

Between Man and Nature

By Hubert L. Dreyfus

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THE DIFFERENCE BETWEEN THE *NATUR* AND the *Geisteswissenschaften*, where the *Geisteswissenschaften* means the humanities, is obvious. What needs to be argued is that there is a basic methodological difference between the empirical disciplines that study nature and the empirical disciplines that study human comportment. In this case the *Geisteswissenschaften* means the social sciences. There are many ways to approach the question of the unity and differences between these two types of discipline. I want to talk about a difference in the goals of the social and the natural sciences. I will argue that the relation of a science's practices to the object the science studies is different in the natural and social sciences, and that this difference leads to different disciplinary goals — *explaining* in the natural sciences and *understanding* in the social ones.

The attempt to draw a principled distinction between the methods of the natural and social sciences has had a surprising history. For a century the pressure to unify the sciences came from the attraction of the hard natural sciences as models for the soft social sciences. Those who opposed unification did so by arguing that the human sciences dealt with meaningful events and so required an interpretive approach different in principle from the covering law model of the sciences of nature. Just when the difference between the theoretical and the hermeneutic disciplines was becoming accepted, however, the line of attack suddenly shifted and now it has become fashionable to push for the methodological unity of the sciences by arguing that *all* disciplines are interpretive and their objects are all social constructs. The hope of hammering all of the disciplines into one hard objective science has thus given way to the desire to dissolve them all into a soft hermeneutical hash.

This second approach to unity is furthered by the fact that among philosophers any attempt to defend an essential difference between the hard sciences as converging on the objective truth about nature and the soft sciences as dealing with historically changing human meanings, has become suspect. On the one hand, Thomas Kuhn and others have shown that science has a history of radical paradigm shifts and have claimed that this undermines the argument that science is converging on the truth about nature. On the other hand, eliminative materialists, such as Paul Feyerabend, Richard Rorty and their followers, have convincingly argued that there is no

in principle reason why a social science might not predict the behavior of human beings under some objective description that eliminates reference to everyday meaningful entities and events and to people as agents.

Since many philosophers are convinced that no argument for the *in principle* distinction between the methods of the *Geistes* and the *Naturwissenschaften* can be defended, it has become increasingly unpopular among "post-modern" philosophers even to raise the issue. Still, there does seem to be an obvious difference in the current status of the two types of disciplines. Put crudely: the natural science's progress while the human sciences do not. So, rather than attempting to distinguish these disciplines by looking for an *essential* difference in their objects that necessitates an *essential* difference in their methods, we should ask a more modest question: What is there about the practices of each type of discipline that accounts for the natural sciences' ability to formulate objective theoretical truths about nature, and the social sciences' failure to discover similar types of truths about human beings?

Anyone who wants thus to defend the *disunity* of the sciences must fight on two fronts. He needs to show that, even though physical science is a social practice subject to radical paradigm shifts, it can still reveal the way the world is independent of our theories and practices, *and* that, even though the human sciences deal with human beings who are, among other things, objects, they can never be objective. Since the task of arguing for a basic, if not essential, difference between the natural and human sciences is double, my paper will be in effect two mini-papers.

I. How Natural Science Can Discover Truths About Nature.

The status of the entities supposedly discovered by natural science, and the correlated question of the special authority of science in our culture has increasingly become an issue of debate. Literary theorists, social scientists, and feminists, each for their own reasons, have found themselves allied with anti-realist philosophers of science in their attack on the special claim of the natural sciences to tell us the truth about objective reality. The literary theorists would like to one-up the sciences by showing that scientific theories are after all just texts and therefore fall into the domain of the humanities. Social scientists, by pointing out that scientific truth is a product of shared practices, seek to annex science to the domain of sociology and anthropology. Feminists would like to undermine the authority of the scientific establishment which they rightly regard as a bastion of male domination. All these groups would like to believe that natural science is just one more interpretive practice that has somehow conned our culture into thinking that it alone has access to the real. The stakes are high. As Evelyn Fox Keller recently put it:

The question of whether scientific knowledge is objective or relative is at least in part a question about the claim of scientists to absolute authority. If there is only one truth, and scientists are privy to it ... then the authority of science is unassailable. But if truth is relative, if science is divorced from nature and married instead to culture then the privileged status of that authority is fatally undermined.¹

There is, indeed, something wrong with our culture's worship of natural science, as if what science tells us about the fundamental particles has fundamental importance for all aspects of life. The success of books like

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Fritjof Capra's *The Tao of Physics*, which tells us that we can breathe easier because science is no longer atomist and materialist but is now holistic and works with energy fields, shows that many people believe that science does tell us the final truth about reality. But the attempt to limit the influence of natural science by denying that it discovers anything at all — as the title of a recent book, *Constructing Quarks*, implies — is clearly an over-reaction. It is a non-sequitur to claim that because the development of physical theories depends upon scientists' practices and that the authority of science is constituted by way of broader social practices, physics does not discover truths about nature and so has no legitimate authority. If one wants to undermine the illegitimate authority of natural science, especially physics, in our culture it would be sufficient to show that although scientific theory can tell us the truth about physical nature, it does not have a special access to the truth about ultimate reality.

