

Habermas and the Natural Sciences

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Habermas' fundamental philosophical project is to reinstate, in a contemporary context, the classical idea that human lives can be guided by practical knowledge; i.e., that it is possible to know what are the ultimate human values and direct our lives in accord with this knowledge.² This project has a central importance because of the ironic turn taken by the development of contemporary society. Previously, societies generally thought they had a clear and rationally founded notion of the ultimate values that should guide human lives; but they lacked the technical resources needed to implement (or remove obstacles to) these values. Today, we have the technical resources to at least make a significant effort toward the realization of our values. But the very scientific advances that have provided these technical resources have called into question the rational bases of traditional values and even led to the suggestion--urged by the positivists--that our ultimate values have no cognitive status but are merely irrational givens. The influence of this suggestion has led to the widespread idea that the only role reason has vis-a-vis values is a purely instrumental one. Reason can only provide means to implement previously decided on values; it has no role in deciding which values should be implemented.

Habermas' central concern is to reject this view and to show instead that reason itself is value-oriented; specifically, that to engage in the rational pursuit of knowledge is, by that very fact, to be guided by certain basic human interests (i.e., orientations toward modes of action essential to the survival of the human species as human)³. Accordingly, Habermas is primarily concerned to establish two fundamental theses: (1) that all human knowledge is value-oriented in the sense that its very status as knowledge derives from its orientation towards basic human interests; (2) that these basic interests (which he calls "cognitive interests") are themselves not just arbitrary givens but rather are an essential orientation of reason itself.

Obviously, one essential task in carrying out this project is the development of a methodologically adequate account of natural scientific knowledge that presents it as derived from human interests. And, although Habermas has never developed in an explicit way what we in the Anglo-American tradition call a "philosophy of natural science", his various comments on what he terms "empirical-analytic" science (especially in [3]) and on generic features of all sciences (in works subsequent to [3], especially [4] and the introduction to [5]) in effect constitute a basic philosophical view of natural science. My goal in this paper is to explicate and critically evaluate this view.

Apart from the internal importance of this topic for an understanding of Habermas, there are several other reasons for focusing on it in the present context: (1) Since issues concerning the methodology of natural science have dominated Anglo-American philosophy of science, this provides us with a way of encountering Habermas' views in a familiar context. (2) Some of the most central topics of Habermas' thought are involved in his treatment of natural science, so this topic provides a good introduction to much of his other work. (3) Most importantly, reflection on Habermas' views about natural science raises very important questions about the meaning and the viability of his general philosophical project and about the relation of his views to those of major Anglo-American philosophers (especially Sellars). In section one I offer a brief explication of Habermas' views on natural science; and in section two I raise some of these questions.

1. Explication

Like most post-positivists, Habermas rejects the idea that there is a simply given body of uninterpreted experience that provides an unrevisable foundation for both the meaning and the justification of all scientific claims. The objects of scientific experience are, rather, given to us already categorized in terms of a conceptual framework antecedent to the experience in which they are given. Employing the Kantian language still current on the Continent, Habermas says that the object-domain of the natural sciences is "constituted" by the categories of this conceptual framework.

However, Habermas differs from many other post-positivist philosophers of science in the account he gives of the way the objects of natural science are categorized. For, like Kant, he insists that there is one privileged framework in terms of which natural scientific objects must be encountered. In particular, he revives the pragmatic view (which he associates primarily with Peirce) that scientific objects are given to us as essentially subject to our technical manipulation and control. He calls the framework that provides the categories for conceiving of objects in this way the "framework of instrumental action" (FIA). Accordingly, he holds that scientific objects are necessarily "constituted" within the FIA; that is, we must experience and think of them in terms of categories that make them accessible to our technical control.

It must be emphasized that Habermas does not regard the FIA as merely an interpretation imposed on objects that are experientially given prior to their conceptualization under the categories of the FIA. Rather, he insists that there is no experience of the natural world (either scientific or pre-scientific) apart from its interpretation in terms of the FIA. Consequently, for Habermas the fact that natural science is oriented toward the technical control of nature is not an accidental fact. The technical power of natural science is due essentially to the fact that its objects simply cannot be encountered except as subject (in principle if not practical fact) to our technical control.

