

Materialism, Realism and the Reflection Theory*

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I

The reflection theory is the traditional theory of knowledge of Marxism. It is this theory which is put forward by Engels and which is developed and defended at length by Lenin in *Materialism and Empirio-Criticism* [1]. The basic principles of this theory are simply stated and easily grasped. First of all, the reflection theory, in its Marxist version, is a variety of philosophical materialism. It is founded upon the metaphysical view [2] that there is a material world which exists independently of our consciousness of it; whereas consciousness, on the other hand, cannot exist independently of matter. On this basis, the reflection theory of knowledge holds that the material world is knowable by consciousness, because consciousness reflects material reality; and that the test of truth is practice.

These ideas have a great initial appeal. Indeed, to many people - particularly to those unfamiliar with philosophy - they will probably seem evident and obvious. And yet the reflection theory has been amongst the most controversial and disputed areas of Marxist philosophy. Indeed, it has been a view very widely held among philosophers, both inside and outside the Marxist tradition, that materialism in general and the reflection theory in particular, is a false and untenable position, and one which has long been discredited in the history of philosophy. The criticisms come from all sides and from writers who otherwise disagree about the most fundamental issues. Yet, when one examines this literature one cannot fail to be struck by the fact that a few simple and ancient idealist arguments, deriving from Berkeley and Kant, are repeated with monotonous regularity and regarded as decisive. My aim in this paper will be to show that materialism in the theory of knowledge, in the form of the reflection theory, can be developed so as to meet these objections and provide a satisfactory

account of the material world and of our knowledge of it.

At the outset, however, it must be acknowledged that the reflection theory as found in the traditional Marxist accounts *needs* developing - it will not do as it stands. In particular, there are inadequacies in Lenin's account of it in *Materialism and Empirio-Criticism* - inadequacies which Lenin himself came to recognise and acknowledge as a result of his study of Hegel [3]. In my account of the reflection theory, I, too, shall draw substantially on Hegel's philosophy. For, as I shall try to show, his philosophy provides the essential basis upon which the reflection theory can be developed in a satisfactory and fruitful way.

II

The reflection theory is no invention of Marxism. It is one of the traditional approaches in epistemology and has had a long history. During the course of this history, many different versions of the theory have been put forward, embodying virtually all the different main philosophical outlooks: there have been empiricist and rationalist versions, idealist and materialist ones. The first essential point to see, however, is that the Marxist theory of reflection is a distinctive, dialectical materialist, version, which does not merely repeat previous accounts. Failure to appreciate this has been at the basis of almost all the criticisms and objections which are aimed at Engels' and Lenin's work. Lenin, in particular, is regularly accused of naively and ignorantly reproducing Locke's theory of knowledge, and thereby laying himself open to the arguments by which Berkeley discredited and refuted it.

It is undeniable that Lenin's theory of knowledge shares features in common with Locke's. Lenin's account of reflection, like Locke's, is strongly

*A Note on Terminology

Since some of the key terms I use in this article have on occasions given rise to misunderstandings, an initial note of clarification may be helpful.

By 'realism', in what follows, I mean the view that there is a material world which exists independently of our consciousness of it and which can be known by consciousness. Realism, as thus defined, is a very widespread view and has been developed in many different forms (empiricist, rationalist, mater-

ialist, dualist). One particular form of realism is materialism in the theory of knowledge. However, the term 'materialism' has been so much abused in recent years that it often seems to signify no more than 'the theory I maintain (whatever that may be)'. I stress, therefore, that here I am using the term 'materialism' in its strict and philosophical sense, to mean the theory that consciousness does not exist independent of matter and that all reality is material. In this sense, I argue, Lenin is a materialist, and his theory of knowledge is a materialist form of realism. By contrast, Locke's realism and the recent

'scientific realism' of Bhaskar are dualistic forms of realism, since these philosophies both involve a rejection of philosophical materialism, and a dualistic distinction and separation of consciousness from matter, appearance from reality, etc.

In this article I try to show that such dualistic forms of realism cannot comprehend our knowledge of the material world. I argue for a materialist realism and try to indicate how this can be developed in a dialectical fashion to avoid the inadequacies and pitfalls of mechanical materialism in the theory of knowledge.

empiricist in character, and suffers from the defects and one-sidedness which are characteristic of this tradition. I shall come on to these problems presently. However, it is equally undeniable that there are fundamental and crucial differences between Lenin's philosophy and the classical empiricist version of the reflection theory as found in Locke. Lenin is a materialist, Locke a dualist and his realism takes a dualist form. Lenin has an excellent sense of dialectics, Locke's account is purely mechanical. These differences are crucial. Because of its dualism, Locke's theory is vulnerable to Berkeley's criticisms; whereas Lenin's dialectical and materialist understanding of reflection provides the basis for a response to Berkeley.

At the basis of Locke's epistemology and metaphysics is his theory of ideas. This is Locke's account of experience, the central term of empiricist philosophy. According to his theory, the immediate objects of consciousness and knowledge are ideas:

'The mind, in all its thoughts and reasonings, hath no other immediate object but its own ideas, which it alone does or can contemplate'

[4]

According to Locke, ideas are purely subjective, private, mental entities, distinct from the objective, material world, which exists independently of consciousness. Locke's philosophy thus involves a sharp metaphysical dualism between ideas and things, between the mental and the material realms. Dualism is also a feature of his theory of knowledge, which involves a rigid distinction between subjective appearances and the objective reality of things. In his account of knowledge, Locke begins by rejecting the theory of innate ideas and enunciating the empiricist principle that all our ideas and knowledge derive from experience. Through experience, however, I am directly presented with ideas and not things. I am immediately aware only of the subjective appearances which things present to me, not of their objective reality; I am aware of them as phenomena not as they are in-themselves. Locke thus rejects the philosophy of 'direct realism', the view that we have a direct and immediate awareness of objective reality. In its place he develops a version of the reflection theory of knowledge.

According to Locke, objects and forces in the external world act upon the senses; a stimulus is transmitted through the nervous system, eventually giving rise to ideas in consciousness. A physical process gives rise to a mental one, and the connection between them is causal and contingent [5]. We can have knowledge of the world because our ideas reflect or, in Locke's language, 'resemble' the objects which give rise to them [6]. Ideas of sensation are thus, for Locke, mental entities, which have the character of subjective appearances, reflecting and resembling the material objects independent of consciousness which give rise to them. In this way, Locke's philosophy involves both a metaphysical dualism of mind and matter and also an epistemological dualism between subjective appearances and objective reality.

Berkeley's response to Locke is both simple and devastating. He starts from the same basic assumption as Locke, embodied in the theory of ideas, that ideas and not things are the immediate objects of consciousness. Berkeley then proceeds to show that this assumption is incompatible with Locke's realism and with the reflection theory. If we are immediately aware only of our ideas, we can never have any basis for saying anything about the objective world, independent of them. Experience provides us no access to the world as it is in-itself - it informs us only of how the world appears to us.

'As for our senses, by them we have the knowledge

only of our sensations, ideas, or those things that are immediately perceived by sense, call them what you will: but they do not inform us that things exist without the mind, or unperceived, like those which are perceived. This the materialists [i.e. Locke] themselves acknowledge.'

[7]

Nor can we form any rational inferences about the material world independent of consciousness on the basis of experience, since, according to Locke, there is no necessary connection between it and our experience. As Berkeley says,

'I do not see what reason can induce us to believe the existence of bodies without the mind, since the very patrons of matter themselves do not pretend there is any *necessary connection between them and our ideas.*' [8]

And so, Berkeley concludes, Locke's realism and the reflection theory of knowledge are untenable. We must reject the idea of a material world independent of consciousness. Things are mere 'collections of ideas', constructions of appearances.