Before I can argue for this claim I need to define what I mean by scientific theory. Theorizing is a special form of intellectual activity, discovered by Socrates and refined by the philosophical tradition. It has six essential characteristics, never fully achieved, but approached to varying degrees. The first three are introduced by Socrates. (1) *Explicitness*. A theory should not be based on intuition and interpretation but should be spelled out so completely that it can be understood by any rational being. (2) *Universality*. Theory should hold true for all places and all times. (3) *Abstractedness*. A theory must not require reference to particular examples.

Descartes and Kant complete the Socratic account of theory by adding two further requirements: (4) *Discreteness*. A theory must be stated in terms of context-free elements — elements which make no reference to human interests, traditions, institutions, etc. (5) *Systematicity*. A theory must be a whole in which decontextualized elements, (properties, attributes, features, factors, etc.) are related to each other by rules or laws.²

Plato clairvoyantly expressed all five characteristics of theory in the myth of the cave: the theorist must remove his object of knowledge from the everyday world in order to see the universal relations between the explicit and abstract elements, in this case the ideas. Freed from all context, the elements form a system of their own — all ideas are organized by the idea of the Good. Plato saw that while everyday understanding is implicit, concrete, local, and partial, theories, by contrast, are explicit, abstract, universal, and total.

In the *Republic* Plato put the natural sciences of his day on only the third level of his four-level divided line since they did not satisfy two further conditions: indubitability and rational grounding. Yet the theoretical explanation of nature developed by modern natural science, although still only on Plato's third level, is the most successful version ever obtained of the sort of theory Plato envisaged. Indeed, while relinquishing indubitable and grounded knowledge, the modern natural sciences have been able to add a sixth characteristic of ideal theory. It is this characteristic which is sought in vain by the social sciences. (6) *Closure and prediction*. The description of the domain investigated must be complete, i.e. it must specify all the influences that affect the elements in the domain and must specify their effects. Closure permits precise prediction.

For this discussion it is irrelevant whether natural *scientists* ever achieve the ideal of theoretical explanation or whether, as is now generally believed, shared interpretations, metaphors, specific examples, etc. play a crucial role in the activities of normal scientists and their understanding and acceptance of theories. All I need claim for my argument is that *theories* can become more and more explicit and complete making less and less reference to shared background interpretations, metaphors, examples, etc. — and that there is no *in principle* limit to such refinement.

Many recent philosophers of science, however, hold that science cannot even approach the ideal of theory. They contend that scientific entities are social constructions essentially related to human purposes. Such antirealists, as Arthur Fine puts it, “accept the behaviorist idea that the working practices of conceptual exchange exhaust the meaning of the exchange, giving it its significance and providing it with its content”.³ Such thinkers conclude from the fact that background practices are necessary for *access* to theoretical entities, that these entities must be *defined in terms of* these access practices.

Fine, in response to both realists and antirealists, tries to remain true to the understanding of science already in scientific practice. Like Michael Polanyi and Nancy Cartwright, he starts with the observation that the scientist “believes in the existence of those entities to which his theories refer.”⁴ Fine calls this the Natural Ontological Attitude (NOA). In this attitude one “accepts the evidence of one’s senses [with regard to the existence and features of everyday objects] and ... accepts, *in the same way*, the confirmed results of science.”⁵ Fine tells us:

NOA helps us to see that realism differs from various antirealisms in this way: realism adds an *outer* direction to NOA, that is, the external world and the correspondence relation of approximate truth; antirealisms add an *inner* direction, that is, human-oriented reductions of truth, or concepts, or explanations. NOA suggests that the legitimate features of these additions are already contained in the presumed equal status of everyday truths with scientific ones, and in our accepting them both as *truths*. No other additions are legitimate, and none are required.⁶

Heidegger expounded a similar view. In his 1927 Kant lectures he gives us his conception of the goal of scientific discipline (*Wissenschaft*):

Scientific knowing presupposes that existing Dasein⁷ takes as a freely chosen task the revealing of the entity it approaches *for the sake of revealing it*. ... The struggle is solely directed to the entity itself and solely in order to free it from its hiddenness.⁸

As I would put it, scientists are “background realists”, i.e., their practices take the independent existence of their domain of objects for granted. We might call these who explicate this understanding hermeneutic realists.

