

says about his conscious experiences which is inconsistent with anything the physiologist might want to say about the brain processes which cause him to describe the environment and his consciousness of that environment in the way he does. When the subject describes his experience by saying that a light which is in fact stationary appears to move, all the physiologist or physiological psychologist has to do in order to explain the subject's introspective observations is to show that the brain process which is causing the subject to describe his experience in this way is the sort of process which normally occurs when he is observing an actual moving object and which therefore normally causes him to report the movement of an object in his environment. Once the mechanism whereby the individual describes what is going on in his environment has been worked out, all that is required to explain the individual's capacity to make introspective observations is an explanation of his ability to discriminate between those cases where his normal habits of verbal descriptions are appropriate to the stimulus situation and those cases where they are not, and an explanation of how and why, in those cases where the appropriateness of his normal descriptive habits is in doubt, he learns to issue his ordinary descriptive protocols preceded by a qualificatory phrase like "it appears," "seems," "looks," "feels," etc.<sup>5</sup>

## NOTES

- 1 E. C. Tolman, *Purposive Behaviour in Animals and Men* (Berkeley 1932).
- 2 L. Wittgenstein, *Philosophical Investigations* (Oxford 1953); G. Ryle, *The Concept of Mind* (1949).
- 3 Place, "The Concept of Heed," *British Journal of Psychology* XLV (1954), 243-55.
- 4 Sir Charles Sherrington, *The Integrative Action of the Nervous System* (Cambridge 1947) pp. xx-xxi.
- 5 I am greatly indebted to my fellow-participants in a series of informal discussions on this topic which took place in the Department of Philosophy, University of Adelaide, in particular to Mr C. B. Martin for his persistent and searching criticism of my earlier attempts to defend the thesis that consciousness is a brain process, to Professor D. A. T. Gasking, of the University of Melbourne, for clarifying many of the logical issues involved, and to Professor J. J. C. Smart for moral support and encouragement in what often seemed a lost cause.

## 3

## Early Causal and Functionalist Views

### The Causal Theory of the Mind

D. M. ARMSTRONG

#### Is Philosophy Just Conceptual Analysis?

What can philosophy contribute to solving the problem of the relation to mind to body? Twenty years ago, many English-speaking philosophers would have answered: "Nothing beyond an analysis of the various mental *concepts*." If we seek knowledge of things, they thought, it is to science that we must turn. Philosophy can only cast light upon our concepts of those things.

This retreat from things to concepts was not undertaken lightly. Ever since the seventeenth century, the great intellectual fact of our culture has been the incredible expansion of knowledge both in the natural and in the rational sciences (mathematics, logic). Everyday life presents us with certain simple verities. But, it seems, through science and only through science can we build upon these verities, and with astonishing results.

The success of science created a crisis in philosophy. What was there for philosophy to do? Hume had already perceived the problem in some degree, and so surely did Kant, but it was not until the twentieth century, with the Vienna Circle and with Wittgenstein, that the difficulty began to weigh heavily. Wittgenstein took the view that philosophy could do no more than strive to undo the intellectual knots it itself had tied, so achieving intellectual release, and even a certain illumination, but no knowledge. A little later, and more optimistically, Ryle saw a positive, if reduced, role for philosophy in mapping the "logical geography" of our concepts: how they stood to each other and how they were to be analyzed.

On the whole, Ryle's view proved more popular than Wittgenstein's. After all, it

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retained a special, if much reduced, realm for philosophy where she might still be queen. There was better hope of continued employment for members of the profession!

Since that time, however, philosophers in the "analytic" tradition have swung back from Wittgensteinian and even Rylean pessimism to a more traditional conception of the proper role and tasks of philosophy. Many analytic philosophers now would accept the view that the central task of philosophy is to give an account, or at least play a part in giving an account, of the most general nature of things and of man. (I would include myself among that many.)

Why has this swing back occurred? Has the old urge of the philosopher to determine the nature of things by *a priori* reasoning proved too strong? To use Freudian terms, are we simply witnessing a return of what philosophers had repressed? I think not. One consideration that has had great influence was the realization that those who thought that they were abandoning ontological and other substantive questions for a mere investigation of concepts were in fact smuggling in views on the substantive questions. They did not acknowledge that they held these views, but the views were there; and far worse from their standpoint, the views imposed a form upon their answers to the conceptual questions.