To deepen our understanding of this view, let us next pay some attention to the nature of the FIA. On Habermas' view, this framework is operative first in our pre-scientific encounters with nature. On the prescientific level, it defines the natural world as the object of a "cumulative learning process" in which our beliefs about nature are tested by their value as guides to "purposive-rational action" (i.e., action designed to achieve, through rational calculation, goals relevant to human survival). Thus, in the FIA a belief is regarded as a behavioral rule, a habit guiding our action; and a belief's validity depends on the success of the action it guides (i.e., on the extent to which it provides "behavioral certainty"). So a valid belief can always be transformed into a successful technical recommendation. Further, it is only to the extent that a belief about nature can be converted into a technical recommendation that it is meaningful. (Following Peirce, Habermas regards this last claim as the essential assertion of pragmatism.) The validity of a belief is determined in the very process of acting in accord with the technical rules it generates; that is, we test the belief by acting according to these rules and reject it if the resultant action is unsuccessful. When a belief fails the test, the nature of our failure itself suggests ways to frame a more adequate belief. So testing beliefs in the FIA establishes a pattern of negative-feedback-controlled action whereby we learn, in a cumulative way, from our experience.

Given the above characterization of the FIA, we can see that objects categorized in terms of it meet three key conditions: (1) They behave according to fixed rules of the form, 'In circumstances C, objects of type O behave in manner M'. (2) The "circumstances" referred to in the rules can (in principle) be produced or excluded by human intervention. (3) The rules can be discovered by human beings by a self-correcting process of trial-and-error (negative feedback).

Habermas views natural science as a self-conscious and systematic refinement of this basic learning process. In particular, the move to a specifically scientific development of the FIA involves the following refinements. First, science isolates the learning process from the life process; that is, the attempt to discover the rules governing the behavior of natural objects is carried out in contexts where there is no immediate need for controlling the behavior in question. Second, science introduces procedures for guaranteeing a very high level of precision in our formulations and for assuring intersubjective agreement on

the results of our learning. Finally, science integrates the results of our learning into a system developed to maximize unity and simplicity. Thus, science moves beyond the prescientific learning process by introducing the dimensions of experimentation, precision and certainty, and systematization. However, Habermas makes it clear that the objects of science remain constituted entirely within the FIA.

A final but crucial point about the FIA: The fact that we "employ" this framework is neither a matter of choice (by individuals or by particular societies) nor an accidental feature of the historical evolution of our race. Rather, it derives from an essential need of the human species to control its environment by technical manipulation. Because of this need, the survival of our species (as human) requires it to have a fundamental orientation toward the technical control of nature. It is this orientation--which Habermas calls the "technical interest"--that accounts for the fact that we encounter the world in terms of the FIA. So for Habermas the ultimate source of our basic construal of the object-domain of natural science (that which constitutes natural-scientific objects) is the technical interest.

Our discussion so far can be summed up by saying that Habermas endorses a particular form of a pragmatic account of the meaning of scientific statements. It might seem that he is also committed to a pragmatic account of the truth of natural scientific statements; i.e., to an account of the truth of such statements as a matter of their success as a basis for the technical control of nature. Indeed he does say: "... the meaning of the validity of [natural-scientific] statements is determined with reference to possible technical control of the connection of empirical variables." [3], p. 121). However, in later discussions he makes it clear that though the meaning of scientific statements is constituted by the technical interest, this is not so for their truth. The technical interest determines the basic categories applicable to the objects (things or events) that are the referents of scientific language; but, following Ramsey and Strawson, Habermas draws a sharp distinction between the objects of the natural world and the facts that embody the truth about that world. The former but not the latter are constituted by the technical interest.

Habermas' refusal to understand natural-scientific truth as a matter of satisfying the technical interest is based on the following line of argument ([4], p. 180): If the truth of a scientific statement were a matter of its technical success, then the truth of scientific theories (systems of scientific statements) could be decided solely on the basis of our experience of the world, since it is here alone that we encounter success or failure in controlling nature. Now the progress of science consists in the successive development of more and more adequate theories (i.e., theories that are "closer" to the truth). If experience were the sole criterion for evaluating the truth of a theory, then theoretical progress would always require new experience. But such a view of theoretical progress ignores the fact that it is often a matter not of revising theories in the light of new experience but rather of providing a new interpretation of the same experience. Consequently, we

must reject the idea that theoretical truth-claims are evaluated by experiential verification and therefore the idea that scientific truth is simply a matter of technical success.