How can Berkeley's arguments be refuted? How can such idealism be rejected? Here we come to the parting of the ways between Locke's dualism and the dialectical materialist reflection theory of Lenin. For Berkeley's arguments really are valid and effective against Locke's dualist form of realism, which has no philosophical response to them. The theory of ideas, the view that we are immediately aware of ideas *and not* of objects in-themselves, creates an absolute and unbridgeable gulf between our experience and material reality. The realist view that we can have knowledge of the world of things independent of consciousness and the reflection theory are indeed incompatible with the dualistic separation of the subjective from the objective. Realism cannot be defended on the basis of such dualism. Berkeley is right about this. Berkeley's response is then to reject the reflection theory and the very idea of a material reality independent of consciousness, and opt instead for a purely subjective idealism. The lesson that the materialist should take from Berkeley, by contrast, is that a materialist theory of knowledge can be developed only if the dualistic presuppositions of the theory of ideas are abandoned.

Although he is all too rarely given credit for it, Lenin is very clear about this. In criticising idealism and dualism in the theory of knowledge, he makes the vital point that there is no gulf between the subjective and the objective. Yet these philosophies, which both rest upon the theory of ideas, have the effect of 'fencing off' appearances from things-in-themselves, and making the material world into an unknowable 'beyond' to consciousness.

'For every scientist who has not been led astray by professorial philosophy, as well as for every materialist, sensation is ... the direct connection between consciousness and the external world: it is the transformation of the energy of external excitation into a state of consciousness. This transformation has been, and is, observed by each of us a million times on every hand. The sophism of idealist philosophy consists in the fact that it regards sensation as being, not the connection between consciousness and the external world - not an image of the external phenomenon corresponding to the sensation, but as the "sole entity".' [9]

Hegel makes a very similar criticism of subjective idealism when he observes that it portrays consciousness as 'hemmed in by an impervious circle of purely subjective conceptions' [10]. Sensations, appearances, ideas are regarded as purely subjective entities, which cut us off from any possible contact

with things-in-themselves. Lenin, by contrast, insists that sensation is the contact and the connection of consciousness with the external world. Sensation, for Lenin (and indeed for Hegel), is the subjective form of appearance of the thing-in-itself, the form in which the thing-in-itself is immediately manifested to consciousness. The thing-in-itself is transformed in the process of sensation into the thing-for-us, into appearance. There is no barrier, no impassable gulf, between the object and the subject here. On the contrary, there is rather a constant process of transition and of transformation of the one into the other.

'In practice each one of us has observed time without number the simple and palpable transformation of the "thing-in-itself" into phenomenon, into the "thing-for-us". It is precisely this transformation that is cognition.' [11]

A materialist theory of knowledge must reject any dualistic, absolute and metaphysical distinction between appearance and reality, between the thing-for-us and the thing-in-itself. Lenin is absolutely clear about this: 'There is definitely no difference in principle between the phenomenon and the thing-in-itself, and there can be no such difference' [12].

As I have pointed out already, dualism can take both a metaphysical (ontological) and an epistemological form. In Locke these two aspects are confused and run together through his identification of ideas (a metaphysical concept) and appearances (an epistemological notion). The same tendency is apparent in Lenin, who is also inclined to identify sensations with appearances. This is an aspect of his empiricism. However, materialism must reject dualism in both these forms, and Lenin is well aware of this. Lenin thus insists not only that appearances must not be regarded as absolutely distinct from things-in-themselves; he equally makes the point that sensations must not be regarded as merely mental entities. Sensations, for Lenin, are not mere 'ideas', mere states of consciousness, they are also physical in nature. 'We think with the help of our brains', he says, and 'Consciousness is an internal state of matter' [13].

Lenin is an uncompromising materialist, both in his epistemology and in his metaphysics. In this respect his reflection theory has nothing in common with Locke's, and the charge that Lenin is simply repeating Locke, common as it is, is without foundation. But this point is not well understood, even by some of Lenin's would-be friends. David Ruben, for example, claims to be defending Lenin's views in his recent book called *Marxism and Materialism*. Despite the title, it soon becomes clear that Ruben would prefer the term 'realism' for the point of view he is defending, and it also becomes clear that he rejects, as 'reductive', the sort of materialism that Engels and Lenin defend.

'Marxist materialism, or realism, asserts the existence of *something* other than the mind and its contents, whereas reductive materialism claims that everything, including the mind and its contents, can be reduced to matter, or the physical' [14].

Here, as throughout the book, Ruben runs together realism and materialism. However, it is important to be clear that there are different forms of realism, some of them quite distinct from materialism, properly so-called. Specifically, Ruben's realism is not materialist in character - it is a form of dualism very similar to Locke's. Like Locke, Ruben believes in the existence of 'something' - presumably a material world - independent of consciousness. But materialism, as I have stressed, is a stronger philosophy than this: it goes on to insist that there is

no consciousness independent of matter. All reality is material; there is nothing in the world but matter in motion. Consciousness is matter organised and acting at its most complex and developed level. This is philosophical materialism; and it is quite explicitly rejected by Ruben. Moreover, in his epistemology Ruben also rejects materialism. Here, too, he is a dualist realist; and his attempt to portray Lenin's philosophy in these terms inevitably leads to a distortion of it. For, like Locke, Ruben insists that appearances are independent of things-in-themselves. The relation between appearance and reality is an external and contingent one.

'The relationship between a belief or a thought and the objects or real states of affairs which the beliefs are about is a contingent relationship' [15].

This is pure Locke. Once appearance and reality are separated in this fashion, and related only contingently to each other, an unbridgeable gulf is created between them, and Berkeley's objections become unanswerable.

The lesson that Marxists should learn from Berkeley is that reflection theory is not defensible in its dualistic, Lockean, form. There is no gulf or gap between appearance and reality; the relation between them is not a merely contingent one: they exist in unity. Ruben, however, has another way out. It is a mistake, he tells us, even to try to answer Berkeley. Materialism cannot ultimately be justified: 'There is no non-circular justification for belief in a material world' [16], he says. By this he means that it is impossible 'to justify the belief in a realm essentially independent of mind by reference to something else', such as sense-experience, which 'does not presuppose the existence of the mind-independent reality for which the justification is being sought' [17].

Ruben here poses the problem of justifying 'materialism' in terms which materialism rejects. These terms presuppose his own dualist realist outlook, and make the problem insoluble. If consciousness is divorced from the material world in dualistic fashion, then indeed knowledge of the material world by consciousness becomes inexplicable and impossible. This is merely Berkeley's argument re-stated. But the problem does not arise in this form for materialism, since materialism denies that consciousness *is* independent of matter.

Ruben, on the other hand, does face this problem. He makes short work of it, however: 'We eschew all attempts to justify, by non-question-begging arguments our belief in mind-independent objects. We merely begin with them' [18]. In other words, dogmatic assertion takes the place of argument at this point. And this dogmatism is justified in the following terms:

'Ultimately the choice between materialism and idealism is the choice between two competing ideologies. The choice is not an "epistemological" choice to be made on grounds of stronger evidence or more forceful argument, but is a "political" choice to be made on class allegiance' [19].

In short, blind political commitment is to replace rational and philosophical thought. This disastrous view of philosophy can be traced back to Althusser; for he, undoubtedly, has been the main exponent of such dogmatism in recent years. According to Althusser, philosophy is mere 'class struggle in the field of theory'. It has no 'object' and no 'history' [20]. Different philosophies are merely the ideological expression of different class outlooks. Questions of truth and of rational justification do not arise - all that is involved in doing philosophy

is commitment to a political line.

Of course, it is true that political issues are involved in philosophical positions. In defending materialism in philosophy one is defending one of the most basic aspects of the socialist outlook and attitude. However, the only effective and useful way of doing this is to show that materialism is a true and rationally defensible account of the world and of our knowledge of it. Mere dogmatic commitment, blind and irrational adherence by philosophers, even to the 'correct line', on the other hand, is not a help but a hindrance to the socialist cause.