Hermeneutic realists hold that a science’s background realism cannot be used to *justify* the claim that the objects of science exist independently of the activity of the scientists, nor can this understanding *dictate* what methods or operating assumptions a science must accept. Rather, the role of the hermeneutic philosopher of science is (1) to spell out what everyday scientific practice takes for granted — in the case of natural science, that there is a nature independent of us and that current science is giving us a better and better explanation of how that nature works, and (2) to show that the self-understanding of the science is both internally coherent and compatible with

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the ontological implications of our everyday practices.

According to the hermeneutic realist, natural science's background realism is compatible with neither metaphysical realism nor antirealism. Scientists work within social practices that neither they nor philosophers can transcend, so science cannot justify a metaphysical realism which claims to have an *argument* there there is nature in itself, that nature has the structure science finds, and that science is converging on the one true account of this independent reality. Yet scientists take for granted they *can* discover the truth about nature as it is independent of scientific practices, so metaphysical antirealism is also unacceptable.

This minimal hermeneutic realism is first found in *Being and Time*. There Heidegger argues as follows: Only human beings make sense of things. So the intelligibility of each kind of thing, including natural things, depends upon our practices. Still nature as *a* being, or as an ensemble of beings, need not depend on us, for one way we make sense of things — find them intelligible — is as merely occurrent (*vorhanden*), *i.e.*, as not related to our practices.

Occurrent beings are revealed when we take a detached attitude towards things and decontextualize them. Then things show up as independent of human purposes and even as independent of human existence. Decontextualizing takes place in two stages. First we use skills and instruments to isolate things and their properties which then appear as meaningless objects, colors, shapes, sounds, etc. Such data are independent of our purposes but not independent of our senses. We then invent theories in which the occurrent data are taken up as evidence for quasars and quarks and other entities we cannot directly experience. These theoretical entities need not conform at all to our everyday understanding of objects, space, time, and causality. Our current theory tells us that these entities belong to natural kinds — types of things in nature like water, gold, iron, etc. — and if correct, the theory describes the causal powers of these natural kinds. There is no way to stand outside current science and give it metaphysical support by arguing that there must be natural kinds or that these are what our science must be about. All that philosophy can do is show the coherence of the natural scientist's background assumption that there is some way nature is in itself.

If we encountered things only in using them, never in detachedly reflecting on them, *i.e.*, if availableness (*Zuhandenheit*) were the only way of being we knew, we would not be able to make the notion of entities in themselves intelligible. But since we understand occurrentness, we understand that occurrent entities can have existed even if human beings had never existed. Indeed, given our understanding of occurrentness, we *must* understand things this way. To take a Heideggerian example, what it is to be a hammer essentially depends upon Dasein and its cultural artifacts. It belongs to the being of a hammer that it is used to pound in nails for building houses, etc. In a culture that always tied things together, there could be no hammers. But there could, nonetheless, be pieces of wood with iron blobs on the end, since wood and iron are natural kinds and their being and causal powers make no essential reference to human purposes.

Joseph Rouse in defense of what he takes to be Heidegger's social constructivism argues convincingly that what counts as an electron and even

what counts as a physical cause depends on current scientific instruments and practices. Heidegger would agree. He would of course further agree that once our practices define what counts as an “X” we must still determine whether there are any “X”s. Heidegger would even accept that if the “X”s in question are available like hammers, then when we find out that there are “X”s we find entities that exist only relative to our practices. He would point out, however, that if what counts and an “X” has occurrentness as its way of being, then when we find that there are “X”s we find at the same time that these “X”s exist independently of us and of our scientific instruments and practices. This is what Heidegger means when he says.

Intraworldliness does not belong to the essence of the occurrent things as such, but it is only the transcendental condition ... for the possibility of occurrent things being able to emerge as they are.⁹

Heidegger’s account is thus compatible with holding that science is converging on getting it right about natural kinds like gold and water and their causal powers.¹⁰ But even if physical science is progressing in its understanding of physical nature, this cannot be used to argue that the current scientific approach to nature is the only right one. A theory of the causal powers of natural kinds tells us only what is *causally* real, so modern science need not be the only way of understanding nature. As Heidegger sees it, many different practices can reveal nature as it is in itself.