For instance, in *The Concept of Mind* (1949), Gilbert Ryle, although he denied that he was a Behaviorist, seemed to be upholding an account of man and his mind that was extremely close to Behaviorism. Furthermore, it seemed in many cases that it was this view of the mind-body problem that led him to his particular analyses of particular mental concepts, rather than the other way around. Faced with examples like this, it began to appear that, since philosophers could not help holding views on substantive matters, and the views could not help affecting their analyses of concepts, the views had better be held and discussed explicitly instead of appearing in a distorted, because unacknowledged, form.

The swing back by analytic philosophers to first-order questions was also due to the growth of a more sophisticated understanding of the nature of scientific investigation. For a philosophical tradition that is oriented towards science, as, on the whole, Western philosophy is, the consideration of the *methods* of science must be an important topic. It was gradually realized that in the past scientific investigation had regularly been conceived in far too positivistic, sensationalistic and observationalistic a spirit. (The influence of Karl Popper has been of the greatest importance in this realization.) As the central role of speculation, theory and reasoning in scientific investigation began to be appreciated by more and more philosophers, the border-line between science and philosophy began to seem at least more fluid, and the hope arose again that philosophy might have something to contribute to first-order questions.

The philosopher has certain special skills. These include the stating and assessing of the worth of arguments, including the bringing to light and making explicit suppressed premises of arguments, the detection of ambiguities and inconsistencies, and, perhaps especially, the analysis of concepts. But, I contend, these special skills do not entail that the *objective* of philosophy is to do these things. They are rather the special *means* by which philosophy attempts to achieve further objectives. Ryle was wrong in taking the analysis of concepts to be the end of philosophy. Rather, the analysis of concepts is a means by which the

philosopher makes his contribution to great general questions, not about concepts, but about things.

In the particular case of the mind-body problem, the propositions the philosopher arrives at need not be of a special nature. They perhaps might have been arrived at by the psychologist, the neuro-physiologist, the biochemist or others, and, indeed, may be suggested to the philosopher by the results achieved or programs proposed by those disciplines. But the way that the argument is marshalled by a philosopher will be a special way. Whether this special way has or has not any particular value in the search for truth is a matter to be decided in particular cases. There is no *a priori* reason for thinking that the special methods of philosophy will be able to make a contribution to the mind-body problem. But neither is there an *a priori* reason for assuming that the philosopher's contribution will be valueless.

### The Concept of a Mental State

The philosophy of philosophy is perhaps a somewhat joyless and unrewarding subject for reflection. Let us now turn to the mind-body problem itself, hoping that what is to be said about this particular topic will confirm the general remarks about philosophy that have just been made.

If we consider the mind-body problem today, then it seems that we ought to take account of the following consideration. The present state of scientific knowledge makes it probable that we can give a purely physico-chemical account of man's body. It seems increasingly likely that the body and the brain of man are constituted and work according to exactly the same principles as those physical principles that govern other, non-organic, matter. The differences between a stone and a human body appear to lie solely in the extremely complex material set-up that is to be found in the living body and which is absent in the stone. Furthermore, there is rather strong evidence that it is the state of our brain that completely determines the state of our consciousness and our mental state generally.

All this is not beyond the realm of controversy, and it is easy to imagine evidence that would upset the picture. In particular, I think that it is just possible that evidence from psychical research might be forthcoming that a physico-chemical view of man's brain could not accommodate. But suppose that the physico-chemical view of the working of the brain is correct, as I take it to be. It will be very natural to conclude that mental states are not simply *determined* by corresponding states of the brain, but that they are actually *identical* with these brain-states, brain-states that involve nothing but physical properties.

The argument just outlined is quite a simple one, and it hardly demands philosophical skill to develop it or to appreciate its force! But although many contemporary thinkers would accept its conclusion, there are others, including many philosophers, who would not. To a great many thinkers it has seemed obvious *a priori* that mental states could not be physical states of the brain. Nobody would identify a number with a piece of rock: it is sufficiently obvious that the two entities fall under different categories. In the same way, it has been thought, a perception or a feeling of sorrow must be a different category of thing

from an electro-chemical discharge in the central nervous system.