How then do natural scientists evaluate theoretical truth-claims? According to Habermas, they do so by a process of argumentative reasoning about the significance of our experience of scientific objects. This process requires that we question--in a way that rarely happens in everyday life--the factual validity of claims about the natural world. In particular, it requires that we give up many of our ordinary means of reaching agreement about facts for the purpose of practical action. For example, we cannot, on this level of scientific validation, accept a claim because it is endorsed by someone in authority, because it accords with accepted "common-sense", or even because it is pragmatically useful. Rather, on the level of scientific argumentation we suspend all factors that might determine the conclusion we finally agree on except the cogency of the rational arguments presented: "...the 'force' of the argument is the only permissible compulsion" and "the cooperative search for truth is the only permissible motive" ([4], p. 168). Because this sort of rational argumentation involves a significant withdrawal from the attitude with which we approach our ordinary activities, Habermas says that it is a distinctive mode of communication, which he calls discourse and sharply distinguishes from our ordinary communications about the natural and social worlds, which he calls action (or "life-praxis"). In the context of action (e.g., instrumental action), our focus is on the objects we experience; and we evaluate factual claims about objects on the basis of this experience. In the context of discourse, we regard these "facts" as merely hypothetical states-of-affairs; and the experiences that were put forward in support of validity claims are regarded as data, the significance of which must be established by rational argumentation.

The outcome of rational argumentation on the level of discourse is a consensus among those engaging in the discourse that some statements are to be accepted. It is this consensus rather than successful technical control that Habermas regards as the criterion of the truth of natural scientific statements. So the technical interest that determines the meaning of natural-scientific statements plays no direct role in the determination of their truth.

2. Questions

The central question I want to consider is: Should we accept Habermas' claim that natural scientific knowledge is essentially oriented by an interest in the technical control of nature? As we will see, an attempt to answer this question will lead us to some further basic questions about Habermas' attitude toward realistic interpretations of natural science and even about his understanding of the nature of human interests. But let us begin with the question of natural science and the technical control of nature.

There is no doubt that the attainment of theoretical scientific knowledge will always in principle further the technical interest. The more we know of how nature behaves the better our chance of controlling it. But the mere fact that a body of knowledge can, in principle, be put at the disposal of a particular interest does not imply that this interest accounts for essential epistemic features of this knowledge (i.e., that the interest constitutes the body of knowledge). For example, the emancipative interest is always in principle furthered by successes in natural science; but Habermas would not on this basis have to say that the emancipative interest defines the cognitive character of natural science. For an interest to play this definitive role, it must either (i) provide the categories in terms of which the objects of natural science are described or (ii) specify the criteria by which the truth of natural scientific theories is evaluated. Prima facie, Habermas would seem to base his claim on (i) rather than (ii). For he seems to concede that the truth of natural scientific statements is not determined by their connection to the technical interest, but insists that their meaning is.

So let us ask if the concepts employed by the natural sciences must conform to the basic categories of the FIA. Such a claim is highly questionable. This becomes apparent if we examine a central element of natural scientific methodology to which Habermas has paid far too little attention: the postulation of microtheoretical entities. Time and again, scientists have found it necessary to explain puzzling phenomena by positing the existence of entities like molecules, atoms, electrons, etc. Now on Habermas' view, such entities may surely be posited; but it seems they must be described by the same basic categories as the observable ("manifest") objects of everyday experience. In other words, microtheoretical entities must be conceived in terms of the FIA. Thus, Habermas says: "The theory languages, which undergo a discontinuous development in the course of scientific progress, can interpret the structures of an object domain not yet penetrated by science. They can also to some extent reformulate them. But as long as we are not angels or animals, these languages cannot transform the structures themselves into conditions of another object domain. It is always the experience of identical objects of our world which is being interpreted differently according to the state of scientific progress we happen to have reached." ([4], p. 171). If we take "the structures of an object domain" to refer to the basic categories in terms of which a set of objects is described, then Habermas seems to be saying that theoretical science cannot introduce objects that are not describable by the categories of the FIA: "theoretical languages cannot transform the structures themselves into conditions of another object domain." Such an interpretation is supported by the final sentence of the text cited, which suggests that the referent of scientific language is always the world as we encounter it in everyday experience ("our world"), not a conceptually independent domain of scientific entities. But if this is what Habermas means, then his view is inconsistent with the way theoretical language in fact functions in natural science.