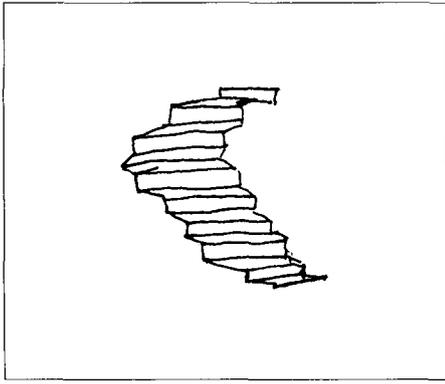
What is represented by physics is indeed nature itself, but undeniably it is only nature as the object-area, whose objectness is first defined and determined through the refining that is characteristic of physics and is expressly set forth in that refining. Nature, in its objectness for modern physical science, is only *one* way in which what presences — which from of old has been named *physis* — reveals itself.¹¹

Heidegger thus denies that modern physics has found *the* right vocabulary for describing nature. This, I presume, is the meaning of his Kuhn-like remark back in 1938:

[We cannot] say that the Galilean doctrine of freely falling bodies is true and that Aristotle’s teaching, that light bodies strive upward, is false; for the Greek understanding of the essence of body and place and of the relation between the two rests upon a different interpretation of entities and hence conditions a correspondingly different kind of seeing and questioning of natural events. No one would presume to maintain that Shakespeare’s poetry is more advanced than that of Aeschylus. It is still more impossible to say that the modern understanding of whatever is, is more correct than that of the Greeks.¹²

Here Heidegger is obviously trying to counter the claim that Galileo has refuted Aristotle. He is doing so, not as Kuhn does in *The Structure of Scientific Revolutions*, by holding that neither theory is true of nature, but rather by holding that *both* are true. This could be the innocuous observation that both are “illuminating,” but in the context of the remark just quoted that “what is represented by physics is indeed nature itself”, it must be the stronger claim that different theories can reveal different aspects of nature. Of course, if one thinks of Aristotle’s theory of natural place as an account of *physical* causality meant to explain, for example, why rocks fall, in the same sense that modern physics claims to explain the same phenomenon, this position is untenable. On that account modern physics, as far as we know, would be right and Aristotle would simply be wrong. It may well be, however, that Aristotle and Galileo were asking *different kinds of questions*, and so each could be right

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about a different aspect of nature.

It follows from the above considerations that what counts as real for a culture depends upon the interpretation in its practices, but this does not make what is thus revealed any less real. We could call this position *plural realism*. For a plural realist there is no point of view from which one can ask and answer the metaphysical question concerning the one true nature of ultimate reality. Given the dependence of the intelligibility of all ways of being on our practices, and the dependence of what counts as elements of reality on our purposes, the question makes no sense. But since different practices reveal different realities or domains of intelligibility, and since no one way of revealing is exclusively true, accepting one does not commit us to rejecting the others. Donald Davidson holds a similar view: *If we are right in our claims about reality under various descriptions, then what we are right about has whatever properties it has even if these descriptions are not reducible to a single description, and that physical reality has whatever properties it has whether we describers and our ways of describing things exist or not.*

There are no clear limits as to what kinds of cultural entities can be encountered. In natural science, however, there seems to be one right answer as far as physical causality is concerned. Radically different theories than those proposed by modern science presumably would not reveal physical causal powers. As Heidegger once put it:

The spiritual ... offers less resistance than in the field of natural science, where nature immediately takes its revenge on a wrongheaded approach.¹³

This suggests how one should respond to scientific relativists like Richard Rorty who scoff at the idea of science learning nature's own language. Granted that we can never completely decontextualize our data, and that therefore our scientific theories are always to some extent parasitical upon our cultural practices and language, still once we discover that we have practices that can reveal meaningless occurrent data divorced from essential reference to our purposes, we can use recontextualization in theories to distance our science further and further from the everyday world. It is as if nature is teaching the natural scientist, not *nature's own language*, since only a Platonist thinks that representations exist independently of meaningful practices, but rather nature is leading natural scientists to improve *their* language for representing her under an objectified aspect.

It is helpful to compare Heidegger and Rorty here. Both argue that the real can show up differently given different practices (vocabularies, Rorty would say), and neither wants to allow that there is a privileged description that founds all the others. Anyone who claims to have a description of ultimate reality claims a point of view outside of all particular, finite interpretations, and both Heidegger and Rorty think, given their understanding of understanding, that the very idea of such an interpretation-free understanding of what ultimately is does not make sense. But Rorty thinks that this is an argument against accepting even a minimal hermeneutic realism where science is concerned, whereas Heidegger shows how one can reject the claim that there is *a* correct description of reality, and still hold that there can be *many* correct descriptions, including a correct causal description of objectified

physical nature. Natural science can be getting it righter and righter about how things *work* even if there is no one right answer to how things *are*.

