The Future of Philosophy

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The situation of philosophy today is somewhat analogous to the situation of the Greeks at the time of the transition from Socrates and Plato to Aristotle. Socrates and Plato took skepticism very seriously and struggled with piecemeal issues. Aristotle did not regard the skeptical paradoxes as a serious threat to his overall enterprise of attempting to do systematic, constructive, theoretical philosophy. I think we now have the tools to move into a twenty-first century version of an Aristotelian phase.

Because of the nature of the subject, I do not believe it is possible to project a future course of philosophy with anything like the confidence that one can project the future course of the sciences—though, of course, that is not at all an easy thing to do in itself. What I will do here, therefore, is take three areas of philosophical investigation that are very much alive at the present moment and discuss their present status and future prospects. These are (1) the traditional mind-body problem, (2) the philosophy of mind and cognitive science, and (3) the philosophy of science. While my reflections may include some guesses about what I think will happen in these areas, they will also contain critical remarks and expressions of hope for future research in the coming decades.

Introduction

I will begin by explaining some of the similarities and differences between science and philosophy. There is no sharp dividing line between the two. Both, in principle, are universal in subject matter,

and both aim at the truth. However, though there is no sharp dividing line, there are important differences in method, style, and presuppositions. Philosophical problems tend to have three related features that scientific problems do not have. First, philosophy is in large part concerned with questions that we have not yet found a satisfactory and systematic way to answer. Second, philosophical questions tend to be what I will call "framework" questions; that is, they tend to deal with large frameworks of phenomena, rather than with specific individual questions. And third, philosophical questions are typically about conceptual issues; they are often questions about our concepts and the relation between our concepts and the world they represent.

These differences will become clearer if we consider actual examples. The question "What is the cause of cancer?" is a scientific question, not a philosophical one. The question "What is the nature of causation?" is philosophical, not scientific. Similarly, "How many neurotransmitters are there?" is a scientific question, not a philosophical one; but the question "What is the relationship between mind and body?" is still, in large part, a philosophical question. In each case the philosophical questions cannot be settled by the simple application of either experimental or mathematical methods because they are about large frameworks involve conceptual issues. Sometimes major scientific advances are contributions to both science and philosophy because they involve changes in frameworks and revision of concepts. Einstein's relativity theory is an obvious twentieth century example.

Because philosophy deals with framework questions and with questions that we do not know how to answer systematically, it tends to stand in a peculiar relation to the natural sciences. As soon as we can revise and formulate a philosophical question to the point that we can find a systematic way to answer it, it ceases to be philosophical and becomes scientific. Something very much like this happened to the problem of life. How "inert" matter could become "alive" was once considered a philosophical problem. As we came to understand the molecular biological mechanisms of life, this ceased to be a philosophical question and became a matter of established scientific fact. It is hard for us today to recover the intensity with which this issue was once debated. The point is not so much that the mechanists won and the vitalists lost, but that we came to have a much richer concept of the biological mechanisms of life and heredity. I hope a similar thing will happen to the problem of consciousness and its relation to brain processes. As I write this, it is still regarded by many as a philosophical question, but I believe with recent progress in neurobiology and with

a philosophical critique of the traditional categories of the mental and the physical, we are getting closer to being able to find a systematic scientific way to answer this question. In which case it will, like the problem of life, cease to be "philosophical" and will become "scientific." These features of philosophical questions, that they tend to be framework questions and tend not to lend themselves to systematic empirical research, explains why science is always "right," and philosophy is always "wrong." As soon as we find a systematic way to answer a question and get an answer that all competent investigators in the field can agree is the correct answer, we stop calling it "philosophical" and start calling it "scientific." These differences do not have the result that, in philosophy, anything goes, that one can say anything and make any speculation that one likes. On the contrary, precisely because we lack established, empirical or mathematical methods for investigating philosophical problems, we have to be all the more rigorous and precise in our philosophical analyses.

