaluative or practical, cannot have any evaluative or practical implications. Yet is this really the case? One vitally important kind of evaluative and

practical implication is commonly attributed to science conceived in this way, namely technological implications. Indeed, it might be said that given science conceived in this way, technology is its only possible evaluative and practical role, so that as a paradigm of rationality in theory, science under this conception constitutes for practice the paradigm of technological rationality. For example, Ohm's Law in theory of electricity says that in any electrical circuit the voltage, current, and resistance stand in a constant relationship, that is, with a given voltage and a higher resistance the current flow will be lower. From this there seems to follow a technological implication, i. e. an implication that can be characterised in a variety of such general ways as that it tells us: what to do in order to do something else; or, how to do a certain thing; or, by what means or in what way we can do something. In this example, Ohm's Law seems to imply that in order to lower the current flow in a circuit with a constant voltage, we must or may or ought to increase the resistance. It's this piece of technological know-how that's embodied in the electrical device known as a rheostat, a variable resistance that can be wired into a circuit, e. g. in a wireless receiver, to enable us to control the current flow in the instrument. In general, it's by virtue of this sort of implication that scientific knowledge, in Bacon's aphorism, is power. It's by virtue of this sort of implication that science conceived in this way gives us mastery or control over nature, makes us, in Descartes' words, 'masters and possessors of nature'. This is certainly at least a part of what was in Marx's mind when he urged the crucial role of science in man's relation to Nature and society: at present they dominate and master us, but with the knowledge science gives us we enter a cosmic struggle in which we can ultimately realise the ancient Faustian dream without its awful penalty; we can turn the tables on Nature and society, liberate ourselves by mastering them, and so move from the realm of necessity to that of freedom, in which at last we make our own history.

These dramatic possibilities, long dreamed of by the great visionaries of the scientific revolution, seem at this very moment to be starting their conversion into reality, as advanced industrial societies move into the so-called post-industrial stage, into technological society, their essential structure changing to bring about this unity of theory and practice, the systematic application of scientific knowledge to the problems of production through technology. That being so, it's of some interest to note that philosophers, especially analytical philosophers, have devoted so little time and effort to investigating and clarifying the concept of technology, by which scientific theory seems to come into such close logical relation to practice. It's this idea, of course, that Hume is seeking to characterise in his famous aphorism 'Reason is and ought only to be the slave of the passions'; Kant considered it in his account of 'hypothetical imperatives'; Sidgwick says some things to the point in The Methods of Ethics; and in The Language of Morals Hare developed a theory that has since been sporadically examined and criticised by others. Significantly, all those contributions have been made by ethics: though this is clearly an area of important overlap between ethics and the philosophy of science, the philosophy of science has on the whole steadfastly ignored the problems of technology, apparently conceiving itself, perhaps with unconscious but understandable elitism, as the philosophy of 'pure' science rather than the philosophy of science both 'pure' and 'applied'. As

far as our present topic is concerned, the chief problem in this area of technology is precisely whether, and if so how, scientific theory, or more generally factual, empirical, or descriptive propositions, can have evaluative and practical implications: for instance, how, if at all, Ohm's Law can imply a technical imperative or value judgment containing the word 'ought' or one of its family, e. g. that in order to increase the current in a circuit with a constant voltage, one must or may or ought to lower the resistance.