II. Why Current Human Sciences Must be Hermeneutic?

The phenomenon that leads one to expect a basic difference between the natural sciences and the disciplines that study human beings is clear. The natural sciences may not be as rational nor as cumulative as once believed, but they still show stability and progress. For extended periods sciences like physics exhibit an agreed upon way of doing research. Occasionally disagreement arises as to how to account for anomalies. This then constitutes a crisis which continues until the anomalies are removed by some new scheme which gains agreement, establishing a new normal science. But even when previously accepted theories are abandoned many results are conserved.

The human sciences, on the other hand, have been neither stable nor cumulative. These "dubious disciplines," to use Foucault's pejorative phrase, do not progress through revolutions like physical science, but merely go through episodes in which certain fads tend to dominate research until some competing fad lures most researchers onto its bandwagon. One style of research gives way to another not because the new research is based upon a theory which explains certain anomalies the old theory failed to explain, but simply because researchers have become bored and discouraged with the old approach. The new style, introducing new methods and problems, allows everyone to forget the old problems. Thus the human sciences are subject to frequent factionalism and reorganization, but this is not a crisis — a period of competing paradigms. It is a pre-paradigm state. The human sciences are not even generally stable nor are they even somewhat cumulative.

But disagreement arises as soon as one tries to interpret the above contrast. Rorty, for example, accepts the difference between normal and non-normal science but rejects the attempt to use it to draw a distinction between the natural and the human sciences.

The line ... is not the line between the human and the non-human but between that portion of the field of inquiry where we feel rather uncertain that we have the right vocabulary at hand and that portion where we feel certain that we do. This *does*, at the moment, roughly coincide with the distinction between the fields of the *Geistes-* and the *Naturwissenschaften*. But this coincidence may be *mere* coincidence.¹⁴

Thus Rorty holds that while at present the human sciences are unable to find an agreed upon vocabulary, this fact has nothing to do with the essential nature of man or of science. It is simply an effect of the complexity of the domain and the immaturity of the human sciences.

But this way of dismissing the difference seems too simple. The argument that the human sciences are young is beginning to show its age. Looked at historically the social sciences make a quite different impression than sciences such as biology or meteorology that are struggling with a very complex domain. These latter sciences are making slow but steady progress in developing more and more complicated theories that take into account more and more factors, whereas the human sciences first seek to develop a general theory using one approach, then scrap that attempt *in toto* and take up some other equally simplistic research program.

To take a recent example. The behaviorists sought a complete description

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of human action in terms of elements of behavior and seeks covering laws that predicted the occurrence of particular behavioral events. When this approach came up against hard problems such as linguistic behavior, however, it was quickly abandoned and cognitivism became popular. Cognitivists reject all of the behaviorists carefully compiled results and seek to explain human behavior by analyzing the rule-like relations holding between mental representations. Both approaches aim, in the ideal limit, at attaining the sort of complete explanatory account which allows one to predict precisely the effects of alterations in an object's internal and external environment, and each fails to achieve its goal. It looks more and more like there must be something about human activity, on the one hand, and the nature of theoretical explanation, on the other, which do not fit together.

Why does the sort of theoretical explanation that succeeds brilliantly in the natural sciences fail in the human sciences? The problem, I believe, lies in the attempt to apply theory to the everyday world. Just as physical science predicts and explains everyday changes of place in terms of meaningless, context-independent properties such as mass and position which can be abstracted from the everyday world, so a theoretical science of human beings seeks to emulate natural science by abstracting meaningless, context-free features from everyday, context-dependent, meaningful human activities, and then predict and explain these everyday activities in terms of formal relations between these elements. Insofar as these would-be sciences follow the ideal of physical theory, they must predict and explain *everyday activities*, using *decontextualized features*. But since the context in which human beings pick out the everyday objects and events whose regularities theory attempts to predict is left out in the decontextualization necessary for theory, the everyday objects and events human beings pick out do not always coincide with those elements over which the theory ranges. Therefore predictions, though often correct, are not reliable. Indeed, predictions will work only as long as the elements picked out and related by the theory happen to coincide with the objects and events picked out in their everyday activities by the human beings falling under the theory.

A striking example of what happens when one tries to study human beings as objects was given inadvertently by a Stanford psychologist who announced that his science had discovered that, although people classify some people as talkative and although there is general agreement among participants in the everyday world as to which people belong in this class, the concept of talkativeness is unfounded. If you count the number of words uttered by an individual in a day, the would-be theorist explained, you find that there is no significant difference in the quantity of words uttered by so-called normal and by so-called talkative people.

It never occurred to this objective psychologist that what makes a person count as talkative may be the meaning of what is said and the situation in which it is said. Talkative people presumably say little of importance and say it during other people's lectures, at funerals, etc. The general agreement among participants in the everyday world as to who is talkative is no illusion. Rather the sort of data collection appropriate to the natural sciences, where one studies objects and counts noises, is simply inappropriate to the study of

human beings' understanding of themselves and other human beings. People making judgments such as who is talkative agree because they dwell in a shared background of meaningful practices. In general, in the human sciences, if one is to understand what is going on, one must share a general human background understanding with the person or group being studied. Shared agreement disappears as soon as the meaning of the situation is bracketed out in the attempt to attain the sort of objectivity appropriate to natural science.