It might seem, from what I have said, that eventually philosophy will cease to exist as a discipline as we find a systematic scientific way to answer all philosophical questions. This has been the dream of philosophers, I believe, since the time of the ancient Greeks, but in fact, we have not had much success in getting rid of philosophy by solving all philosophical problems. A generation ago it was widely believed that we had at last discovered, through the efforts of Wittgenstein, Austin, and other "linguistic philosophers," systematic methods for solving philosophical questions, and it seemed to some philosophers that we might be able to solve all the questions within a few lifetimes. Austin, for example, believed that there were about a thousand philosophical questions left and that, with systematic research, we should be able to solve all of them. I do not think anyone believes that today. Only a small number of the philosophical problems left us by the preceding centuries, going back to the Greek philosophers, have been amenable to scientific, mathematical, and linguistic solutions. The question as to the nature of life, I believe, has been finally resolved and is no longer a philosophical question. I hope something like this will happen to the so-called mind-body problem in the twenty-first century. However, a very large number of other questions left us by the ancient Greeks such as "What is the nature of justice?" "What is a good society?" "What is the proper aim and goal of human life?" "What is the nature of language and meaning?" "What is the nature of truth?" are still very much with us as philosophical questions. I would estimate that about ninety percent of the philosophical problems left us by the Greeks are

still with us and that we have not yet found a scientific, linguistic, or mathematical way to answer them. Furthermore, new philosophical problems are constantly being thrown up and whole new areas of philosophy invented. The Greeks could not possibly have had the sort of philosophical problems we have had in getting a correct philosophical interpretation of the results of quantum mechanics, Godel's theorem, or the set theoretical paradoxes. Nor did they have such subjects as the philosophy of language or the philosophy of mind as we think of them. It seems that, even at the end of the twenty-first century, we shall still have a very large number of philosophical problems left.

Future Prospects

Because of the nature of the subject, I do not believe it is possible to project a future course of philosophy with anything like the confidence that one can project the future course of the sciences—though, of course, that is not at all an easy thing to do in itself. What I will do here, therefore, is take two areas of philosophical investigation that are very much alive at the present moment and discuss their present status and future prospects. These are (1) the traditional mind-body problem and (2) the philosophy of science. While my reflections may include some guesses about what I think will happen in these areas, they will also contain critical remarks and expressions of hope for future research in the coming decades.

I have a specific intellectual objective in proposing that we should abandon skepticism and reductionism. I believe we cannot get a satisfactory constructive analysis of language, mind, society, rationality, political justice, and so on until we abandon our obsession with the idea that the presupposition of all investigation is first to provide a justification for the very possibility of knowledge and that real advances in philosophical knowledge in general require the reduction of higher level phenomena to more epistemically fundamental phenomena. The way to deal with skepticism is not to try to refute it on its own terms, but to overcome it in such a way that we can go on to deal with the problems at hand. This is certainly is where I am in my own intellectual development. On my interpretation of the contemporary philosophical scene, skepticism has finally ceased to be a primary concern of philosophers and reductionism has in general failed. The situation we are in is somewhat analogous to the situation of the Greeks at the time of the transition from Socrates and Plato to Aristotle. Socrates and Plato took skepticism very seriously and struggled with piecemeal issues. Aristotle did not regard the skeptical

paradoxes as a serious threat to his overall enterprise of attempting to do systematic, constructive, theoretical philosophy. I think we now have the tools to move into a twenty-first century version of an Aristotelian phase.

The Traditional Mind-Body Problem

I begin with the traditional mind-body problem because I believe it is the contemporary philosophical problem most amenable to scientific solution: What exactly are the relations between consciousness and the brain? It seems to me that the neurosciences have now progressed to the point that we can address this as a straight neurobiological problem, and indeed several neurobiologists are doing precisely that. In its simplest form, the questions are how exactly neurobiological processes in the brain cause conscious states and processes and how exactly those conscious states and processes are realized in the brain?

So stated, this looks like an empirical scientific problem. It looks similar to such problems as "How exactly do biochemical processes at the level of cells cause cancer?" and "How exactly does the genetic structure of a zygote produce the phenotypical traits of a mature organism?"

However, there are a number of purely philosophical obstacles to getting a satisfactory neurobiological solution to the problem of consciousness, and I have to devote some space at least to trying to remove some of the worst of these obstacles.