I shan't pursue that problem here (having said something about it in Reason in Theory and Practice, at 4.11): I'll simply record my view that technological statements, though not moral judgments, are genuinely prescriptive, practical, or evaluative, and really do follow from empirical statements of fact and scientific theories; and therefore, that technology represents a crucial breach, from within science itself so to speak, of the supposed logical barrier between fact and value, between theory and practice. But what kind of practice is legitimated by the idea of technological rationality? The first thing to note is that technology is not simply the use of knowledge for some practical purpose, as if knowledge were here just a means to some practical end: the idea of technology is not just the idea that knowledge is practically useful. For instance, the knowledge that a diplomat is homosexual may be used to blackmail him. In this sense, the knowledge is a means to an end external to its content; whereas in technology it's the content of the knowledge that represents theoretically the real relation of those states of affairs that a practical point of view represents as means to ends. As we've seen, among the categories involved in this idea are those of power, control, and domination; and just as it's essential in characterising science as descriptive, explanatory, and predictive to ask 'Descriptive, explanatory, and predictive of what?', so it's essential here to ask 'Power, control, and domination over what?'. The answer is, of course, the same in both cases. What a scientific theory, as technology, gives us power, control, or domination over is what it is descriptive, explanatory, or predictive of: that reality, or part of it, that constitutes its subject-matter or object. As a theory of or about electricity, Ohm's Law in its technological applications enables us to control electrical phenomena. We could say that in technology the power relation has the same object as the theory whose application it is. More generally, if we can talk of scientific knowledge as a relation between subject and object, between a knowing subject and what he has knowledge about, we can say that the power relation has the same terms as the knowledge relation: the subject with the knowledge also has the power, and the object he has knowledge about is what his knowledge gives him power or control over. This is one of the main reasons why the human sciences, if conceived according to the doctrine of the unity of science on the model of the natural sciences, can seem to be oppressive rather than liberating in their practical implications. Unlike the natural sciences, which as technology give power to human subjects over non-human nature, the object of the human sciences is or essentially involves people, and it's over people that these sciences as technology give power. If in these sciences subject and object were identical this technology would constitute (one kind of) self-control. When subject and object in the human sciences are different, or thought of as different, as in our society or the technocratic society some sociologists foresee for the post-

industrial phase, the human sciences as technology constitute the power of some people over others: in B. F. Skinner's honest but menacing designation, the behavioural sciences, for instance, yield a 'technology of behaviour control'.

Science as critical practice

Even if it's the case, then, that the idea of technology helps to bring fact and value, theory and practice, into some kind of unity, it's far from obvious that this is the kind of unity envisaged by Marx's conception of science as dialectical. Indeed, this kind of unity, characteristic of technocratic society, seems to be involved in an essentially non-dialectical conception of scientific theory as purely descriptive, explanatory, and predictive of its object. It's because the relation of theory to object is conceived as purely descriptive, explanatory, and predictive that the practical relation of subject to that object is a relation of power, the object of the theory conceived in that theory's practical implications as under the control of the subject. One important thing that's missing from this model of scientific theory if it's compared with Marx's conception of social science is the idea of criticism. Marx's social science is socialist science by being, as science, among other things a critique of its object, capitalist society.

Now the simple model of science already outlined contains not only the embryonic idea of technology but also the implicit notion of criticism. The notion is implicit rather than explicit because the model represents only the relation of a single scientific theory to reality, its object. But if we enrich the model with a second theory about the same object, and consider the relation not of theory to object but of theory to theory, the possibility arises of a relation between the two theories that is a relation at once both of contradiction and of criticism. Given two theories about the same subject-matter, one can contradict the other and in doing so implicitly criticise it as wrong, as mistaken. This notion of wrongness or mistake, whether of action or theory, is evaluative, as criticism or appraisal in general is evaluative. It is not technologically evaluative. Nor is it morally evaluative. The familiar and widespread tendency both to identify values with moral values and to regard reason as value-free is simply a fundamental part of the prevailing ideology of science.

Popper himself sees criticism, as well as description, explanation, and prediction, as crucial to science; and he therefore sees science as in some sense essentially evaluative. But at vital points in his account he reveals how his Third World conception of logic, specifically his anti-psychologism in the philosophy of logic, misleads him. One central part of Popper's argument in 'What is Dialectic?' concerns 'the dialectical saying that the thesis "produces" its antithesis. Actually, ' he objects, 'it is only our critical attitude which produces the antithesis, and where such an attitude is lacking - which often enough is the case - no antithesis will be produced. Similarly, we have to be careful not to think that it is the "struggle" between a thesis and its antithesis which "produces" a synthesis. The struggle is one of minds...'. And later: 'The only "force" which propels the dialectic development is, therefore, our determination not to accept, or to put up with, the contradiction between the thesis and the antithesis. It is not a mysterious force inside these two ideas, not a mysterious tension between them which promotes development - it is purely our decision, our resolution, not to admit contradictions...'