Here, it seems to me, is a question to which philosophers can expect to make a useful contribution. It is a question about mental concepts. Is our concept of a mental state such that it is an intelligible hypothesis that mental states are physical states of the brain? If the philosopher can show that it is an *intelligible* proposition (that is, a non-self-contradictory proposition) that mental states are physical states of the brain, then the scientific argument just given above can be taken at its face value as a strong reason for accepting the truth of the proposition.

My view is that the identification of mental states with physical states of the brain is a perfectly intelligible one, and that this becomes clear once we achieve a correct view of the analysis of the mental concepts. I admit that my analysis of the mental concepts was itself adopted because it permitted this identification, but such a procedure is commonplace in the construction of theories, and perfectly legitimate. In any case, whatever the motive for proposing the analysis, it is there to speak for itself, to be measured against competitors, and to be assessed as plausible or implausible independently of the identification it makes possible.

The problem of the identification may be put in a Kantian way: "How is it possible that mental states should be physical states of the brain?" The solution will take the form of proposing an *independently plausible* analysis of the concept of a mental state that will permit this identification. In this way, the philosopher makes the way smooth for a first-order doctrine, which, true or false, is a doctrine of the first importance: a purely physicalist view of man.

The analysis proposed may be called the Causal analysis of the mental concepts. According to this view, the concept of a mental state essentially involves, and is exhausted by, the concept of a state that is *apt to be the cause of certain effects or apt to be the effect of certain causes*.

An example of a causal concept is the concept of poison. The concept of poison is the concept of something that when introduced into an organism causes that organism to sicken and/or die.<sup>1</sup> This is but a rough analysis of the concept the structure of which is in fact somewhat more complex and subtle than this. If *A* pours molten lead down *B*'s throat, then he may cause *B* to die as a result, but he can hardly be said to have poisoned him. For a thing to be called a poison, it is necessary that it act in a certain *sort* of way: roughly, in a biological as opposed to a purely physical way. Again, a poison can be introduced into the system of an organism and that organism fail to die or even to sicken. This might occur if an antidote were administered promptly. Yet again, the poison may be present in insufficient quantities to do any damage. Other qualifications could be made.

But the essential point about the concept of poison is that it is the concept of *that, whatever it is, which produces certain effects*. This leaves open the possibility of the *scientific identification* of poisons, of discovering that a certain sort of substance, such as cyanide, is a poison, and discovering further what it is about the substance that makes it poisonous.

Poisons are accounted poisons in virtue of their active powers, but many sorts of thing are accounted the sorts of thing they are by virtue of their *passive* powers. Thus brittle objects are accounted brittle because of the disposition they have to break and shatter when sharply struck. This leaves open the possibility of discovering empirically what sorts of thing are brittle and what it is about them that makes them brittle.

Now if the concepts of the various sorts of mental state are concepts of that which is, in various sorts of way, apt for causing certain effects and apt for being the effect of certain causes, then it would be a quite unpuzzling thing if mental states should turn out to be physical states of the brain.

The concept of a mental state is the concept of something that is, characteristically, the cause of certain effects and the effect of certain causes. What sort of effects and what sort of causes? The effects caused by the mental state will be certain patterns of behavior of the person in that state. For instance, the desire for food is a state of a person or animal that characteristically brings about food-seeking and food-consuming behavior by that person or animal. The causes of mental states will be objects and events in the person's environment. For instance, a sensation of green is the characteristic effect in a person of the action upon his eyes of a nearby green surface.

The general pattern of analysis is at its most obvious and plausible in the case of *purposes*. If a man's purpose is to go to the kitchen to get something to eat, it is completely natural to conceive of this purpose as a cause within him that brings about, or tends to bring about, that particular line of conduct. It is, furthermore, notorious that we are unable to characterize purposes *except* in terms of that which they tend to bring about. How can we distinguish the purpose to go to the kitchen to get something to eat from another purpose to go to the bedroom to lie down? Only by the different outcomes that the two purposes tend to bring about. This fact was an encouragement to Behaviorism. It is still more plausibly explained by saying that the concept of purpose is a causal concept. The further hypothesis that the two purposes are, in their own nature, different physical patterns in, or physical states of, the central nervous system is then a natural (although, of course, not logically inevitable) supplement to the causal analysis.