The single most important obstacle to getting a solution to the traditional mind-brain problem is the persistence of a set of traditional but obsolete categories: mind and body, matter and spirit, mental and physical. As long as we continue to talk and think as if the mental and the physical were separate metaphysical realms, the relation of the brain to consciousness will forever seem mysterious and we will not have a satisfactory explanation of the relation of neuron firings to consciousness. The first step on the road to philosophical and scientific progress in these areas is to forget about the tradition of Cartesian dualism and just remind ourselves that mental phenomena are ordinary biological phenomena in the same sense as photosynthesis or digestion. We must stop worrying about how the brain *could* cause consciousness and begin with the plain fact that it *does*. The notions of both mental and physical as they are traditionally defined need to be abandoned as we reconcile ourselves to the fact that we live in one world, and all the features of the world, from quarks and electrons to nation states and balance of payments problems, are, in their different ways, part of

that one world. I find it truly amazing that the obsolete categories of mind and matter continue to impede progress. Many scientists feel that they can only investigate the "physical" realm and are reluctant to face consciousness on its own terms because it seems not to be "physical" but to be "mental," and several prominent philosophers think it is impossible for us to understand the relations of mind to brain. Just as Einstein made a conceptual change to break the distinction between space and time, so we need a similar conceptual change to break the bifurcation of mental and physical.

Related to the difficulty brought about by accepting the traditional categories is a straight logical fallacy that I need to expose. Consciousness is, by definition, subjective, in the sense that for a conscious state to exist, it has to be experienced by some conscious subject. Consciousness in this sense has a first-person ontology in that it only exists from the point of view of a human or animal subject, an "I," who has the conscious experience. Science is not used to dealing with phenomena that have a first-person ontology. By tradition, science deals with phenomena that are "objective" and avoids anything that is "subjective." Indeed, many philosophers and scientists feel that, because science is by definition objective, there can be no such thing as a science of consciousness because consciousness is subjective. This whole argument rests on a massive confusion, which is one of the most persistent confusions in our intellectual civilization. There are two quite distinct senses of the distinction between objective and subjective. In one sense, which I will call the epistemological sense, there is a distinction between objective knowledge and subjective matters of opinion. If I say, for example, "Rembrandt was born in 1606," that statement is epistemologically objective in the sense that it can be established as true or false independently of the attitudes, feelings, opinions, or prejudices of the agents investigating the question. If I say, "Rembrandt was a better painter than Rubens," that claim is not a matter of objective knowledge, but is a matter of subjective opinion. But in addition to the distinction between epistemologically objective and subjective claims, there is a distinction between entities in the world that have an objective existence, such as mountains and molecules, and entities that have a subjective existence, such as pains and tickles. I call this distinction in modes of existence the ontological sense of the objective/subjective distinction.

Science is indeed epistemologically objective in the sense that scientists attempt to establish truths that can be verified independently of the attitudes and prejudices of the scientists. But epistemic objectivity

of method does not preclude ontological subjectivity of subject matter. Thus there is no objection in principle to having an epistemologically objective science of an ontologically subjective domain, such as human consciousness.

Another difficulty encountered by a science of subjectivity is the difficulty in verifying claims about human and animal consciousness. In the case of humans, unless we perform experiments on ourselves individually, our only conclusive evidence for the presence and nature of consciousness is what the subject says and does, and subjects are notoriously unreliable. In the case of animals, we are in an even worse situation, because we have to rely on just the animal's behavior in response to stimuli. We cannot get any statements from the animal about its conscious states.

I think this is a real difficulty, but I would point out that it is no more an obstacle in principle than the difficulties encountered in other forms of scientific investigation where we have to rely on indirect means of verifying our claims. We have no way of observing black holes, and indeed, strictly speaking, we have no way of directly observing atomic and subatomic particles. Nonetheless, we have quite well established scientific accounts of these domains, and the difficulties in verifying hypotheses in these areas should give us a model for verifying hypotheses in the area of the study of human and animal subjectivity. The "privacy" of human and animal consciousness does not make a science of consciousness impossible. As far as "methodology" is concerned, in real sciences, methodological questions always have the same answer: in order to find out how the world works, you have to use any weapon that you can lay your hands on and stick with any weapon that seems to work.