This thesis can be further illustrated by the sort of difficulties that, according to Pierre Bourdieu, confront Lévi-Strauss's structuralist theory of gift exchange. In *Outline of a Theory of Practice*, Bourdieu argues that Lévi-Strauss's formal, reversible rules for the exchange of gifts — abstracted as they are from everyday gift-giving — cannot account for and predict actual exchanges. His point is not that theory leaves out the subjective, so-called phenomenological, qualities of gift exchange. That would not be a valid objection. The natural sciences legitimately abstract from subject-relative properties. Bourdieu's point is that Lévi-Strauss's abstraction of the pure objects exchanged leaves out something essential. The tempo of the event actually *determines what counts as a gift*.

In every society it may be observed that, if it is not to constitute an insult, the counter-gift must be *deferred* and *different*, because the immediate return of an exactly identical object clearly amounts to a refusal.¹⁵

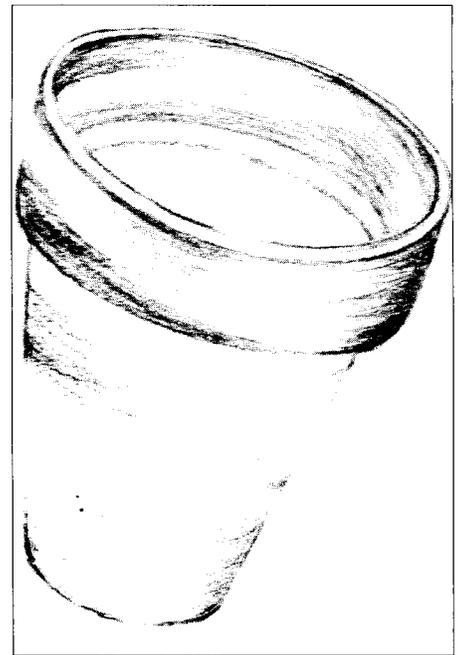
Predictions based only on formal principles fail in those cases in which what formally counts as a gift in the theory is rejected because it is reciprocated too soon or too late to count as a gift in everyday practice.

It is all a question of style, which means in this case timing and choice of occasion, for the *same act* — giving, giving in return, offering one's services, paying a visit, etc. — can have completely different meanings at different times.¹⁶

In general the meaning of the situation plays an essential role in determining what counts as an object or event; yet it is precisely this contextual meaning that theory must ignore. Thus imprecision in the human sciences as they are now constituted is inevitable because what counts as an everyday fact depends on a background of meanings and skills which is excluded by the decontextualization required by theory.

THE QUESTION THEN ARISES: CAN THE HUMAN sciences provide a theoretical account of the social background practices? If the background skills could be captured in strict rules then we could still hope for an objective social science. I must therefore pause here to sketch the phenomenological considerations which lead me to conclude that, there is no reason to think that there can be a *theory* of skills.

Skill acquisition usually begins with the student learning and applying rules for manipulating context-free elements. This is the element of truth in cognitivism. Thus a chess beginner must follow strict rules relating such features as center control, material balance, etc. After one begins to understand a domain, however, one sees meaningful aspects, not context-free features. Thus a more experienced chess player sees context-dependent aspects like unbalanced pawn structure or weakness on the king side. A further stage



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of proficiency is achieved when, after a great deal of experience, one is able to see a situation as having a certain significance tending towards a certain outcome, and certain aspects of the situation stand out as salient in relation to that end. Given a certain board position all masters conclude after a few seconds of examination that the issue is to attack or defend the king-side.

Finally, after even more experience an expert simply sees immediately what must be done, presumably because the current situation is perceived as similar to another already experienced one. The chessmaster, for example, sees the issues in a position almost immediately, and the right move just pops into his head. There is no reason to suppose the beginner's features and rules, or any other features and rules, play any role in such expert performance.¹⁷ Connectionist models of brain functioning which made no use of the features and rules might be able to capture such learning, but such nets do not yield a psychological theory.

The same holds for the shared social skills which make possible picking out objects and events. These skills can no more be understood theoretically, i.e., in terms of features and rules, than any other skills. But if what human beings pick out as specific sorts of objects depends on background skills which are not rule-governed, then what counts as a certain sort of object is not rule-governed either. Predictive failure is a constant possibility in any area where facts such as being talkative or being a gift depend on background practices not integrated into the theory. Prediction will fail whenever an object that, according to the theory, has the defining features of a given type is nonetheless not counted by those in the culture as belonging to that type.