In ancient China, a number of men always accompanied the army on its campaigns, to bang loud gongs and cymbals and to wave banners of ugly monsters at the enemy. The idea was that these unpleasant sights and sounds would frighten the enemy into submission. Some philosophers, it seems, have recently been trying to resurrect these primitive methods. By the use of ugly and heavy-sounding jargon they have been attempting to scare their opponents. But, just as in military affairs, so too in philosophy, it is the real forces brought to bear which are ultimately decisive. And ugly jargon, dogmatically asserted, while it may disconcert people, is ineffective as argument. Irrational noise-making is no help, and the resort to it is a disastrous rejection of what philosophy can, in fact, contribute to the 'class struggle in theory'. For philosophy can articulate the basic theoretical presuppositions of the socialist outlook, and give them rational justification and defence. In this way, philosophers can play an important role in the struggle for socialism and be of real service.

The conclusion so far, then, is that materialism must reject dualism, and insist on the unity of the subjective and the objective, of consciousness and matter. Lenin is very clear on this. However, to maintain the unity of these opposites does not entail their absolute identification, in such a way as to exclude all difference. For it is important to see that dialectical materialism equally rejects any *immediate* identification of thought and reality, it rejects the *reduction* of matter to thought or vice-versa. Such reductionism can take either an idealist or a materialist form. Materialism of an abstract and metaphysical kind is the result when thought is reduced to matter. In the theory of knowledge this takes the form of 'direct realism'. This is the view that reality is presented directly and immediately in appearance. Would that it were so! For, as Marx observed, 'all science would be superfluous if the outward appearance and essence of things directly coincided' [21]. The real nature of things would be immediately manifest, and no work of discovery or understanding would be required in order to gain knowledge.

Berkeley's subjective idealism, by contrast, involves the reduction of reality to appearances. Objects are mere 'collections' or, in more recent 'phenomenalist' versions of this philosophy, 'constructions' of ideas or sense-data [22]. Sometimes one meets the view that this philosophy is 'irrefutable'; but that is absurd. On the contrary, it is perhaps the least adequate and least plausible philosophy ever to have been put forward, and attempts to develop it by subsequent phenomenologists have been no more successful. It is an untenable philosophy for all the reasons given by Lenin in *Materialism and Empirio-Criticism*. It is based upon an untenable account of experience, as I have argued above. If consistently developed, subjective idealism leads to a denial of any knowledge of the objective world, of the past, of the future; indeed, of anything beyond the confines of our own immediate subjective impres-

sions. It leads, in other words, to pure solipsism, to the view that only my consciousness and its present state exist.

Dialectics in general, whether of a Marxist materialist or Hegelian idealist form, rejects both the dualistic and absolute separation of thought and matter, the subjective and the objective from each other; and also it rejects the reductionist collapse of either into the other. Dialectics, to be sure, asserts the unity of thought and matter; but not as an abstract, lifeless, metaphysical unity or identity which excludes all difference and contradiction. Thought and matter, appearance and reality, are opposites which exist in unity, and to allow for this we must reject the 'metaphysical either/or' [23] exemplified in the traditional alternatives of dualism and reductionism. The relation between these opposites is neither a mere identity nor a mere difference: rather we must recognise that thought and matter, the subjective and the objective, are *both* opposed (different) *and also* united (identical): they are opposites which exist in unity. And the process of knowledge is the process through which the unity of these opposites is realised:

'The whole point of scientific enquiry is to *establish* a harmony by *making* our thought conform to reality. A pre-established harmony would make the whole project of scientific experiment unnecessary. On the other hand a pre-established insulation of thought from reality would make science impossible' [24].

Mysterious and perplexing as this may sound when put in such abstract and logical terms, the fact of the opposition and identity of these terms is a familiar feature of experience. The opposition, the distinction, of thought and reality is to be seen in the fact that they do not always and necessarily coincide. Our ideas about reality can be mistaken and false. On the other hand, there is no impassable gulf or barrier between reality and thought. On the contrary, these opposites interpenetrate and pass into each other. Matter is transformed into thought, and thought into matter. The processes of perception and knowledge *are* the processes of the transformation of reality into thought. In knowledge we apprehend the objective world in thought, and thereby transform reality into ideas and thoughts. The opposite movement, from thought to reality, is present in practical activity; for in our actions, our consciousness, our intentions and purposes are given a material form, *realised* and embodied in things. The interpenetration of thought and reality is thus a familiar and everyday phenomenon, which may be observed even at the level of animal life. As Hegel so nicely puts it:

'Of a metaphysics prevalent today which maintains that we cannot know things because they are absolutely shut to us, it might be said that not even the animals are so stupid as these metaphysicians; for they go after things, seize them and consume them.' [25]

As Hegel here suggests, practical activity, the appropriation of the world, eating and drinking, are the most basic manifestations of the unity of consciousness and matter, and the basis upon which all subsequent developments of this unity rest.

'We have all reason to rejoice that the things which environ us are not steadfast and independent existences; since in that case we should soon perish from hunger both bodily and mental.' [26]

In eating and drinking we appropriate and incorporate the material world, and thus sustain our consciousness and subjective being. In perception and know-

ledge of the world we also appropriate the objective world and transform it into consciousness and thought. On the other hand, in practical activity we translate our subjective purposes and intentions into reality, we realise them and embody them in things. Here, in all our awareness and action, we have the concrete unity of consciousness and matter.

From the outset man's relation to nature takes this practical form. Conscious and articulate thought and knowledge develop only on this basis, as an extension of these essentially practical relations. Our relationship to the material objective world is first of all a practical and a material one. The idea that we are cut off from the things that surround us, things-in-themselves, comes from regarding human subjectivity and consciousness as purely mental, cut off not only from the external world, but equally from our own material and practical activity. This is what Marx is saying in the well known passage from his 'Notes on Wagner':

'With a schoolmaster-professor the relations of man to nature are not *practical* from the outset, that is, relations established by action; rather they are *theoretical* relations... But on no account do men begin by "standing in that theoretical relation to the *things of the external world*". They begin, like every animal, by *eating, drinking, etc.*, hence not by "standing" in a relation, but by *relating themselves actively*, taking hold of certain things in the external world through action, and thus satisfying their needs. (Therefore they begin with production.) Through the repetition of this process, the property of those things, their property "to satisfy needs", is impressed upon their brains; men, like animals, also learn to distinguish "theoretically" from all other things the external things which serve for the satisfaction of their needs. At a certain stage of this evolution, after their needs, and the activities by which they are satisfied, have, in the meantime, increased and developed further, they will christen these things linguistically as a whole class, distinguished empirically from the rest of the external world.' [27]

III

So far, I have been considering objections to the reflection theory which were put by Berkeley and which have been particularly influential within the empiricist tradition; and I have tried to show how the dialectical materialist approach provides the basis for a response to them. But this is not the end of the difficulties for the reflection theory. There are other objections, that raise even greater problems for the traditional Marxist account, which have been made from the rationalist and Kantian perspective. Lenin's account of the reflection theory, in *Materialism and Empirio-Criticism*, seems especially vulnerable to these objections, since it is so strongly empiricist in character.

Lenin's empiricism is evident in his tendency to equate knowledge with what is given in sensation. This reduction of knowledge to sensory data is characteristic of empiricism. And, as with the classical empiricist writers, Lenin tends to portray knowledge as a merely passive registration of what is immediately apparent to the senses. The very language that Lenin uses to describe the way in which our sensations reflect reality is strikingly passive and mechanistic: our sensations and ideas,

he says, are 'photographs', 'copies', 'images' of reality [28].