Assuming, then, that we are not worried about the problem of objectivity and subjectivity and that we are prepared to seek indirect methods of verification of hypotheses concerning consciousness, how should we proceed? Most scientific research today into the problem of consciousness seems to me to be based on a mistake. The scientists in question characteristically adopt what I will call the "building block theory" of consciousness, and they conduct their investigation accordingly. On the building block theory, we should think of our conscious field as made up of various building blocks, such as visual experience, auditory experience, tactile experience, the stream of thought, etc. The task of a scientific theory of consciousness would be to find the neurobiological correlate of consciousness (nowadays called the NCC), and, on the building block theory, if we could find the NCC for even one

building block, such as the NCC for color vision, that would, in all likelihood, give us a clue to the building blocks for the other sensory modalities and for the stream of thought. This research program may turn out to be right in the end. Nonetheless, it seems to me doubtful as a way to proceed in the present situation for the following reason. I said above that the essence of consciousness was subjectivity. There is a certain subjective qualitative feel to every conscious state. One aspect of this subjectivity, and it is a necessary aspect, is that conscious states always come to us in a unified form. We do not perceive just the color, the shape, or the sound of an object; we perceive all of these at once simultaneously in a unified conscious experience. The subjectivity of consciousness implies unity. They are not two separate features, but two aspects of the same feature.

Now, that being the case, it seems to me that the NCC we are looking for is not the NCC for the various building blocks of color, taste, sound, and so on, but rather what I will call the basal, or background, conscious field, which is the presupposition of having any conscious experience in the first place. We should think of my present conscious field not as made up of various building blocks, but rather as a unified field that is modified in specific ways by the various stimuli that I and other human beings receive. Because we have pretty good evidence from lesion studies that consciousness is not distributed over the entire brain, and because we also have good evidence that consciousness exists in both hemispheres, I think what we should look for now is the kind of neurobiological processes that will produce a unified field of consciousness. These, as far as I can tell, are likely to be, for the most part, in the thalamocortical system. My hypothesis, then, is that looking for the NCC's of building blocks is barking up the wrong tree, and that we should instead look for the correlate of the unified field of consciousness in massive synchronized patterns of neuron firing.

The Philosophy of Mind and Cognitive Science

The mind-body problem is one part of a much broader set of issues, known collectively as the philosophy of mind. This includes not only the traditional mind-body problem, but the whole conglomeration of problems dealing with the nature of mind and consciousness, of perception and intentionality, and of intentional action and thought. A very curious thing has happened in the past two or three decades: the philosophy of mind has moved to the center of philosophy. Several other important branches of philosophy, such as epistemology,

metaphysics, the philosophy of action, and even the philosophy of language, are now treated as dependent on, and in some cases even as branches of, the philosophy of mind. Whereas fifty years ago the philosophy of language was considered "first philosophy," now it is the philosophy of mind. There are a number of reasons for this change, but two stand out.

First, it has become more and more obvious to a lot of philosophers that our understanding of the issues in a lot of subjects—the nature of meaning, rationality, and language in general—presupposes an understanding of the most fundamental mental processes. For example, the way language represents reality is dependent on the more biologically fundamental ways in which the mind represents reality, and indeed, linguistic representation is a vastly more powerful extension of the more basic mental representations such as beliefs, desires, and intentions.

Second, the rise of the new discipline of cognitive science has opened to philosophy whole areas of research into human cognition in all its forms. Cognitive science was invented by an interdisciplinary group consisting of philosophers who objected to the persistence of behaviorism in psychology, together with like-minded cognitive psychologists, linguists, anthropologists, and computer scientists. I believe the most active and fruitful general area of research today in philosophy is in the general cognitive science domain.

The basic subject matter of cognitive science is intentionality in all of its forms. "Intentionality" is a technical term used by philosophers to refer all of those mental phenomena that refer to or are about objects and states of affairs in the world. "Intentionality" so defined has no special connection with intending in the ordinary sense in which I intend to go to the movies tonight. Intending is just one kind of intentionality among others. Intentionality so defined includes at least beliefs, desires, memories, perceptions, intentions (in the ordinary sense), intentional actions, and emotions.