What is at least strongly suggested here is that the notion of contradiction, in being a category of logic, is not itself evaluative or critical, and does not imply criticism: characterising something as contradictory, Popper seems to say, is one thing, a logical thing; criticising it is another, logically independent, thing, a matter of psychological attitude and decision rather than of logic.

I have argued elsewhere that the connection here is on the contrary internal and conceptual: that to characterise something as a contradiction, where that concept is a category of logic, is, at least by implication, to criticise it; and moreover that to criticise a theory is to criticise the actual or possible acceptance of that theory by some actual or possible subject. It is in fact difficult to make much sense of Popper's notion of criticism, given his view that what one criticises are theories, and his Third World doctrine of knowledge without a knowing subject, i. e. of theory without a theorising subject. What would be the point of criticising a theory, if not to criticise the actual or possible acceptance of that theory? Contrary to the Platonic conception of logic that has characterised the subject from Frege to Popper, logical categories are themselves implicitly critical, and in their use as characterisations of theories or propositions criticise or appraise those theories by criticising or appraising their acceptance by actual or possible subjects. The connection between logic and the faculty of reason cannot be just contingent.

It follows from this, or is perhaps a presupposition of it, but in any case is true, that people, as well as propositions, can contradict themselves, i. e. that people can hold contradictory views; the critical point of characterising a theory in terms of the logical category of contradiction therefore implies or presupposes that in this sense there can be contradictions in reality. To say 'Smith contradicted himself' is to make a statement about Smith that is itself non-contradictory and at once empirical, logical and evaluative, i. e. critical: it could not be critical if there could not in this sense be contradictions in reality. The contradictory thing Smith said of course putatively describes something that is logically impossible; but his asserting and believing it is logically possible, though logically impermissible.

In this way, science in general must be critical and evaluative. But as has already been suggested, the evaluative nature of scientific theories in relation to other theories and views can't be understood Platonically, simply in terms of logical implications holding between descriptive propositions on the one hand and value-judgments on the other. Just as, in construing these value-judgments as criticism we imply that in the sense outlined what is criticised, e. g. a contradiction, can have a real existence in some subject's thoughts and attitudes, so the criticism itself is empirically instantiated as: opposition - opposition to what is being criticised. Indeed, criticism is an activity or practice, the activity or practice of opposing, and without that activity there could be no such thing as science. Science understood philosophically, i. e. Platonically, as a logical structure of theories would be impossible and unintelligible without the idea of scientific activity, theoretical practice, including the practice of criticism; and with it the understanding of an argument not abstractly, as a set of propositions distinguishable into premises and conclusion, with some logical relation between them, but concretely as the activity of arguing. Science essentially involves arguing against people's theories and views, that is, critically opposing them: or, as we some-

times say, attacking them. The representation of science simply as an attempt to understand the world forgets that its point in so doing is also to change that part of it that consists of misunderstanding. 'The real is partly irrational: change it': that is the imperative of science.

Social science as criticism of its object

How however true all that might be, it will no doubt be objected that it's irrelevant. For all these claims about the critical nature of scientific activity fail to come to grips with the essential feature of the Marxist conception of science as dialectic. Of course, it will be said, science involves criticism, but the object of that criticism, what is criticised, is always some other theory: the critical relation is always between theories, it's horizontal, so to speak, never vertical, never a relation between a theory and its object, the reality it's about. In relation to its object, a scientific theory is always descriptive, explanatory, and predictive, never critical. For example, the cosmological theory that the universe is expanding may by implication be critical of the theory that the universe is stable, but it is not critical of its object, i. e. of the universe itself and of its size from one moment to another.