These metaphors are entirely inadequate to comprehend the relation of knowledge to its object. A photograph records merely the outward and immediately given appearances of particular things. Likewise, sensation presents us only with the outward appearance of particular things. However, there is much in human knowledge which is not given directly in the outward and immediate appearance of things. Much of our knowledge is not given in sensation and cannot be captured on a photograph. This has been stressed particularly by the rationalist philosophers, who have emphasised that thought plays an essential role in knowledge. In Hegel's words:

'The reality in object, circumstances or event, the intrinsic worth or essence, the thing on which every thing depends, is not a self-evident datum of consciousness, or coincident with the first appearance and impression of the object; ... on the contrary, Reflection [i.e. thought] is required in order to discover the real constitution of the object.' [29]



In particular, as Kant stressed, the elements of universality and necessity are not given immediately in appearance. Through sensation we are presented with a mere diversity of different appearances. That we come to interpret this diverse manifold of appearances as indicative of order and necessity in the world is the work of thought, which we bring to bear on our experience. As Hegel says,

'Nature shows us a countless number of individual forms and phenomena. Into this variety we feel a need of introducing unity: we compare, consequently and try to find the universal on each single case. Individuals are born and perish, the species abides and recurs in them all, and its existence is only visible to reflection [i.e. thought].' [30]

Likewise, necessity and law are not given immediately in experience. Our experience, rather, presents us with an apparently unrelated succession of distinct events. When we observe the planets, for example, we see them now here, now there. The necessary connections between these events, the laws and principles governing their movements, are not given to experience alone, but are discovered by thought.

'The universal does not exist externally to the outward eye as a universal. The kind as such cannot be perceived: the laws of the celestial motions are not written on the sky. The universal is neither seen nor heard, its existence is only for the mind.'

[31]

Universality and necessity are not features of the outward appearance of things. They are not given directly in experience. These aspects of our knowledge cannot be accounted for in terms of the direct reproduction in consciousness, in a photographic fashion, of what is given to the senses. Nor can we say, with Locke, that universality and necessity can be 'abstracted' from appearances. For experience tells us only of particulars, and no matter how extensive it is, it can never inform us of what is universally or necessarily the case. Claims to knowledge of what is universally or necessarily so clearly go beyond what can be given in any possible particular experience, and cannot therefore be 'abstracted' from it.

Our knowledge goes beyond what is directly given in experience, and it was Kant's view that 'going beyond' was the work of thought'. Our minds, argues Kant, are *active* in knowledge, actively interpreting and giving form and order to the data provided by the senses. Here we have the distinctively Kantian idea of knowledge as an 'instrument' which actively transforms the immediately given object. These ideas present the gravest difficulties for any reflection theory of knowledge. For, as Hegel says, we are faced with the problem that 'the application of an instrument to an object does not leave it as it is in-itself, but rather entails in the process, and has in view, a moulding and alteration of it' [32]. And this, indeed, is the basis for the Kantian rejection of the reflection theory. We are *active* in knowledge, we interpret and order the given sensory material, we apply categories to it. But in so doing, we necessarily alter it, and so 'produce' or 'create' something new: an 'object of knowledge' which, as in part our 'construct', must necessarily differ from the thing as it is in-itself. In this way, the process of knowledge, in Hegel's words, seems to 'bring about the opposite of what it intended' [33], and to construct an object of knowledge which is discrepant from the thing-in-itself, which it was the aim of knowledge to grasp. A gulf is thus created between the thing-in-itself, the 'real object', on the one hand, and the thing as it is grasped and known by us, the 'object of knowledge', on the other [34]. Our knowledge, Kant therefore argues, is necessarily confined to appearances, and we can never gain knowledge of things-in-themselves.

These Kantian arguments have exerted an enormous influence on contemporary philosophy; and understandably so, since they bring into focus the active role of thought in our knowledge. In the light of these considerations, one must certainly recognise the inadequacy of the passive and mechanical account of reflection implied by some of Lenin's formulations. Many philosophers would go further than this, however, and argue that an appreciation of these points must lead to the rejection of the reflection account of knowledge altogether. This was certainly Kant's response: he insists that our knowledge is confined to appearances and can never grasp the thing-in-itself. So here again we come against the problem of dualism. For Kant's philosophy, like Locke's, also involves an unbridgeable separation, a gulf, between appearances and things-in-themselves; with things-in-themselves placed irretrievably beyond the grasp of our knowledge.

Although Lenin, in *Materialism and Empirio-Criticism*, is quite clear about the dualist and idealist character of this Kantian account of knowledge, he does not there develop any satisfactory response to it. This is because the account of knowledge he gives in that work is so strongly empiricist in character. As I have stressed already, he tends to identify knowledge with sensation, and to regard

reflection in passive and mechanical terms. As a result, he fails to acknowledge the active role of thought in knowledge. However, I now want to argue that due recognition can be given to the active role of thought in knowledge, without abandoning the reflection theory and the materialist approach in epistemology. Lenin himself came to recognise this, after writing *Materialism and Empirio-Criticism*, in the course of reading Hegel's *Logic*; and it is not surprising that reading Hegel should have brought this home to him, since Hegel makes this point with unparalleled clarity and force in his criticisms of Kant.

Hegel accepts Kant's argument, that active thought - the theoretical interpretation and transformation of the materials of experience - plays an essential role in the process of knowledge. But he rejects the Kantian idea that thought and interpretation are purely *subjective* forms, something that we impose on our knowledge and which takes us away from the object-in-itself. In other words, he rejects the Kantian idea that our thought, our interpretations, our theories, act as a barrier between us and the world as it is in-itself. Hegel makes this point against Kant in the following terms:

'To regard the categories as subjective only, i.e. as part of ourselves, must seem very odd to the natural mind.... It is quite true that the categories are not contained in the sensation as it is given to us. When, for instance, we look at a piece of sugar, we find it hard, white, sweet, etc. All these properties we say are united in one object. Now it is this unity that is not found in the sensation. The same thing happens if we conceive two events to stand in the relation of cause and effect. The senses only inform us of the two several occurrences which follow each other in time. But that the one is cause, the other effect - in other words, the causal nexus between the two - is not perceived by sense; it is evident only to thought. Still, though the categories such as unity, or cause and effect, are strictly the property of thought, it by no means follows that they must be ours merely and not also characteristic of the objects. Kant however confines them to the subject-mind...' [35]

The contribution of thought, in other words, is not merely subjective. Thought and theory do not cut us off from the objective material world; again, it is 'the sophism of idealism' to regard it so. On the contrary, as Lenin says,

'Essentially, Hegel is completely right as opposed to Kant. Thought proceeding from the concrete to the abstract - provided it is *correct*... - does not get away from the truth but comes closer to it. The abstraction of *matter*, of a *law* of nature, the abstraction of *value* etc., in short *all* scientific (correct, serious, not absurd) abstractions reflect nature more deeply, truly, *completely*.'

[36]

The mind is certainly active in the process of knowledge, interpreting experience, forming theories, but Lenin makes the essential point here when he stresses that thought does not thereby, as at first appears, cut us off from the thing-in-itself; rather it helps us to grasp and understand reality more fully and more completely. The 'object of knowledge' that we construct theoretically with the aid of thought is not, or ought not to be, entirely different or discrepant from the real object, from the object as it is in-itself. Rather, we seek, with the aid of theoretical understanding, to reflect the nature of things-in-themselves 'more deeply, truly,

completely'. Thought is the means by which we can penetrate beyond immediate appearances and the given data of the senses, and grasp the essential and underlying reality of things. In this way it is possible to acknowledge the Kantian insight that thought contributes actively to knowledge, and yet resist the idealist implications that Kant, and so many other philosophers, have sought to draw from it. Indeed, it is possible to use Kant's important insight to deepen and strengthen the reflection theory, and the materialist theory of knowledge.