Paradoxically, cognitive science was founded on a mistake. There is nothing necessarily fatal about founding an academic subject on a mistake, indeed many disciplines were founded on mistakes. Chemistry, for example, was founded on alchemy. However, a persistent adherence to the mistake is at best inefficient and an obstacle to progress. In the case of cognitive science, the mistake was to suppose that the brain is a digital computer and the mind is a computer program.

There are a number of ways to demonstrate that this is a mistake, but the simplest is to point out that the implemented computer

program is defined entirely in terms of symbolic or syntactical processes, independent of the physics of the hardware. Minds, on the other hand, contain more than symbolic or syntactical components. They contain actual mental states with semantic content in the form of thoughts, feelings, and so on, and these are caused by quite specific neurobiological processes in the brain. The mind could not consist in a program because the syntactical operations of the program are not sufficient by themselves to guarantee the semantic contents of actual mental processes. I demonstrated this years ago with the so-called Chinese Room Argument.[1]

A debate continues about this and other versions of the computational theory of the mind. Some people think that the introduction of computers that use parallel distributed processing ("PDP," sometimes also called "connectionism"), would answer the objections I just stated. But I do not see how the introduction of the connectionist arguments makes any difference. The problem is that any computation that can be carried out on a connectionist program can also be carried out on a traditional von Neumann system. We know from mathematical results that any function that is computable at all is computable on a universal Turing machine. In that sense, no new computational capacity is added by the connectionist architecture, though the connectionist systems can be made to work faster because they have several different computational processes acting in parallel and interacting with each other. Because the computational powers of the connectionist system are no greater than the traditional von Neumann system, if we claim superiority for the connectionist system, there must be some other feature of the system that it is being appealed to. But the only other feature of the connectionist system would have to be in the hardware implementation, which operates in parallel, rather than in series. But if we claim that the connectionist architecture, rather than connectionist computations, are responsible for mental processes, we are no longer advancing the computational theory of the mind, but are engaging in neurobiological speculation. With this hypothesis, we have abandoned the computational theory of the mind in favor of speculative neurobiology.

What is actually happening in cognitive science is a paradigm shift away from the computational model of the mind and toward a much more neurobiologically based conception of the mind. For reasons that

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[1] John R. Searle, "Minds, Brains and Programs," *Behavioral and Brain Sciences* 3 (1980): 417–457.

should be clear by now, I welcome this development. As we come to understand more about the operations of the brain, it seems to me that we will succeed in gradually replacing computational cognitive science with cognitive neural science. Indeed, I believe this transformation is already taking place.

Advances in cognitive neuroscience are likely to create more philosophical problems than they solve. For example, to what extent will an increased understanding of brain operations force us to make conceptual revisions in our common sense vocabulary for describing mental processes as they occur in thought and action? In the simplest and easiest cases, we can simply assimilate the cognitive neuroscience discoveries to our existing conceptual apparatus. Thus, we do not make a major shift in our concept of memory when we introduce the sorts of distinctions that neurobiological investigation have made apparent to us. In popular speech, we now distinguish between short-term and long-term memory, and no doubt as our investigation proceeds, we will have further distinctions. Perhaps the concept of iconic memory is already passing into the general speech of educated people. But in some cases, it seems we are forced to make conceptual revisions. I have thought for a long time that the common sense conception of memory as a storehouse of previous experience and knowledge is both psychologically and biologically inadequate. My impression is that contemporary research bears me out on this. We have to have a conception of memory as a creative process, rather than simply a retrieval process. Some philosophers think even more radical revisions than this will be forced upon us by the neurobiological discoveries of the future.

Another set of philosophical problems arises when we begin to examine the relationships between the developmental evidence regarding mental phenomena and the mental phenomena as they occur in mature adults. Very young children apparently have a different conception of the relation of belief to truth from that of adults. How seriously should we take these differences? Do we need to enrich our theory of intentionality by incorporating the developmental data? We do not yet know the answer to any of these questions, and my point in raising them here is to call attention to the fact that, once we have removed the philosophical error of supposing that the brain is a digital computer, and once we have a more mature and sophisticated cognitive neuroscience, we still have to deal with a number of philosophical questions.