Simple models have great value in trying to grasp complex conceptions, but they are ladders that may need to be kicked away after we have mounted up by their means. It is vital to realize that the mental concepts have a far more complex logical structure than simple causal notions such as the concept of poison. The fact should occasion no surprise. In the case of poisons, the effect of which they are the cause is a gross and obvious phenomenon and the level of causal explanation involved in simply calling a substance "a poison" is crude and simple. But in the case of mental states, their effects are all those complexities of behavior that mark off men and higher animals from the rest of the objects in the world. Furthermore, differences in such behavior are elaborately correlated with differences in the mental causes operating. So it is only to be expected that the causal patterns invoked by the mental concepts should be extremely complex and sophisticated.

In the case of the notion of a purpose, for instance, it is plausible to assert that it is the notion of a cause within which drives, or tends to drive, the man or animal through a series of actions to a certain end-state. But this is not the whole story. A purpose is only a purpose if it works to bring about behavioral effects *in a certain sort of way*. We may sum up this sort of way by saying that purposes are *information-sensitive* causes. By this is meant that purposes direct behavior by utilizing *perceptions* and *beliefs*, perceptions and beliefs about the agent's current situation and the way it develops, and beliefs about the way the world works. For instance, it is part of what it is to be a purpose to achieve *X* that this cause will

cease to operate, will be "switched off," if the agent perceives or otherwise comes to believe that *X* has been achieved.

At this point, we observe that an account is being given of that special species of cause that is a purpose in terms of *further* mental items: perceptions and beliefs. This means that if we are to give a purely causal analysis even of the concept of a purpose we also will have to give a purely causal analysis of perceptions and beliefs. We may think of man's behavior as brought about by the joint operation of two sets of causes: first, his purposes and, second, his perceptions of and/or beliefs about the world. But since perceptions and beliefs are quite different sorts of thing from purposes, a Causal analysis must assign quite different causal *roles* to these different things in the bringing about of behavior.

I believe that this can be done by giving an account of perceptions and beliefs as *mappings* of the world. They are structures within us that model the world beyond the structure. This model is created in us by the world. Purposes may then be thought of as driving causes that utilize such mappings.

This is a mere thumb-nail, which requires much further development as well as qualification. One point that becomes clear when that development is given is that just as the concept of purpose cannot be elucidated without appealing to the concepts of perception and belief, so the latter cannot be elucidated without appealing to the concept of purpose. (This comes out, for instance, when we raise Hume's problem: what marks off beliefs from the mere entertaining of the same proposition? It seems that we can only mark off beliefs as those mappings in the light of which we are prepared to *act*, that is, which are potential servants of our purposes.) The logical dependence of purpose on perception and belief, and of perception and belief upon purpose, is not circularity in definition. What it shows is that the corresponding concepts *must be introduced together or not at all*. In itself, there is nothing very surprising in this. Correlative or mutually implicated concepts are common enough: for instance, the concepts of husband and wife or the concepts of soldier and army. No husbands without wives or wives without husbands. No soldiers without an army, no army without soldiers. But if the concepts of purpose, perception and belief are (i) correlative concepts and (ii) different species of purely causal concepts, then it is clear that they are far more complex in structure than a simple causal concept like poison. What falls under the mental concepts will be a complex and interlocking set of causal factors, which together are responsible for the "minded" behavior of men and the higher animals.

The working out of the Causal theory of the mental concepts thus turns out to be an extremely complex business. Indeed when it is merely baldly stated, the Causal theory is, to use the phrase of Imre Lakatos, a *research program* in conceptual analysis rather than a developed theory. I have tried to show that it is a hopeful program by attempting, at least in outline, a Causal analysis of all the main concepts in *A Materialist Theory of Mind* (1968); and I have supplemented the rather thin account given there of the concepts of belief, knowledge and inferring in *Belief, Truth and Knowledge* (1973).

Two examples of mental concepts where an especially complex and sophisticated type of Causal analysis is required are the notions of introspective awareness (one sense of the word "consciousness") and the having of mental imagery. Introspective

awareness is analyzable as a mental state that is a "perception" of mental states. It is a mapping of the causal factors themselves. The having of mental imagery is a sort of mental state that cannot be elucidated in *directly* causal terms, but only by resemblance to the corresponding perceptions, which *are* explicated in terms of their causal role.