The natural way to cope with this problem is to abandon the attempt to find what one might call first-order interpretation-free features and to settle for second-order features such as the participants' *judgments*, e.g. judgments as to whether what was just exchanged counted as a gift. Such judgments or scores on questionnaires, could be treated as context-free facts or features and then related by theory to explain and predict other objectively determined judgments or test scores. Economics attempts to be such a second-order science. It accepts the current understanding of money, property, etc. and current desires to maximize possessions etc. It then seeks laws relating these socially defined elements. As long as the practices defining the objects and goals of a group remain constant economic laws can in principle be as predictive as those of physics. But if background conditions determine, in a way which in principle falls outside a theory, what counts as the events over which the theory ranges, the theory is at the mercy of changes in these conditions which at any moment can undermine the predictive power of the theory.

It might seem that if one could make explicit the theory's boundary conditions one could at least predict when the theory would fail. Thus ecological theories are explicitly understood as applying only as long as the temperature of the earth remains relatively constant. And, indeed, if the conditions which form the background of a human science such as economics could be made explicit one could gain a kind of scientific closure by stating the limits within which a given economic theory was meant to be predictive. But in the human sciences the background conditions are not physical facts,

nor are they psychological facts such as what agents desire and what they believe is rational. They are not facts at all. As I have tried to show, the background conditions are patterns of skilled behavior which embody an interpretation of what counts as facts, i.e., what counts as objects and events in various domains.

The problem for the social sciences is that these background conditions change, yet the social scientist cannot state precisely in advance what aspects of these patterns have to remain constant for his predictions to continue to be fulfilled. In general, since the boundary conditions of the human sciences are not facts but interpretations, social sciences, such as economics, which build on second order judgments that presuppose these interpretations, are not only incomplete and unstable in comparison with theoretical disciplines such as physics; they are incomplete and unstable even when compared to disciplines with changing background conditions such as ecology.

TO SUM UP. EVEN THE BEST PREDICTIVE THEORIES in the human sciences may at any moment encounter exceptions. Given the lack of any solid predictive successes, other approaches inevitably arise in the discipline which offer competing types of systematic accounts. Such competing types of account do not agree on method, evidence, or even on what are the problems. We then have neither normal science nor even revolutionary science, but just the sort of pre-paradigmatic instability characteristic of the social sciences from their inception to the present.

It follows from the above considerations that the only vocabulary that could make the human sciences theoretical would be one which picked out entirely different features than those abstracted from our everyday activities — features which would remain invariant through changes in background practices. Eliminativists argue that if there were such features and we were able to find them by some sort of luck or divination, then the study of human beings could, in principle, be closed, predictive, and normal.

Entertaining such logical possibilities has little use, however, except to keep philosophers from claiming that, *in principle*, the study of human beings can never be normal. But from the fact that there is no in-principle argument against the possibility of an objective theory of human beings, one cannot conclude, as Rorty seems to do, that the instability of the social sciences is an historical accident. Since we have no reason to believe that the features a theory of human activity requires exist, and no way to find them if they do, the abstract possibility of eliminating reference to meaning should not prevent us from noticing and trying to account for the evident differences between the *Geistes* and *Naturwissenschaften*.

The argument I have presented enables us to see why the only kind of predictive human sciences anyone has tried to develop, indeed, the only kind we can concretely envisage, i.e., sciences based on features abstracted from everyday life, cannot succeed. Either current social sciences must, like economics, build on a background they cannot adequately describe and so whose changes they cannot predict, or else, like behaviorism and cognitivism, human sciences must use features obtained by abstracting from all practical

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contexts to predict events in practical contexts. But since the practical context determines what counts as the events one wants to predict any attempt to obtain completeness in this way is bound to fail. This leads to an attempt to formalize the background practices themselves. But since the background practices are skills they cannot be understood in terms of features and rules. Thus there can be no theory of the everyday world.

Conclusion

Nancy Cartwright has pointed out that scientists too must share background practices that enable them to pick out events in the everyday world that count as instances of the events and objects referred to in their theories, cases of force or of absorption, for example. So, what then is the difference between the natural and human sciences? The difference is that in the social world instances of a given type of object or event are *defined* by the practice of picking them out. A gift *is* whatever the natives take to be a gift. But in natural science the practices for picking out instances of the theory in the everyday world do not define these instances. What in everyday scientific practice counts as a force, for example, must be compatible with the way forces behave under ideal conditions such as weightlessness or in a vacuum. The natives cannot be wrong about what, in the everyday world, is a gift, but, since the everyday world can be transformed by degrees into an artificial world, the scientists can discover they have been wrong about what in the everyday world they have been picking out as an instance of some theoretical entity such as a force. In general, the answer I would give to Cartwright's objection is that in the natural sciences shared background skills are, indeed, necessary for decontextualizing features and for applying theories, but, unlike in the human sciences, these skills do not define what counts as the objects of the theory. Rather, the background skills function progressively to free the science's objects from dependence on *all* practices, including the practices that reveal them.