The significance of these ideas is profound and important. In saying that the interpretations and theories that make up our knowledge can provide a correct reflection of the objective world as it is in-itself, one is saying something with important implications about the nature of the world in-itself. If scientific theory reflects reality, then reality must be as described in theory. In particular, the universality and necessity which are a part of our account of the world must really be in the world, as inherent features of the world as it is in-itself. The division of the world into different kinds and species, the necessary and law-like behaviour of things, must be features of reality in-itself, and not the mere impositions of our thought. In saying this, one is taking issue with two widely influential opposing views on these matters. First of all, one is rejecting the Kantian idea that interpretations and categories are merely subjective forms which we impose on the given data, our 'way of seeing things'; and secondly, one is rejecting the empiricist view that the world is made up of unrelated particulars, or particular 'ideas' or appearances, and that kinds (universals) and laws (necessities) are only convenient 'abbreviations' for 'collections' or series of such particulars. On the contrary, universality and necessity are not the merely subjective creations of our minds, they are rather the inherent characteristics of things-in-themselves, which exist independently of our thought.

There are natural kinds and natural necessities. Contrary as such ideas may be to some deeply ingrained philosophical assumptions, these materialistic views are common within the sciences, where, as Hegel says,

'objective reality is attributed to laws, forces are immanent, and matter [is regarded as] the true nature of the thing itself.... Genera, too, ... are not just a grouping of similarities, an abstraction made by us; they not only have common features but they are the object's own inner essence.... Physics looks upon these universals as its triumph.'

[37]

Only a few years ago these ideas would have seemed outlandish and extravagant; but recently there has been a widespread renewal of interest in the notions of natural kinds and natural necessities. Within the Marxist tradition this has been due particularly to the work of what may be termed various 'structuralist realists' [38]. Bhaskar and Godelier will serve as my examples [39]. Both insist that universality and necessity have objective existence, embodied in real 'mechanisms' (Bhaskar) or 'structures' (Godelier). However, these mechanisms or structures are not directly present to the senses. Characteristic of these writers is their extreme hostility to empiricism and to the idea that experience can be a source of knowledge. The senses, they argue, give us knowledge only of the world of appearances, the empirical world; but this must be sharply distinguished from the level of 'reality' at which mechanisms and structures operate. Bhaskar, for example, talks of structures and mechanisms as 'transcendent' and as 'transfactual' [40] entities, and repeatedly emphasises their indep-

endence from the empirical world, the world of experience. Godelier, likewise, puts all the stress in his account on the distinction and the separation of the structural level from the world of appearances. The appearances we apprehend with our senses, he insists, *conceal* these real structures; and so scientific theory must simply reject and put aside these sensory appearances in order to grasp reality -

'The scientific conception of social reality does not "arise by abstraction" from the spontaneous or reflected conceptions of individuals. On the contrary, it must destroy the obviousness of these conceptions in order to *bring out* the hidden internal logic of social life. Therefore, for Marx, the model constructed by science corresponds to a reality concealed beneath visible reality.'

[41]

The dialectical materialist reflection theory, as I have been explaining it, clearly shares much in common with such structuralist 'realism'. In particular, it also insists that scientific and correct knowledge reflects the real nature of things: laws and kinds have an objective existence; they are not the mere creations of our subjective activity. However, the structuralist realists that I am considering go too far in their eagerness to emphasise that such laws and kinds are not directly present in experience. They stress the *distinction* of appearances from reality in a one-sided and metaphysical fashion. They create an absolute gulf, an unbridgeable duality, between appearances and reality. Reality is put ungraspably beyond appearances; it is regarded as something *merely* in-itself and not also for-us, and knowledge of it becomes impossible and incomprehensible.

Such realism, which is a rationalist form of realism, thus shares with the Lockean, empiricist sort of realism considered earlier, a dualistic basis. And, as I argued earlier, dualism, although it acknowledges the existence of the material world independent of consciousness, cannot explain our knowledge of it. Once an absolute gulf and distinction is presupposed between appearance and reality, there is no way in which we can gain knowledge of reality starting out from appearances. It is impossible to develop a satisfactory theory of knowledge on the basis of dualistic assumptions. Rather, it is essential to recognise the *dialectical* relation of appearance and reality. There is no absolute gulf between these opposites - they exist in unity - they interpenetrate and pass into each other. This is the essential point that Hegelian and materialist dialectics makes.

Dualist realism involves an unsatisfactory account of appearance and reality and of the relation between them. Reality and appearance are each regarded as self-contained realms, isolated and detached from each other. It is true, as the dualist realists insist, that the reality of things is not directly and immediately apparent. Reality is different from appearance; appearances conceal reality. That is true - provided that this point is not emphasised in a one-sided and exclusive fashion, and it is also and equally acknowledged that reality is *revealed* to us in and through appearances. Appearances *both* conceal and reveal reality - only by recognising both aspects here can we properly understand the relation between them.

First, as regards reality: it is only because reality does manifest itself to us, and reveal itself as appearance, that we can gain knowledge of it. If appearances were *merely* different from reality, and did not also *reveal* reality, we could have no way of knowing reality through experience. Scientific

discovery would be impossible. Reality does not forever remain 'beyond or behind appearance'. Material things, and the forces and tendencies at work in them, certainly have a being in-themselves, independently of our knowledge and consciousness of them. But equally they can impinge on us. Reality does not stay shut up in-itself - it 'shines forth' [42], and manifests itself as appearance.

Similar points can be made with regard to appearances. As Hegel says, 'appearance is not to be confused with a mere show' [43]. Appearance should not be regarded as *mere* appearance, cut off from the reality of things-in-themselves. Initially, we may take the immediate appearances that things present for their reality. But gradually, through the process of knowledge, we come to distinguish appearances from reality. When we have done this, we come to understand appearances, not as mere appearances, but as appearances which reveal the reality which underlies them and which is manifest in them. We understand them as appearances of this reality. In this way, we come to understand how our subjective ideas reflect the reality of the objective world.

It is Hegel who put these points most clearly and fully, and in so doing provides the necessary philosophical basis for an adequate reflection theory of knowledge. He rejects Kantian and other forms of dualism for the way in which it attaches to 'appearance a subjective meaning only, and put(s) the abstract essence immovably outside it as the thing-in-itself beyond the reach of cognition' [44].

As well as concealing reality, appearances reveal reality. In other words, and in this sense, appearances reflect reality. And it is important to see that this is a *necessary* relationship which applies to *all* appearances, all ideas, all thought - false as well as true. True ideas may be distinguished from false ideas in terms of the particular way in which they reflect or correspond to reality - but not in terms of whether they do so or not. If the relationship between appearance and reality, the subjective and the objective, is regarded as a merely contingent one, then we are back to dualism. Indeed, the view that this relationship is a purely contingent one is simply the logical expression of dualism. Dialectics regards the relationship of appearance and reality as a necessary one. Reality *must* appear and 'shine forth'. Hegel puts this in theological terms when he says: 'all that God is he imparts and reveals' [45]. In other words, reality is knowable by us, it is not a 'beyond' to us. Moreover, there are no *mere* appear-

ances. There are no *absolutely* false ideas - all beliefs which are genuinely entertained reflect and reveal *some* aspect of reality - it is only a question of interpreting and understanding them correctly.

These are, indeed, the views which are implicit in Marx's account of ideology. For example, Marx clearly regarded the religious view of the world as a false and mystified one, 'the opium of the people'; and yet he did not regard religious ideas as *merely* false, merely illusory ones. Religious ideas, he insists, arise out of specific social and historical conditions, which they reflect. They reflect and give expression to real and genuine aspirations of the people who hold them, be these reactionary or progressive, albeit in mystified form. 'The religious world is but the reflex [i.e. reflection] of the real world', says Marx [46]. Moreover, religious and ideological reflections will continue to hold sway until social conditions have changed in such a way that 'the practical relations of everyday life offer to man none but perfectly intelligible and reasonable relations with regard to his fellowmen and to Nature' [47]. To see religious ideas as mere illusions, as mere subjective and false appearances, is a superficial and inadequate view. And yet this is the highest insight attainable by dualist realism. Dialectical materialism, by contrast, is capable of grasping 'the positive in the negative' [48] and seeing the way in which ideology both conceals and reveals reality.