I'm willing to concede that point, as a point about natural science; provided, as I've argued, that the criticism of theories is understood as having, even in natural science, a social target, i. e. as the criticism of the acceptance of those theories by possible subjects, including social institutions (e. g. the Church as a target of Copernican criticism). But Marx's theory of capitalism is social science, and though it's sometimes held by Marxists that all science is or should be dialectical it seems indubitable that in Marxism dialectic is primarily and essentially intended to characterise social science. I think that if we claim that all science, including natural science, is or should be dialectical, we must also recognise some crucial differences in what we might call degree of dialecticity between natural and social sciences. If we hold that the natural sciences are dialectical that means: (a) that the reality investigated by natural science has an underlying core ('essence') that differs radically from (conflicts with) its phenomenal appearance; (b) that this underlying core is constituted essentially by conflicting forces; and (c) that the natural sciences develop historically through theory change centrally involving determinate contradiction between theories, such that new theories both negate and preserve old theories.

But in the social sciences there are further vital dimensions to the dialectic, involving the logical category of contradiction both at the level of the object and in the relation, the interaction, between theory and object. For the object of social science is or essentially involves people in society; people are peculiar as objects of science in being also subjects with their own theories, views, and ideas, scientific and otherwise, about their activities, about their social practices and institutions; these theories, views, and ideas stand in much closer logical relation to those social practices and institutions than do theories, views, and ideas about the natural world to their object; and in particular, the logical relation of contradiction, at least in its form as inconsistency, can be instantiated not only between people's thoughts but also between their actions and practices. Marx says that people's ideas about their social practices and institutions reflect the

society they live in. Society is itself a human product, and its production and reproduction have to be seen partly in terms of the ideas that constitute the self-understanding of the members of that society. More specifically these ideas reflect and are instantiated in the surface features of the social structure, and thus form an ideology that obscures the underlying realities of that structure. Scientific critique of this ideology reveals that its appearance as consistent contradicts its own deeper nature: under examination it is revealed as confused and self-contradictory, and even in that 'reflects', though it does not assert, the confused and self-contradictory nature of the underlying social reality. In this way social science, in criticising other, ideological social theories and ideas as deeply contradictory, and so contradicting them, at the same time criticises as contradictory, and so contradicts, the society in whose structure those inconsistent and conceptually muddled theories and ideas are realised. Marx's critique of what he calls 'the system of bourgeois economy' attacks at one and the same time both the theories and concepts of political economy and capitalism itself.

It may be thought that this brief account fails to recognise that the Marxist dialectic is materialist, not idealist. My reply is that as a theory of society Marx's materialism asserts that what is basic in society is the economy - that part of the structure concerned essentially with the production of material goods and thus the satisfaction of material needs. That this 'material base' of social activities is inseparably interwoven with ideas is evident from the section of Capital on 'The Fetishism of Commodities'.

Thus the critical practice constituting Marxist social science involves practical opposition to the basic self-contradictions of capitalist society, its aim (and thus prediction) being the supersession of those contradictions. In two crucial ways, Marx's critique is not a moral or ethical critique, and its practice is not moral practice, at least as those notions have often been understood. First, its criticism is not of personal immoralities but of society's structural irrationalities. Second, it is not doctrinaire in supposing that the changes required can necessarily be effected by ideas alone, i. e. by the theoretical practice of reasoning with and exhorting people. Whatever morality is, in both ways Marxism is not morality as distinct from science: its central values are (and need only to be) those of reason, i. e. dialectic.

To conclude self-reflectively: if that is the role of science, what place is left for philosophy? Coupled with the descriptivist conception of science has been a view of philosophy as itself analytical and descriptive: philosophy can (in the end) only describe the structure of (scientific and other) language, and must leave everything as it is. But in this paper I have been doing philosophy: my aim has been also to show by example that just as science in general can and must be critical, and at an epistemologically basic level critical of existing concepts, and just as social science in particular can and must be critical of its object, society, so philosophy can and must be part of that same general project of social criticism, distinguished if at all only by the fundamentality of its target, the basic categories instantiated in society, in terms of which reality, including the social reality of science itself, is currently understood and shaped. I have criticised a dominant conception of science, and therefore a powerful tendency in the current social practice of science and the emerging technological society in which that conception and practice have a central role.