The key to seeing this is to realize that when the scientist postulates microentities like atoms, etc. to explain certain phenomena, he does not conceive of their behavior as depending on their interactions with macroscopic objects. The laws of the theory relate only microentities to other microentities. In particular, the laws that specify the behavior of a microentity in various situations present this behavior as entirely functionally dependent on antecedent behavior of it and other microentities. The only way we can properly speak (as of course we do) of "manifest" objects of the FIA (or of human persons) as interacting with microentities is to redescribe the objects or persons themselves as systems of microentities. Accordingly microentities cannot be conceived as interacting with the objects and persons of our everyday world. Hence postulated microtheoretical frameworks lack the essential characteristic of the FIA: the behavior of their objects is not conceived as (even in principle) the possible outcome of interaction with human agents. So the objects of postulational theories do not fall under the categories of the FIA and so are not constituted by the technical interest. Rather, scientific theory's concern with completely accurate description requires replacement of the FIA with new basic categories.

Of course the above line of argument has presupposed that talk about microentities is an essential part of natural science. It might be claimed that in fact all microtheoretical statements can be replaced, with no essential scientific loss, by statements about, say, the results of experimental operations. Further, such a claim need not be construed as asserting that there are operational translations of microtheoretical language or that this language can be "reduced" to the language of instrumental action. Rather, it might simply be maintained that science can be carried out just as successfully (even if not as conveniently) with the operational correlates of microtheoretical statements.

However, such a move ignores the fact--emphasized by Sellars--that the primary motivation for theoretical postulations is precisely our inability to explain manifest natural phenomenon in their own terms. To use Habermas' language, theoretical frameworks are introduced just because we are unable to explain the behavior of the objects of the FIA in terms of the FIA. For example, we redescribe gases as systems of molecules because certain aspects of the behavior of gases cannot be explained unless we so redescribe them. Accounts developed in terms of the objects of our experimental manipulations are unable to achieve our explanatory ideals. Consequently, if we replaced our microtheoretical statements by their operational correlates, we would lose the explanatory power that can be derived only from those statements. So the conceptual framework of the postulated entities is both irreducible to the FIA and ineliminable from scientific accounts of the world.

Of course, it may be that the interpretation I have suggested is incorrect and that Habermas does allow that the fundamental categories of theoretical natural science need not be those of the FIA. But if so, then he needs to give us an account of the precise status of postulational theories as descriptions of nature and an explanation of how this

status is consistent with an essential derivation from the technical interest.

The questions I have been raising can be usefully recast as questions about Habermas' attitude toward the question of scientific realism (i.e., toward the reality of the entities postulated by theoretical natural science). Does he hold an instrumentalist or fictionalist denial of any distinct referent for theoretical terms? If so (though this seems unlikely), he faces the challenges that recent philosophy of science has posed to this positivist view. Does he rather hold that theoretical entities are real but that they belong to the same conceptual domain as the macro-objects of our ordinary experience and hence are just new objects to be added to "our world"? If so, then, as we have seen, he has misconstrued the nature of postulational natural science. Or, finally, does he in fact agree with scientific realists such as Sellars, who hold that the postulations of theoretical natural science provide a more adequate description of nature than we can give in terms of the categories of our ordinary experience and hence that the framework of theoretical science should ultimately replace the FIA as our basis for describing nature? If so, it is hard to see how Habermas could sustain his thesis of the essential epistemic tie between natural science and the interest in technical control. Of course, it would remain true that successful natural scientific theories provide (in principle) means of controlling nature. But this would not be because their cognitive status (i.e., their meaning or their truth) derives from the human interest in such control. Rather, it would be because they are more accurate descriptions of the world we are concerned to control. From a realist standpoint, the categories we employ to describe nature would be the same even if we had no interest at all in control and were concerned only with an exact description of reality.

The three questions posed in the above paragraph pose a trilemma suggesting that Habermas' epistemology of human interests cannot provide an adequate account of the methodology of the natural sciences. He seems forced either to accept an inadequate methodology or to give up his central thesis about the cognitive role of human interests.