Two advantages of the Causal theory may now be mentioned. First, it has often been remarked by philosophers and others that the realm of mind is a shadowy one, and that the nature of mental states is singularly elusive and hard to grasp. This has given aid and comfort to Dualist or Cartesian theories of mind, according to which minds are quite different sorts of thing from material objects. But if the Causal analysis is correct, the facts admit of another explanation. What Dualist philosophers have grasped in a confused way is that our direct acquaintance with mind, which occurs in introspective awareness, is an acquaintance with something that we are aware of only as something that is causally linked, directly or indirectly, with behavior. In the case of our purposes and desires, for instance, we are often (though not invariably) introspectively aware of them. What we are aware of is the presence of factors within us that drive in a certain direction. We are not aware of the intrinsic nature of the factors. This emptiness or gap in our awareness is then interpreted by Dualists as immateriality. In fact, however, if the Causal analysis is correct, there is no warrant for this interpretation and, if the Physicalist identification of the nature of the causes is correct, the interpretation is actually false.

Second, the Causal analysis yields a still more spectacular verification. It shows promise of explaining a philosophically notorious feature of all or almost all mental states: their *intentionality*. This was the feature of mental states to which Brentano in particular drew attention, the fact that they may point towards certain objects or states of affairs, but that these objects and states of affairs need not exist. When a man strives, his striving has an objective, but that objective may never be achieved. When he believes, there is something he believes, but what he believes may not be the case. This capacity of mental states to "point" to what does not exist can seem very special. Brentano held that intentionality set the mind completely apart from matter.

Suppose, however, that we consider a concept like the concept of poison. Does it not provide us with a miniature and unsophisticated model for the intentionality of mental states? Poisons are substances apt to make organisms sicken and die when the poison is administered. So it may be said that this is what poisons "point" to. Nevertheless, poisons may fail of their effect. A poison does not fail to be a poison because an antidote neutralizes the customary effect of the poison.

May not the intentionality of mental states, therefore, be in principle a no more mysterious affair, although indefinitely more complex, than the death that lurks in the poison? As an intermediate case between poisons and mental states, consider the mechanisms involved in a homing rocket. Given a certain setting of its mechanism, the rocket may "point" towards a certain target in a way that is a simulacrum of the way in which purposes point towards their objectives. The mechanism will only bring the rocket to the target in "standard" circumstances: many factors can be conceived that would "defeat" the mechanism. For the mechanism to operate successfully, some device will be required by which the developing situation is "mapped" in the mechanism (i.e. what course the rocket is

currently on, etc.). This mapping is an elementary analogue of perception, and so the course that is "mapped" in the mechanism may be thought of as a simulacrum of the perceptual intentional object. Through one circumstance or another (e.g. malfunction of the gyroscope) this mapping may be "incorrect."

It is no objection to this analogy that homing rockets are built by men with purposes, who deliberately stamp a crude model of their own purposes into the rocket. Homing rockets might have been natural products, and non-minded objects that operate in a similar but far more complex way are found in nature. The living cell is a case in point.

So the Causal analyses of the mental concepts show promise of explaining both the transparency and the intentionality of mental states. One problem quite frequently raised in connection with these analyses, however, is in what sense they can be called "analyses." The welter of complications in which the so-called analyses are involved make it sufficiently obvious that they do not consist of *synonymous translations* of statements in which mental terms figure. But, it has been objected, if synonymous translations of mental statements are unavailable, what precisely can be meant by speaking of "analyses of concepts"?

I am far from clear what should be said in reply to this objection. Clearly, however, it does depend upon taking all conceptual analyses as claims about the synonymy of sentences, and that seems to be too simple a view. Going back to the case of poison: it is surely not an empirical fact, to be learnt by experience, that poisons kill. It is at the center of our notion of what poisons are that they have the power to bring about this effect. If they did not do that, they would not be properly called "poisons." But although this seems obvious enough, it is extremely difficult to give exact translations of sentences containing the word "poison" into other sentences that do not contain the word or any synonym. Even in this simple case, it is not at all clear that the task can actually be accomplished.