Similar points can be made even about dreams, as Freud's work shows; and this is particularly significant, since dreams are regarded by Descartes, and by many philosophers since, as the paradigm case of mere subjective delusion. For Descartes dreams are *mere* appearances, merely false and illusory visions to which no reality corresponds. Freud showed, however, that the appearances which dreams present - their 'manifest content' - are not mere appearances, purely subjective delusions or simply false ideas. The manifest content of dreams, what is immediately apparent in them to the dreamer, can be *interpreted*. It can be understood as the (distorted) appearance of reality. The dream, according to Freud, is a reflection of real - though often unconscious - wishes, desires, reactions and feelings of the dreamer, usually responses to events of the previous day. Dreams are thus 'the royal road' to the unconscious [49]. But they reflect this reality in distorted form; they *need* interpreting. In this way, dreams, too, both reveal and conceal reality. The dream is thus the distorted reflection of aspects of the dreamer's reality. The dream is thus the distorted reflection of aspects of the dreamer's reality, whose very distortions, even, reveal facts about the (unconscious) wishes and desires of the dreamer [50].

Moreover, even 'purely subjective' feelings and sensations must be seen as reflecting objective reality. Pain, for example, which has, since Wittgenstein, become the central philosophical example of subjective sensation, reflects the reality of our physical being. It is also a very important means by which we come to know about and react to features of external world. Thus even pain is not a *purely* subjective feeling, but reflects the objective reality of our physical condition. Indeed, pains play an important role in medical diagnosis on just this basis.

All ideas and subjective states reflect reality. This is the materialist position. As Lenin says, 'there is definitely no difference in principle between the phenomenon and the thing-in-itself' [51]; there is no impassable gulf between appearance and reality: they form a unity. And this unity is an existing fact - not an ideal, which merely ought to be. In saying this, of course I am not saying that

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all ideas are true, and that all knowledge complete. Ideological illusions, dreams, etc., reflect reality, but they do so in an inadequate, mystified, distorted and false form. Of course, illusions and false ideas must be criticised and rejected as false and illusory. But one understands very little of religion and dreams if all that one knows of them is that they are false. The realist theories of knowledge that I have been criticising go no further than this. The dialectical materialist theory, however, seeks to understand these false ideas as reflections of reality. It seeks to interpret and understand the meaning of religion, the significance of dreams - it seeks to critically appropriate their true content within their false form - it seeks 'the positive in the negative'. And beyond this it seeks to understand the material conditions which make consciousness take these false and distorted forms.

IV

So far I have discussed the materialist criticism of Kantian dualism in epistemology. However, materialism must also reject the metaphysical dualism involved in Kant's philosophy. As with Locke, so with Kant, the two sorts of dualism are intimately connected. In Kant, however, we find not only a mind/matter dualism, but also a dualistic distinction of reason and nature.

According to Kant, as we have seen, our ability to interpret our sensations, to apply categories to them, is a necessary condition for us to have experience and knowledge. Sensation, for Kant, is a merely particular reaction to a particular present object; whereas the identification, recognition and interpretation of the things presented in experience requires the use of concepts and categories, the employment of our faculties of understanding and reason. In Kant's famous phrase, 'intuitions without concepts are blind...' [52]. Moreover, it was Kant's view that only human beings have these rational capacities and abilities: he regarded human beings as essentially rational beings and, as such, distinct from the rest of natural creation. Thus Kant's philosophy involves a sharp distinction and division between the rational sphere of the human world and the rest of nature.

Of course it is indisputable that human beings have rational powers which set them apart from other creatures. And yet materialism insists that there is no absolute gulf or separation between man and nature. Man is a part of nature, the product of the natural processes of biological evolution. This is the modern scientific view, the materialist view, and the only tenable view. Any attempt dualistically to divide off the human world from the natural world must therefore be rejected.

It is true that human beings are the only creatures capable of self-conscious experience (experience in which, in Kant's words, the 'I think' accompanies my representations) [53]; and the only beings that have developed language to describe and communicate their experience. Nevertheless, it is clear that animals have capacities which deserve to be called rational ones by Kantian standards. In particular, if experience and knowledge presuppose rational capacities, as Kant argues, then since animals can have experience and knowledge, it must be recognised that they too have these capacities. A dog, for example, can 'interpret' its experience. It can recognise its food, its home, its owner. It can identify and categorise the objects in the world around it. It can also form 'expectations' and causal 'hypotheses' - it can, for example, show that it expects to be fed or taken out for a walk. The view implied by the Kantian philosophy, that animals are merely sensory organisms which make only parti-

cular responses to particular situations, is quite untenable.

In arguing thus, I find an unaccustomed ally in Popper. Particularly in his recent work, he has developed similar ideas in fruitful and interesting ways. He writes, for example,

'Observation is always selective. It needs a chosen object, a definite task, an interest, a point of view, a problem... "A hungry animal", writes Katz, "divides the environment into edible and inedible things. An animal in flight sees roads to escape and hiding places"... The theory of inborn *ideas* is absurd, I think; but every organism has inborn *reactions* and *responses*; and among them, responses adapted to impending events. These responses may be described as "expectations" without implying that these expectations are conscious. The newborn baby "expects" in this sense to be fed. In view of the close relation between expectation and knowledge we may even speak in quite a reasonable sense of "inborn knowledge".' [54]

According to Popper, our rational capacities and our knowledge have a biological basis, and the developed forms of theoretically articulate knowledge are grounded in simpler and more primitive material forms. Popper even extends this account to plant life:

'Animals and even plants are problem solvers... The tentative solutions which animals and plants incorporate into their anatomy and their behaviour are biological analogues of theories; and vice versa: theories correspond to endosomatic organs and their ways of functioning. Just like theories, organs and their functions are tentative adaptations to the world we live in.' [55]

Indeed, even at the inorganic level, there are reactions and responses akin to those that Popper points to. It is wrong to imagine that the natural world is made up of mere particulars and particular reactions. As Hegel says, and as I have argued, 'Reason or Understanding is in the world' [56], in the sense that, even in the world of inanimate objects, things respond in *law-like* ways. For causality, it must be stressed, is law-like behaviour: the regular reaction of *kinds* of things to *kinds* of conditions. Litmus paper, for example, turns red in acid: it responds in a particular sort of way in a specific sort of condition. A burglar alarm goes off when the door is opened. Even purely physical and chemical reactions can exhibit what Rorty calls a 'discriminative response' [57]: a response which is ordered and governed by *universals*. This is the sort of reaction which Kant's philosophy suggests requires the use of the categories. Litmus paper responds to the universals of acidity and alkalinity. What this shows, as I have argued already, is that the categories of acidity and alkalinity are *objective* ones: not merely our 'interpretations', our 'way of seeing things', still less those of the litmus paper, but inherent features of things-in-themselves.