In the remainder of this paper, I want to see if this is indeed the case and to explore the possibility that Habermas could accept a full-blooded realist interpretation of science and still maintain his basic epistemological position. Needless to say, he has not adopted such a view; and in fact his attitude to scientific realism (as, e.g., defended by Sellars) is quite negative. This is not surprising, since there are at least three major apparent obstacles to a Habermasian realism: (1) It seems that scientific realism depends on the "objectivist illusion" that we can have a direct access to the way reality is in itself, independent of the mediation of our conceptual frameworks. (2) Further, it seems that scientific realism is committed to the positivist error of eliminating the human subject and replacing all subjective categories (values, intentions, thoughts, actions, etc.) with physical processes. (3) Finally, there is the difficulty we have already encountered of reconciling Habermas' human-interest epistemology with a realistic

construal of scientific theories. Let us see if these obstacles can be overcome.

(1) It might seem that to accept scientific realism is in effect to return to the naively objectivist pre-Kantian view that natural science is able to give us an account of the way nature is "in itself", quite apart from its relation to the human subject. For does not the project of finding categories that enable us to describe nature with complete accuracy really amount to the project of finding categories that are appropriate to nature in itself? And does not the judgment that such a project has succeeded depend on our having an entirely passive experience in which nature is given just as it is? In short, the suggestion is that scientific realism presupposes a naive and long discredited metaphysical realism and correspondence theory of truth.

However, the work of Sellars⁴ shows how it is possible to accept scientific realism and reject a naively objectivist pre-Kantian epistemological stance. Sellars proposes an epistemology of science that accepts the Kantian idea that there is no access independent of the categories of our minds to nature in itself. Where it differs with Kant (and perhaps with Habermas) is in rejecting a view of the categories of knowledge as essential (either to human consciousness as such or the survival of the species as such) and hence unrevisable. Rather, this epistemology endorses the Hegelian view that any conceptual frameworks developed in the course of our history can be revised and even replaced in the future course of this history. Further, it maintains that the revisions in the categories through which we see nature are not simply the outcome of uncontrollable forces of social evolution but are, rather, consciously developed by us in our efforts to explain natural phenomena. On this view science is essentially concerned with devising new conceptual frameworks for experiencing and thinking about nature. The point has been aptly put by Sellars: "The motto of the age of science might well be: Natural Philosophers have hitherto sought to understand 'meanings'; the task is to change them." [9].

Now the above epistemological account does not of itself involve a commitment to realism. It may well be that there either is no nature-in-itself or that categories we devise will never give a correct characterization of nature-in-itself. The relative accuracy of the description generated by a given set of categories may reflect nothing more than internal properties of the categories themselves. On the other hand, the account allows for the possibility of giving a realistic interpretation of science. For example, we may think that the best explanation of the fact that successive conceptual revisions have in fact led to increasingly adequate descriptions is just that there is a nature in itself the structure of which is represented with more and more exactness by our successive conceptualizations. I am myself inclined to accept this sort of "empirical" case for realism. But the point I want to emphasize here is that even if we interpret the success of theoretical natural science in this realistic way, we are not committed to the naively objectivistic epistemology that Habermas seems to regard as essential to realism. Realism is a hypothesis designed to explain the

success associated with our construction of new conceptualizations of nature; it does not presuppose any access to nature independent of these conceptualizations. Accordingly, it would seem that Habermas' Kantian epistemology is no obstacle to accepting scientific realism.