The Philosophy of Science

In the twentieth century, not surprisingly, the philosophy of science shared the epistemic obsession with the rest of philosophy. The chief questions in the philosophy of science, at least for the first half of the century, had to do with the nature of scientific verification, and much effort was devoted to overcoming various skeptical paradoxes, such as the traditional problem of induction. Throughout most of the twentieth century, the philosophy of science was conditioned by the belief in the distinction between analytic and synthetic propositions. The standard conception of the philosophy of science was that scientists aimed to get synthetic contingent truths in the form of universal scientific laws. These laws stated very general truths about the nature of reality, and the chief issue in the philosophy of science had to do with the nature of their testing and verification. The prevailing orthodoxy, as it developed in the middle decades of the century, was that science proceeded by something called the "hypothetico-deductive method." The scientists formed the hypothesis, deduced logical consequences from it, and then tested those consequences in the form of experiments. This conception was articulated, I think more or less independently, by Karl Popper and Carl Gustav Hempel.

Those practicing scientists who took an interest in the philosophy of science at all tended, I think, to admire Popper's views, but much of their admiration was based on a misunderstanding. What I think they admired in Popper was the idea that science proceeds by acts of originality and imagination. The scientist has to form a hypothesis on the basis of his own imagination and guesswork. There is no "scientific method" for arriving at hypotheses. The procedure of the scientist is then to test the hypothesis by performing experiments and to reject those hypotheses that have been refuted.

Most scientists do not, I think, realize how anti-scientific Popper's views actually are. On Popper's conception of science and the activity of scientists, science is not an accumulation of truths about nature and the scientist does not arrive at truths about nature. Rather, all that we have in the sciences are a series of so far unrefuted hypotheses. But the idea that the scientist aims after truth, as well as that, in various sciences, we actually have an accumulation of truths—which I think is the presupposition of most actual scientific research—is not something that is consistent with Popper's conception.

The comfortable orthodoxy of science as an accumulation of truths, or even as a gradual progression through the accumulation of so far unrefuted hypotheses, was challenged by the publication of Thomas

Kuhn's *Structure of Scientific Revolutions* in 1962.[2] It is puzzling that Kuhn's book should have had the dramatic effect that it did, since it is not, strictly speaking, about the philosophy of science, but about the history of science. Kuhn argues that, if you look at the actual history of science, you discover that it is not a gradual progressive accumulation of knowledge about the world, but that science is subject to periodic massive revolutions in which entire world views are overthrown when an existing paradigm is overthrown by a new scientific paradigm. It is characteristic of Kuhn's book that he implies, though as far as I know he does not state explicitly, that the scientist does not give us truths about the world, but gives us a series of ways of solving puzzles, a series of ways of dealing with puzzling problems within a paradigm. And when the paradigm reaches puzzles that it cannot solve, it is overthrown and a new paradigm is erected in its place, which again sets off a new round of puzzle-solving activity. From the point of view of this discussion, the interesting thing about Kuhn's book is that he seems to imply that we are not getting progressively closer to the truth about nature in the natural sciences; we are just getting a series of puzzle-solving mechanisms. The scientist essentially moves from one paradigm to another for reasons that have nothing to do with giving an accurate description of an independently existing natural reality, but rather for reasons that are in greater or lesser degree irrational. Kuhn's book was not much welcomed by practicing scientists, but it had an enormous effect in several humanities disciplines, especially those connected with the study of literature, because it seemed to argue that science gives us no more truth about the real world than do works of literary fiction or works of literary criticism, that science is essentially an irrational operation where groups of scientists form theories that are social constructs and then abandon these in favor of other theories that are likewise arbitrary social constructs.

Whatever Kuhn's intentions, I believe that his effect on general culture, though not on the practices of real scientists, has been unfortunate, for it has served to "demythologize" science, to "debunk" it, to prove that it is not what ordinary people have supposed it to be. Kuhn paved the way for an even more radical skeptical view of Paul Feyerabend, who argued that, as far as giving us truths about the world, science is no better than witchcraft.