Clearly it would be absurd to attribute categories and concepts to litmus paper or to a burglar alarm; and I must emphasise that this is not what I am suggesting. Nor is it Hegel's meaning when he says that 'reason is in the world', as he insists:

'*Nous* ... or Reason rules the world ... but not an intelligence in the sense of an individual consciousness, not a spirit as such. These two must be carefully distinguished. The motion of the solar system proceeds according to immutable laws; these laws are its reasons. But neither the sun nor the planets ... have any conscious-

ness of them.' [58]

Nonetheless, to repeat, a burglar alarm, litmus paper, and the solar system, show that sort of behaviour that Kant and Hegel regard as the exclusive prerogative of thought and reason. In pointing this out, I am not, like Hegel, seeking to suggest that the natural world is animated by thought and reason; rather, I am arguing that our rational abilities and capacities are continuous with, arise from, and are animated by, the natural behaviour of things. Our rational thought and activity is a development of simpler and more primitive biological and physical responses - it requires no appeal to supernatural mental faculties to explain and understand it. In other words, my purpose is not the Hegelian one of spiritualising nature; it is rather the materialist one of naturalising reason.

If Popper is strange company for me to be keeping, how much stranger is this company for him! For, though he may be loath to admit it, what is this line of thought but Hegel's idea that 'reason is in the world', materialistically inverted? Nature is at the basis of reason. There is no gulf between the natural world and the world of reason. On the contrary, our rational powers and capacities are built upon, and presuppose, natural and biological forms of response. In human life, to be sure, reason is developed to much higher forms than exist elsewhere in nature. It is developed to the point of self-conscious and articulate thought and knowledge. However, the philosophy of materialism insists that these distinctively human forms of rational activity are ultimately developments of forms of activity which, in less developed forms, pervade the material world.

'What is rational is actual and what is actual is rational' [59]. There is an important degree of truth in these notorious Hegelian assertions. Hegel, however, develops these ideas in an idealist form. Indeed, his philosophy is ultimately an extravagant sort of idealism, best seen as a sort of pantheism (even though Hegel himself rejected the term). Reason, for him, is 'in the world' and 'actual', not only in the sense that the world is rationally ordered and intelligible in rational terms, but also in the sense that the material and objective world is, for Hegel, the product, the expression, the 'self-alienation' of the 'Idea', of reason. Marx's materialism is the very opposite of this: it inverts this philosophy and turns it 'on its feet':

'For Hegel, the life-process of the human brain, i.e., the process of thinking, which, under the name of "the Idea", he even transforms into an independent subject, is the *demiurgos* [the creator] of the real world, and the real world is only the external, phenomenal form of "the Idea". With me, on the contrary, the ideal is nothing else than the material world reflected by the human brain, and translated into forms of thought.'

[60]

Popper, on the other hand, is extremely hostile both to Hegel's philosophy and to its Marxist inversion. Although he develops the idea of a natural and biological basis for reason, he never fully explores the implications of these metaphysical views. When it comes to the theory of knowledge, they are forgotten, and Popper reverts to his own brand of Kantian-style dualism. He is particularly opposed to the reflection theory; and it is on these grounds that he rejects the Hegelian assertion of the unity of reason and actuality, which he dismisses as 'the worst of all absurd and incredible philosophical theories' [61]. However, it is not the reflection theory which is really 'absurd and incredible', but rather Popper's own.

Popper's account of Hegel's philosophy is little better than caricature. According to Popper, the problem which Hegel sets out to answer is: 'How can mind grasp the world?' Hegel's answer, says Popper, "'Because the world is mind-like" [i.e. the actual is rational] has only the appearance of [being] an answer. We shall see clearly that this is not a real answer if we only consider some analogous arguments like "How can the English language describe the world?" - "Because the world is intrinsically British".'

[62]

This is crude stuff. Nonetheless, Hegel does essentially argue that we can use reason to know the world because the world is rational. The materialist, as I have said, would see the reflective relationship here as the opposite, the inverse, of this: thought can grasp the world because our thought is made world-like. Popper, however, rejects the reflection theory in all its forms, using the Kantian kinds of argument that I have criticised above. For example, he takes Sir James Jeans to task for being troubled by the question 'How can mathematics grasp the world?' and for answering 'Because the world is mathematical'. Jeans, he says, was puzzled by the fact that purely *a priori* and rational mathematical ideas can have application to the physical world. According to Popper, Jeans is being misled here by the error of 'inductivism'. For Popper's view is that it does not matter how a theory is arrived at. What matters is whether it has application and is empirically testable; and often, Popper claims, useful theories are arrived at purely speculatively.

However, the questions that worried Jeans are not as fruitless as Popper suggests. To be sure, Jeans was a rationalist and an idealist; and his account must be 'turned on its feet'. It is not so much that the world is mathematics-like; rather, mathematics is, or rather has been made, world-like. Mathematics can be applied in physical theory so that it reflects reality. That it does so is the product, the result, of a long process of practical activity and thought - it is a human achievement. If one looks at the actual historical development of mathematics, one sees at once that its early development was neither purely rational and *a priori*, as Jeans suggests; still less was it the result of mere speculative 'conjectures', as Popper would have it. It has its origins in the empirical and practical operations of counting, measuring, surveying and assessing. The experience and results of these operations are first generalised in empirical and pragmatic rules of calculation for particular operations, and only later are they formalised into abstract and *a priori* systems [63]. As Engels says,

'Pure mathematics deals with the space forms and quantitative relations of the real world - that is, with material which is very real indeed. The fact that this material appears in an extremely abstract form can only superficially conceal its origin from the external world. But in order to make it possible to investigate these forms and relations in their pure state, it is necessary to separate them entirely from their content, to put the content aside as irrelevant.... Even the apparent derivation of mathematical magnitudes from each other does not prove their *a priori* origin, but only their rational connection.... Like all other sciences, mathematics arose out of the *needs* of men; from the measurement of land and the content of vessels, from the computation of time and from mechanisms. But, as in every department of thought, at a certain stage of development the laws, which were

abstracted from the real world, become divorced from the real world, and are set up against it as something independent, as laws coming from outside, to which the world has to conform.' [64] In other words, mathematics is not a mere guess, a mere speculative 'conjecture', which fits the world and reflects reality purely by chance, as Popper suggests. This surely is the most incredible and absurd account. On the contrary, it is the outcome of a lengthy process of experiment and practice, and

the attempt to sum this up in general and theoretical terms. Mathematics can grasp reality because, through this process, mathematics has been made to reflect the world. Such is the nature of mathematical knowledge of reality, and of other knowledge too. It is only in these terms, the terms of the reflection theory, that knowledge can adequately be understood. This is what I have been trying to show in this paper.