Thus, although *physics* is a social practice, *physical theory* has, in the course of its development, progressively left behind our shared everyday understanding of space, time, objects and causality. There is no in principle limit to how far this decontextualizing can go. This is why we can make sense of the idea of an ideal natural science getting a correct view of causal nature — a view a Martian could understand and accept. But there is no equivalent idea of an ideal social science converging on the interpretation-free truth about a practice like gift-giving or comportment like being talkative. On the contrary, in the human sciences, as we have seen, producing an account of meaningful human comportment requires concepts that are essentially dependent upon social meanings. Decontextualizing is thus impossible in the human sciences if the human sciences wish to predict comportment in our meaningful everyday world.

I have tried to give a sketch of the phenomenological arguments of a hermeneutic philosophy of science which could serve as a substitute for the old in principle arguments of traditional philosophy of science. Even if philosophers cannot prove that nature has an objective structure that is revealed by science, hermeneutic phenomenology can show that there is no contradiction in the idea of natural science converging on the causal structure

of nature itself. Likewise even if philosophers cannot rule out the possibility of human beings being explained as objects, hermeneutic phenomenology can show why the attempt to explain the everyday world in terms of features and rules cannot work. Thus a description of the relation of theory to scientific and to everyday background practices, as well as an account of the background skills themselves, can show why the distinction between normal and pre-paradigm science parallels the distinction between the *Natur* and *Geisteswissenschaften*. It can thus show that the *disunity* of the sciences is no mere historical accident as Rorty claims. Indeed, we should expect a crucial difference between natural and human science to arise just where it has arisen and to remain as long as these disciplines exist. \varnothing

ENDNOTES

- ¹Evelyn Fox Keller, "The Gender/Science System: or, Is Sex to Gender as Nature is to Science?", *Hypathia* vol. 2, no.3, Fall 1987, p. 45.
- ²In asserting that theories range over decontextualized, uninterpreted facts I am not endorsing a positivist account of theories as based on brute data. The basic data are meter reading and computer print outs. These "uninterpreted facts" are cut off from our everyday world of equipment and purposes but they are, of course, recontextualized or theory laden, otherwise they could not fill in variables asking for mass, charge, etc.
- ³Arthur Fine, *The Shaky Game: Einstein, Realism and the Quantum Theory*, Chicago, Ill., University of Chicago Press, 1986, p. 140. For an example of such a constructivist account see Joseph Rouse, *Knowledge and Power: Toward a Political Philosophy of Science*, Cornell University Press, 1987.
- ⁴Arthur Fine, *The Shaky Game*, p. 130.
- ⁵*Ibid.*, pp. 126ff.
- ⁶Arthur Fine, *The Shaky Game*, p. 133.
- ⁷The best way to understand what Heidegger means by Dasein is to think of our term "human being," which can refer to a way of being that is characteristic of all people, or it can refer to a specific person — a human being.
- ⁸Martin Heidegger, *Gesamtausgabe*, Vol. 25, Vittorio Klossman, Frankfurt, 1977, p. 2.
- ⁹Martin Heidegger, *Basic Problems*, p. 194.
- ¹⁰If these kinds of things turn out not to have the properties predicted and the natural kind terms referring to them have to be dropped from the lexicon of science like phlogiston was, then some other system of natural kind terms might, in principle, still be found which do refer to the natural kinds there really are; although, of course, we could never know for certain we had the final account.
- ¹¹Martin Heidegger, "Science and Reflection," pp. 173-174.
- ¹²Martin Heidegger, "The Age of the World Picture," *The Question Concerning Technology and Other Essays*, p. 117.
- ¹³Martin Heidegger, *The History of the Concept of Time*, p. 203.
- ¹⁴Richard Rorty, *Philosophy and the Mirror of Nature*, Princeton University Press, 1979, p. 352.
- ¹⁵Bourdieu, *Outline* p. 5. My italics.
- ¹⁶*Ibid.*, p. 6.
- ¹⁷One can, of course, recall the rules one once used and act on them again, but then ones behavior will be halting and clumsy just as it was when one mastered the rules as an advanced beginner. For a more detailed account of the stages of skill acquisition and the implications of this account for cognitive science, cf. *Mind Over Machine*, Hubert and Stuart Dreyfus, Free Press, 1986.