My own view is that these issues are entirely peripheral to what we ought to be worried about in the philosophy of science, and what I

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[2] Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962).

hope we will dedicate our efforts to in the twenty-first century. I think the essential problem is this: twentieth-century science has radically challenged a set of very pervasive, powerful philosophical and common sense assumptions about nature, and we simply have not digested the results of these scientific advances. I am thinking especially of quantum mechanics. I think that we can absorb relativity theory more or less comfortably because it can be construed as an extension of our traditional Newtonian conception of the world. We simply have to revise our ideas of space and time and their relation to such fundamental physical constants as the speed of light. But quantum mechanics really does provide a basic challenge to our world view, and we simply have not yet digested it. I regard it as a scandal that philosophers of science, including physicists with an interest in the philosophy of science, have not so far given us a coherent account of how quantum mechanics fits into our overall conception of the universe, particularly as regards to causation and determinacy.

Most philosophers, like most educated people today, have a conception of causation that is a mixture of common sense and Newtonian mechanics. Philosophers tend to suppose that causal relations are always instances of strict deterministic causal laws and that cause and effect relations stand to each other in the kind of simple mechanical relations of gear wheels moving other gear wheels and other such Newtonian phenomena. We know at some abstract level that that is not right, but we still have not replaced our common sense conception with a more sophisticated scientific conception. I think that it is the most exciting task of the twenty-first-century philosophy of science, and this is something that would be done both by scientists and philosophers, to give an account of results of quantum mechanics that will enable us to assimilate quantum mechanics to a coherent overall worldview. I think that, in the course of this project, we are going to have to revise certain crucial notions, such as the notion of causation, and that this revision is going to have very important effects on other questions, such as the questions concerning determinism and free will. This work has already begun, and I hope it will continue successfully in the twenty-first century.

Conclusion

The history of philosophy, as it is described in the standard textbooks, is largely a history of the works of a number of towering geniuses. From Socrates, Plato, and Aristotle, to Wittgenstein and Russell, the chief results of philosophy are in the works of its great figures. In

that sense, there simply are no towering geniuses alive today. This, I believe, is not because we have less talent than our predecessors. On the contrary, I believe that, paradoxically, the reason there are no recognized geniuses today is simply that there are more good philosophers alive now than there were in the past. Because there is so much talent and so much good work is being done, it is impossible for a single figure or a few figures to dominate the field in a way that was possible up until the early part of the twentieth century. I think that there are probably a number of other fields like philosophy in this respect—the apparent shortage of geniuses is the result of a surplus, rather than a deficit, of talent. But whether or not the phenomenon is general, I am quite confident that this is true of philosophy: the sheer number of hard working, able, talented figures in the field makes it impossible that any small number of people should be recognized as standing head and shoulders above all of the others.

One of the many advantages in having a field that is not dominated by a tiny number of overpowering figures is that philosophy as a cooperative enterprise seems to be more possible than it has typically been in the past. It is quite possible for people working on a common set of problems to see their enterprise as one of advancing theoretical understanding in a given domain.

In my view, the biggest single obstacle to progress of a systematic theoretical kind has been the obsession with epistemology. I believe that epistemic problems such as "How is it possible that we can have knowledge at all in the light of the various skeptical paradoxes?" should be regarded in the same way as other such paradoxes have been regarded in the history of philosophy. Zeno's paradoxes about space and time, for example, pose interesting puzzles, but no one supposes that we cannot seriously attempt to cross a room until we have first answers Zeno's skepticism about the possibility of moving through space. Analogously, I believe, we should have the same attitude toward the paradoxes about the possibility of knowledge that were advanced by skeptical philosophers. That is, these are interesting puzzles, and they provide good five-finger exercises for training young philosophers, but we should not suppose that the possibility of knowledge and understanding rests on our first being able to refute Hume's skepticism. I cannot, of course, predict what is going to happen in the twenty-first century, but I can express the hope—and I think at this stage in our intellectual history it is a well-founded hope—that, with the abandonment of the epistemic bias in the philosophy of language, the philosophy of mind, ethics, political philosophy, and the philoso-

phy of science, we may achieve greater theoretical understanding and more constructive theoretical accounts than we have had at any time in the past history of the subject. NV