Footnotes

- 1 Engels, *Ludwig Feuerbach and the End of Classical German Philosophy*, in Marx and Engels, *Selected Works in One Volume*, Lawrence & Wishart, London, 1970; and Lenin, *Materialism and Empirio-Criticism*, Foreign Languages Press, Peking, 1972.
- 2 Here and below, I am using the term 'metaphysical' purely descriptively, to denote a particular branch of philosophy, rather than pejoratively.
- 3 Lenin's studies of Hegel (1914-16) are recorded in his *Philosophical Notebooks*, in *Collected Works*, Vol. 38, Foreign Languages Publishing House, Moscow, 1961. That his reading of Hegel led him to develop and modify his earlier views is clearly apparent. Lenin himself implicitly acknowledged this when he wrote, for example, 'Concerning the question of the criticism of modern Kantianism, Machism, etc.... Marxists criticised (at the beginning of the twentieth century) the Kantians and Humists more in the manner of Feuerbach (and Büchner) than of Hegel.' (p.179)
- These Marxists presumably included the Lenin of *Materialism and Empirio-Criticism* (1908). However, the suggestion that Lenin entirely repudiated the reflection theory on reading Hegel is quite clearly false. For the evidence, see, e.g., J. Hoffman, *Marxism and the Theory of Praxis*, Lawrence & Wishart, London, 1975: Chapter 5; and D.H. Ruben, *Marxism and Materialism*, Harvester, Brighton, 1977, Chapter 6.
- 4 Locke, *Essay Concerning Human Understanding*, IV.i.1.
- 5 Cf. Locke, *Essay*, II.vii.12: 'If then external objects be not united to our minds when they produce ideas therein and yet we perceive such of them as fall under our senses it is evident that some motion must be thence continued by our nerves to the brains ... there to produce in our minds the particular ideas we have of them.'
- 6 In fact, for Locke, only the ideas of Primary Qualities reflect the object. Cf. *Essay*, II.viii.15: 'The primary qualities of bodies are resemblances of them, and their patterns do really exist in the bodies themselves; but the ideas produced in us by ... secondary qualities have no resemblance of them at all. There is nothing like our ideas existing in the bodies themselves.'
- 7 Berkeley, *A Treatise Concerning the Principles of Human Knowledge*, Section 18.
- 8 *idem*.
- 9 Lenin, *Materialism and Empirio-Criticism*, p.46.
- 10 Hegel, *Logic* (*Encyclopaedia of the Philosophical Sciences*, Part I), trans. W. Wallace, Clarendon Press, Oxford, 3rd Edition, 1975: Section 131 (Addition); p.188.
- 11 Lenin, *Materialism and Empirio-Criticism*, p.132.
- 12 *ibid.*, p.110.
- 13 *ibid.*, p.90.
- 14 D.H. Ruben, *Marxism and Materialism*, p.5.
- 15 *ibid.*, p.3.
- 16 *ibid.*, p.99.
- 17 *ibid.*, p.98.
- 18 *ibid.*, p.99.
- 19 *ibid.*, p.109.
- 20 L. Althusser, *Lenin and Philosophy and Other Essays*, NLB, London, 1971.
- 21 Marx, *Capital*, Vol.III, Progress Publishers, Moscow, 1971, p.817.
- 22 See, e.g. A.J. Ayer, *The Problem of Knowledge*, Penguin Books, Harmondsworth, 1956, Chapter 3.
- 23 Hegel's phrase, see *Logic*: section 32 (Addition); p.52.
- 24 A. Collier, 'In Defence of Epistemology', in J. Mepham and D.H. Ruben (eds.), *Issues in Marxist Philosophy*, Vol.3, Harvester, Brighton, 1979, pp.84-85. Disappointingly, the bulk of this article does not develop this point, but takes instead a Kantian 'realist' line of the kind criticised below.
- 25 Hegel, *Philosophy of Nature* (*Encyclopaedia of the Philosophical Sciences*, Part II), trans. A.V. Miller, Clarendon Press, Oxford, 1970, Section 246 (Addition), p.9.
- 26 Hegel, *Logic*, Section 131 (Addition), p.188.
- 27 Marx, 'Notes on Wagner', in *Texts on Method*, (ed.) T. Carver, Basil Blackwell, Oxford, 1975, p.190.
- 28 See, e.g., p.145.
- 29 Hegel, *Logic*, Section 21 (Addition), p.33.
- 30 *ibid.*, Section 21 (Addition), p.34.
- 31 *idem*.
- 32 Hegel, *Phenomenology of Mind*, trans. J.B. Baillie, revised 2nd edition, George Allen and Unwin Ltd., London, 1949, p.131.
- 33 *idem*.
- 34 The terminology of the 'real object' and the 'object of knowledge' is used by Althusser. See L. Althusser and E. Balibar, *Reading Capital*, NLB,

- London, 1970, Part I.
- 35 Hegel, *Logic*, Section 42 (addition), p.70.
- 36 Lenin, *Philosophical Notebooks*, p.171.
- 37 Hegel, *Philosophy of Nature*, Section 246 (Addition), p.10.
- 38 But see also S. Kripke, *Naming and Necessity*, Harvard University Press, Cambridge, Mass., 1980, for an extremely interesting exploration of these ideas in a non-Marxist context.
- 39 R. Bhaskar, *A Realist Theory of Science*, Leeds Books, 1975. M. Godelier, 'Structure and Contradiction in Capital', in (ed.) R. Blackburn, *Ideology in Social Science*, Fontana/Collins, London, 1972.
- 40 For 'transcendent', see Bhaskar, *op.cit.*, p.37; for 'transfactual', see p.14, etc.
- 41 M. Godelier, *op.cit.*, p.337.
- 42 Hegel, *Logic*, Section 313 (Addition), p.186.
- 43 *ibid.*, Section 131 (Addition), p.187.
- 44 *idem*.
- 45 Hegel, *Logic*, Section 140 (Addition), p.198.
- 46 Marx, *Capital*, Vol.I, Foreign Languages Publishing House, Moscow, 1961, p.79. This sentence is unaccountably missing from the Penguin edition, p.172.
- 47 *idem*.
- 48 According to Hegel, 'The grasping of opposites in their unity or of the positive in the negative.... [This] is the most important aspect of dialectic, but for thinking which is as yet unpractised and unfree it is the most difficult.'
- 49 Freud, *The Interpretation of Dreams*, trans. J. Strachey, Allen & Unwin, London, 1954, p.608.
- 50 Freud's well-known distinction between 'psychical' and 'material' reality does not invalidate my point here. For example, in his *Introductory Lectures on Psychoanalysis*, trans. J. Strachey, Penguin Books, Harmondsworth, 1974, p.415, Freud writes: 'Phantasies possess psychical as contrasted with material reality; and we gradually learn to understand that in the world of the neuroses it is psychical reality which is the decisive kind.' Of course, there is a distinction between 'material' reality (what actually happens) and 'psychical' reality (what is believed or remembered to happen - i.e. how events appear [consciously or unconsciously] to the person). But the question with which the reflection theory is concerned is the question of how psychical reality arises and how it is related to material reality. Summing up Freud's attitude to this question, J. Laplanche and J.-B. Pontalis write in *The Language of Psychoanalysis*, Hogarth Press and the Institute of Psychoanalysis, London, 1980, pp.406-07, 'Freud could never resign himself to treating phantasy as the pure and simple outgrowth of the spontaneous sexual life of the child. He is forever searching, behind the phantasy, for whatever has founded it in its reality.... Indeed the first schema presented by Freud, with his theory of seduction, seems to us to epitomise this particular dimension of his thought: quite obviously, the first stage - the stage of the scene of seduction - simply must be founded in something more real than the subject's imaginings alone.' If anything, this puts the matter more strongly than I should wish, or need for the purpose of my argument. However, I cannot pursue these issues here, and will have to return to them on another occasion.
- 51 Lenin, *Materialism and Empirio-Criticism*, p.110.
- 52 Kant, *Critique of Pure Reason*, trans. N.K. Smith, MacMillan, London, 1933, A51 = B75.
- 53 *ibid.*, B131.
- 54 K.R. Popper, *Conjectures and Refutations*, Routledge & Kegan Paul, London, 5th edition, 1974, p.46.
- 55 K.R. Popper, *Objective Knowledge: An Evolutionary Approach*, Clarendon Press, Oxford, 1972, p.145.
- 56 Hegel, *Logic*, Section 24, p.37.
- 57 R. Rorty, *Philosophy and the Mirror of Nature*, Princeton University Press, Princeton N.J., 1979, pp.182ff.
- 58 Hegel, *Reason in History* ('Introduction' to *Lectures on the Philosophy of History*), trans. R.S. Hartman, Bobbs-Merrill, Indianapolis, 1953, p.13.
- 59 Hegel, *Philosophy of Right*, trans. T.M. Knox, Clarendon Press, Oxford, 1952, p.10.
- 60 Marx, *Capital*, Vol.K, p.19.
- 61 K.R. Popper, *Conjectures and Refutations*, p.330.
- 62 *idem*.
- 63 For a detailed and lucid account of the earliest development of mathematics along these lines, see V.G. Childe, *Man Makes Himself*, Watts & Co., London, 1941, especially Chapter 8.
- 64 Engels, *Anti-Dühring*, Foreign Languages Publishing House, Moscow, 1962, pp.58-59.