(2) But even if scientific realism need not presuppose a pre-Kantian objectivism, doesn't it still require an illegitimate (and self-refuting) denial of human subjectivity? This seems to be Habermas' view, since he includes scientific realists--in particular, Sellars--among those who propose a program of "scientific self-objectification"; i.e., the eventual elimination of all subjective categories in favor of entirely objective scientific categories (cf., [4], pp. 161-162). He sees such programs as ways of defending "scientific theories of science" that "attribute to the sciences an exclusive claim to knowledge" ([4], p. 160). Here, however, Habermas is not doing justice to at least Sellars' version of scientific realism. Although Sellars does insist that the categories of "subjectivity" must eventually be replaced by objective scientific categories for the purpose of describing what there is, he equally insists that the former categories remain essential for the expression of crucial truths. His realism does not require the absolute elimination of categories such as 'intention', 'action', 'meaning', 'value', etc., but only their elimination as categories describing distinctive sorts of entities. They express truths--and truths not reducible to or replaceable by scientific truths; but not truths about special sorts of realities. Thus, at the end of his essay, "Philosophy and the Scientific Image of Man," Sellars says: "To say that a certain person desired to do A, thought it his duty to do B but was forced to do C, is not to describe him as one might describe a scientific specimen. One does indeed describe him, but one does something more. And it is this something more which is the irreducible core of the framework of persons." ([8], p. 39, Sellars' emphasis). He goes on to suggest that his irreducible "something more" is the recognition of the person as belonging to a community with us: "Thus, to recognize a featherless biped or dolphin or Martian as a person is to think of oneself and it as belonging to a community." (*ibid.*). Sellars further argues that a community is defined by the most general intentions that are shared by its members. As a result, recognizing someone "as a person requires that one think thoughts of the form, 'We (one) shall do . . . actions of kind A in circumstances of kind C'." Further, he emphasizes, "To think thoughts of this kind is not to classify or explain, but to rehearse an intention." Accordingly, he concludes, ". . . the conceptual framework of persons is not something that needs to be reconciled with the scientific image, but rather something to be joined to it. Thus, to complete the scientific image we need to enrich it not with more ways of saying what is the case, but with the language of community and individual intentions. . . ." ([8], p. 40, Sellars' emphasis). Supposing that this approach to the framework of persons can be adequately developed (and Sellars has carried it a long way in various directions), it would seem that Habermas could accept a Sellarsian version of scientific realism and still maintain his entirely correct opposition to the positivist elimination of the categories of subjectivity. (For a further discussion of this topic, cf., Rorty's [7]).

(3) I have argued that a proper assessment of theoretical postulations in the natural sciences--an assessment on which scientific realism is based--is inconsistent with the view that the categorial frameworks of these sciences are derived from the technical interest. So this, initially most promising, way of rooting natural science in human interests fails. However, there is still the possibility, which we initially passed over, that human interests have an essential role in the determination of the truth of natural scientific statements. To explore this possibility, let us reflect further on the nature of discourse in the natural sciences.

The point of this discourse is to achieve a consensus about the acceptability of statements about scientific objects. Now consensus in this regard surely requires that we have criteria relevant to the evaluation of statements as acceptable or not. These criteria need not provide a "mechanical" decision-procedure for accepting or rejecting statements; but unless there are some standards to which we can appeal as relevant, there is no sense to the idea of a rational discussion. Of course it is possible--indeed necessary--to discuss the appropriateness of particular criteria. Our discourse will then have to move to a meta-level of evaluation. However, even discourse at a meta-level will be governed by higher-level criteria; and all these criteria (along with the criteria appropriate to even higher levels of discourse) will themselves have to be ultimately grounded in the ultimate rational purpose of our discourse. The alternative to this view of discourse as governed by criteria derived from its rational purpose is either: (a) a discussion in which there are no criteria at all to which the participants can appeal in support of their views, or (b) a discussion in which the criteria to which we can appeal are arbitrarily specified. But neither of these alternatives corresponds to what could rightly be called a rational discussion and hence cannot provide a characterization of discourse in Habermas' sense.

Accordingly, if we are to regard natural-scientific discourse as a rational process, we must regard it as a discussion governed by criteria that are themselves derived from a rational purpose. Given Habermas' account of natural scientific discourse, the criteria in question will have to concern the adequacy of theories as interpretations of data. What then is required of an adequate theoretical interpretation of scientific data? Surely a primary requirement is accuracy to the data; i.e., the requirement that, given the interpretation, we can derive at least reasonably close approximations of the data from our theory. Other requirements may well concern the simplicity of the theory, its coherence with related theories, and its fruitfulness in yielding interpretations of new data. Let us lump all these and any other relevant requirements together in a single complex criterion of explanatory adequacy. Now, as I argued above, if this criterion is not to be arbitrary, it must be justified as necessary for the fulfillment of some ultimate purpose. What is the nature of this purpose?