For this reason, I think that sentence translation (with synonymy) is too strict a demand to make upon a purported conceptual analysis. What more relaxed demand can we make and still have a conceptual analysis? I do not know. One thing that we clearly need further light upon here is the concept of a concept, and how concepts are tied to language. I incline to the view that the connection between concepts and language is much less close than many philosophers have assumed. Concepts are linked primarily with belief and thought, and belief and thought, I think, have a great degree of logical independence of language, however close the empirical connection may be in many cases. If this is so, then an analysis of concepts, although of course conducted *in* words, may not be an investigation *into* words. (A compromise proposal: analysis of concepts might be an investigation into some sort of "deep structure" – to use the currently hallowed phrase – which underlies the use of certain words and sentences.) I wish I were able to take the topic further.

### The Problem of the Secondary Qualities

No discussion of the Causal theory of the mental concepts is complete that does not say something about the *secondary qualities*. If we consider such mental states as purposes and intentions, their "transparency" is a rather conspicuous feature.

It is notorious that introspection cannot differentiate such states except in terms of their different objects. It is not so immediately obvious, however, that *perception* has this transparent character. Perception involves the experience of color and of visual extension; touch the experience of the whole obscure range of tactual properties, including tactual extension; hearing, taste and smell the experience of sounds, tastes and smells. These phenomenal qualities, it may be argued, endow different perceptions with different qualities. The lack of transparency is even more obvious in the case of bodily sensations. Pains, itches, tickles and tingles are mental states, even if mental states of no very high-grade sort, and they each seem to involve their own peculiar qualities. Again, associated with different emotions it is quite plausible to claim to discern special emotion qualities. If perception, bodily sensation and emotions involve qualities, then this seems to falsify a purely Causal analysis of these mental states. They are not mere "that whiches" known only by their causal role.

However, it is not at all clear how strong is the line of argument sketched in the previous paragraph. We distinguish between the intention and what is intended, and in just the same way we must distinguish between the perception and what is perceived. The intention is a mental state and so is the perception, but what is intended is not in general something mental and nor is what is perceived. What is intended may not come to pass, it is a merely intentional object, and the same may be said of what is perceived. Now in the case of the phenomenal qualities, it seems plausible to say that they are qualities not of the perception but rather of what is perceived. "Visual extension" is the shape, size, etc. that some object of visual perception is perceived to have (an object that need not exist). Color seems to be a quality of that object. And similarly for the other phenomenal qualities. Even in the case of the bodily sensations, the qualities associated with the sensations do not *appear* to be qualities of mental states but instead to be qualities of portions of our bodies: more or less fleeting qualities that qualify the place where the sensation is located. Only in the case of the emotions does it seem natural to place the quality on the mental rather than the object side: but then it is not so clear whether there really *are* peculiar qualities associated with the emotions. The different patterns of bodily sensations associated with the different emotions may be sufficient to do phenomenological justice to the emotions.

For these reasons, it is not certain whether the phenomenal qualities pose any threat to the Causal analysis of the mental concepts. But what a subset of these qualities quite certainly does pose a threat to, is the doctrine that the Causal analysis of the mental concepts is a step towards: Materialism or Physicalism.

The qualities of colour, sound, heat and cold, taste and smell together with the qualities that appear to be involved in bodily sensations and those that may be involved in the case of the emotions, are an embarrassment to the modern Materialist. He seeks to give an account of the world and of man purely in terms of *physical* properties, that is to say in terms of the properties that the physicist appeals to in his explanations of phenomena. The Materialist is not committed to the *current* set of properties to which the physicist appeals, but he is committed to whatever set of properties the physicist in the end will appeal to. It is clear that such properties as color, sound, taste and smell – the so-called "secondary qualities" – will never be properties to which the physicist will appeal.

It is, however, a plausible thesis that associated with different secondary



qualities are properties that are respectable from a physicist's point of view. Physical surfaces *appear* to have color. They not merely appear to, but undoubtedly do, emit light-waves, and the different mixtures of lengths of wave emitted are linked with differences in color. In the same way, different sorts of sound are linked with different sorts of sound-wave and differences in heat with differences in the mean kinetic energy of the molecules composing the hot things. The Materialist's problem therefore would be very simply solved if the secondary qualities could be identified with these physically respectable properties. (The qualities associated with bodily sensations would be identified with different sorts of stimulation of bodily receptors. If there are unique qualities associated with the emotions, they would presumably be identified with some of the physical states of the brain linked with particular emotions.)