It is clear that it cannot be identified with any of Habermas' three cognitive interests. To identify it with the technical interest would

be to fall back into the pragmatic theory of natural scientific truth that Habermas is at pains to avoid. As to the other two interests (the communicative and the emancipative), distortion-free communication and the elimination of repression are necessary means to the achievement of an unconstrained consensus through discourse. So they can hardly be goals of this activity.

More positively, the ultimate goal guiding natural scientific discourse has been indicated by our discussion above of the role of theoretical postulations. Such postulations are made for the same reason that any natural scientific statement is, in the final analysis, accepted: to insure a maximally accurate description of the natural world. Thus, it seems clear that the discourse of natural science is ultimately directed toward accurate description. The criterion of explanatory adequacy is justified by the fact that theories satisfying it are the most likely to be maximally accurate.

Let us call the orientation (characteristic of natural-scientific discourse) to descriptive accuracy the theoretical attitude, since it guides the construction of natural scientific theories. Given that the theoretical attitude is not one of Habermas' three cognitive interests, the success of his project depends on the possibility of construing it as a fourth cognitive interest. Is this a real possibility?

There is no problem about the theoretical attitude's cognitive status, since it constitutes the truth of natural scientific statements. The question is whether it qualifies as an interest in Habermas' sense. On the one hand, there are strong reasons for saying that it does not. First, as noted above, Habermas defines interests as action-oriented, whereas the theoretical attitude seems to be at root contemplative. More importantly, interests for Habermas correspond to achievements (e.g., control of nature, distortion free communication) that are necessary conditions for the survival of the human species, whereas we can well imagine the human species as surviving without the theoretical attitude. Survival requires only good approximations, not maximal accuracy. If, for reasons such as these, we decide that the theoretical attitude is not a human interest, then Habermas' project of showing essential ties between knowledge and values seems severely challenged. For he makes his case by interpreting values as interests and arguing that all knowledge, including natural science, is constituted by interests. If the theoretical attitude is not an interest, then this strategy seems to have been shown ineffective.

On the other hand, there may be enough flexibility in Habermas' notion of interest for it to include the theoretical attitude. Here I am struck by similarities between this attitude and the emancipative interest. For example, like the theoretical attitude, the emancipative interest does not seem to be action-oriented in the way the technical and the communicative interests are; action is a necessary means to achieve its goal, but this goal itself is not a mode of action (like controlling nature or communicating effectively) but a state of enlightenment and freedom. Further, Habermas seems to present emancipation not

as a necessary condition for human survival but as an ideal implicit in our species (in particular, in our capacity to communicate). If interests can have this sort of "ideal" status (as opposed to the "naturalistic" status of a necessary condition for survival), then the theoretical attitude may qualify. So the ultimate viability of Habermas' project turns on further explication of the nature of a human interest. If he can furnish a characterization of interests that applies to the theoretical attitude, then he can make good the claim that the natural sciences are constituted by human interests. If he cannot do this, then the entire enterprise of an epistemology of human interests is called into question.

To summarize the thoughts of this section: At first glance, Habermas' claim that the natural sciences are epistemically derived from human interests seems to be based on the view that the fundamental categories employed by natural scientific theories must be those of the FIA. But this view is inconsistent with the kind of realistic interpretation of natural science that is required by a proper appreciation of the role of theoretical postulation. Further, Habermas' Kantian and anti-positivist epistemology might seem to be inconsistent with scientific realism. However, I suggest that Habermas' epistemology is in fact consistent with a properly formulated scientific realism (e.g., that of Sellars) and even that he might accept such a realism and still maintain that the natural sciences are constituted by human interests. But this latter move would require showing that the theoretical attitude that guides the practice of natural science can be rightly construed as a human interest.

Notes

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²For an excellent general introduction to Habermas' thought, see Thomas McCarthy's [6]. [2] contains a brief summary of themes in Habermas' thought that are particularly relevant to Anglo-American philosophy of science.

³Habermas distinguishes three major interests: the technical (or empirical-analytic) interest, the communicative interest, and the emancipative interest. The technical interest is concerned with technical control of the natural world, the communicative interest with the mutual understanding presupposed by social functioning, and the emancipative interest with the liberation of persons from psychological and political forces of oppression. We will be mainly concerned with the technical interest, since Habermas regards this as the interest behind natural science.

⁴A survey of the main features of Sellars' philosophy can be found in [1].

References

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