But now the Materialist philosopher faces a problem. Previously he asked: "How is it possible that mental states could be physical states of the brain?" This question was answered by the Causal theory of the mental concepts. Now he must ask: "How is it possible that secondary qualities could be purely physical properties of the objects they are qualities of?" A Causal analysis does not seem to be of any avail. To try to give an analysis of, say, the quality of being red in Causal terms would lead us to produce such analyses as "those properties of a physical surface, whatever they are, that characteristically produce *red sensations* in us." But this analysis simply shifts the problem unhelpfully from property of surface to property of sensation. Either the red sensations involve nothing but physically respectable properties or they involve something more. If they involve something more, Materialism fails. But if they are simply physical states of the brain, having nothing but physical properties, then the Materialist faces the problem: "How is it possible that red sensations should be physical states of the brain?" This question is no easier to answer than the original question about the redness of physical surfaces. (To give a Causal analysis of red sensations as the characteristic effects of the action of red surfaces is, of course, to move round in a circle.)

The great problem presented by the secondary qualities, such as redness, is that they are *unanalyzable*. They have certain relations of resemblance and so on to each other, so they cannot be said to be completely simple. But they are simple in the sense that they resist any analysis. You cannot give any complete account of the concept of redness without involving the notion of redness itself. This has seemed to be, and still seems to many philosophers to be, an absolute bar to identifying redness with, say, certain patterns of emission of light-waves.

But I am not so sure. I think it can be maintained that although the secondary qualities *appear* to be simple, they are not in fact simple. Perhaps their simplicity is *epistemological* only, not ontological, a matter of our awareness of them rather than the way they are. The best model I can give for the situation is the sort of phenomena made familiar to us by the *Gestalt* psychologists. It is possible to grasp that certain things or situations have a certain special property, but be unable to analyze that property. For instance, it may be possible to perceive that certain people are all alike in some way without being able to make it clear to oneself what the likeness is. We are aware that all these people have a certain likeness to each other, but are unable to define or specify that likeness. Later psychological research may achieve a specification of the likeness, a specification that may come as a complete surprise to us. Perhaps, therefore, the secondary qualities are in

fact complex, and perhaps they are complex characteristics of a sort demanded by Materialism, but we are unable to grasp their complexity in perception.

There are two divergences between the model just suggested and the case of the secondary qualities. First, in the case of grasping the indefinable likeness of people, we are under no temptation to think that the likeness is a likeness in some simple quality. The likeness is indefinable, but we are vaguely aware that it is complex. Second, once research has determined the concrete nature of the likeness, our attention can be drawn to, and we can observe individually, the features that determine the likeness.

But although the model suggested and the case of the secondary qualities undoubtedly exhibit these differences, I do not think that they show that the secondary qualities cannot be identified with respectable physical characteristics of objects. Why should not a complex property appear to be simple? There would seem to be no contradiction in adding such a condition to the model. It has the consequence that perception of the secondary qualities involves an element of illusion, but the consequence involves no contradiction. It is true also that in the case of the secondary qualities the illusion cannot be overcome within perception: it is impossible to see a colored surface as a surface emitting certain light-waves. (Though one sometimes seems to *hear* a sound as a vibration of the air.) But while this means that the identification of color and light-waves is a purely *theoretical* one, it still seems to be a possible one. And if the identification is a possible one, we have general scientific reasons to think it a *plausible* one.

The doctrine of mental states and of the secondary qualities briefly presented in this paper seems to me to show promise of meeting many of the traditional philosophical objections to a Materialist or Physicalist account of the world. As I have emphasized, the philosopher is not professionally competent to argue the positive case for Materialism. There he must rely upon the evidence presented by the scientist, particularly the physicist. But at least he may neutralize the objections to Materialism advanced by his fellow philosophers.

#### NOTE

- 1 "Any substance which, when introduced into or absorbed by a living organism, destroys life or injures health." (*Shorter Oxford Dictionary*, 3rd edn., rev., 1978.)

## The Nature of Mental States

HILARY PUTNAM

The typical concerns of the Philosopher of Mind might be represented by three questions: (1) How do we know that other people have pains? (2) Are pains brain states? (3) What is the analysis of the concept *pain*? I do not wish to discuss questions (1) and (3) in this paper. I shall say something about question (2).<sup>1</sup>

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