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[Author's version]

COMMENTS

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When I was asked to comment on a paper by Putnam entitled "Psychological Predicates," I expected to find myself discussing a paper dealing with the problems of how far there is any characteristic or set of characteristics which distinguish psychological predicates from predicates of a non-psychological kind. I have always assumed, at least since first reading Ryle's *The Concept of Mind*, that mental or psychological predicates are an extremely heterogeneous collection and that any theory which purports to hold good for psychological predicates in general would be difficult to sustain.

I was therefore somewhat surprised to find not only that Putnam was confining his discussion to one very special kind of psychological predicate, namely 'pain' predicates, but also that he was apparently assuming that conclusions which are arguably true of pain statements can be readily extended to cover psychological predicates in general.

Putnam begins by distinguishing three typical questions which concern the philosopher of mind: "(1) How do we know that other people have pains? (2) Are pains brain states? (3) What is the analysis of the concept of pain?" He then says that he proposes to confine his discussion to the second of these questions. This is unfortunate. For had he devoted some time to the analysis of the concept of pain, he might have avoided discussing the relative merits of three theories about pains, namely that they are brain states, functional states, and behavioral dispositions, all three of which in my view are false - false because pains are not states and hence cannot be brain states, functional states, or behavioral dispositions.

Putnam refers to the theory he discusses according to which pains are brain states as a theory some philosophers have held. He does not say which philosophers; but one gathers from a reference to Smart at one point that he is referring to a view which I put forward in an article in the *British Journal of Psychology* in 1956 and which was defended by J. J. C. Smart in an article in *Philosophical Review* in 1959.¹ My thesis in that paper was not the thesis that statements like "pain is a brain state" are logically defensible. I do not think they are and did not think so when I wrote the paper. The view I was defending and the view which Smart defends in his paper is that statements like "having a pain is a process in the brain" are logically defensible, and I emphasize the word 'process.' The theory as I understand it is a theory about mental processes, not a theory about mental states, and having a pain on this view is a mental process, not a mental state. And if it is not a mental state it cannot be a brain state.

¹ U. T. Place, "Is Consciousness a Brain Process?," *British Journal of Psychology*, XLVII, 1956, pp. 44-50. J. J. C. Smart, "Sensations and Brain Processes," *Philosophical Review*, LXVIII, 1959, pp. 141-156. Both papers are republished in *The Philosophy of Mind*, ed. V. C. Chappell, Englewood Cliffs, New Jersey, 1962.

It may be argued in Putnam's favor that there is a sense of 'state' in which having a pain is a state. We might say that being in pain is an unpleasant state to be in. Nevertheless we do not speak of having a pain as a state of mind. Being in pain can and usually does have devastating effects on an individual's state of mind, but it is not itself a state of mind. A state of mind is the sort of thing that Ryle² has called a short term tendency or disposition. Examples of states of mind are emotional states such as elation, depression, excitement, anger, fear, disgust, embarrassment, jealousy, boredom, weariness, and nostalgia; moods of various kinds, such as reflective, cheerful, irritable, joking, and garrulous; short term propositional attitudes such as expecting, doubting, and intending; and abnormal states of consciousness such as confusion, disorientation, and delirium. States of mind are like mental processes and unlike mental capacities, traits of character, and other long-term tendencies and dispositions in that it is possible to distinguish fairly clearly defined periods of time during which they are and are not the case. And as Wittgenstein³ has pointed out, they share with mental processes the property of being continuously the case from their beginning to their end.

Mental states differ from mental processes, that is from sensations, experiences, thoughts, mental pictures, dreams, and the like, in that although they are continuously the case from their beginning to their end, they cannot be said to be continuously going on. It is this characteristic of being something of which it makes sense to say that it is going on continuously from its onset to its offset that differentiates mental processes⁴ from other mental occurrences and conditions. It is closely connected with another logical feature of mental processes, namely their logical connection with mental activity verbs. Thus for every expression in which an individual is said to have a mental process there is a corresponding verbal expression in which he can be said to do what he otherwise has, and the doing is an activity kind of doing. I can both have thoughts and think, have dreams and dream, have a mental picture and visualize, have a sensation and pay attention to it, and my thinking, dreaming, visualizing, and attending are all things I can be engaged in doing. Most mental states, on the other hand, are expressed in an adjectival rather than in a verbal form. They are things people are said to be or to be in, rather than things they have or do. And in the case of propositional attitude states where we do use the verbal form, where one can both have intentions and intend, have doubts and doubt, have expectations and expect, the verb is not an activity verb. Expecting, doubting, and intending are not things one can be engaged in doing.

Another difference between mental states and mental processes is that mental states are in an important sense less private than are mental processes. They are shown and expressed in behavior in a way that mental processes are not. I can express my intention or my anger, or show my confusion, or what I expect, in what I say or do. Philosophers often talk about the behavioral

² G. Ryle, *The Concept of Mind*, London, 1949, pp. 95-97.

³ L. Wittgenstein, *Philosophical Investigations*, Oxford, 1953, p. 59, footnote (a).

⁴ It will be appreciated that the term 'mental process' is being used here in a technical sense. In its ordinary use, in so far as it has one, the term 'mental process' is roughly equivalent to 'thinking' in the activity sense of that term. The use of a technical term to characterize this particular variety of mental occurrences seems unavoidable. There are a number of other technical terms to be found in the philosophical and psychological literature which embrace approximately the same range of concepts - 'experience,' 'consciousness,' 'conscious experience,' 'sensations,' 'raw feels,' etc. All of them are in one way or another misleading.

expressions of pain, as if pain was expressed in behavior in the way that anger is expressed. We might say "he expressed the pain he felt at this disappointment," using 'pain' in a derivative sense in which it serves to characterize a state of distress; but we never say "he expressed the pain he felt in his big toe." Nor do we say that he showed the pain in his toe. That sort of pain can't be shown. What we show in our behavior is *that* we are in pain. We betray the fact, we do not express it. True we can express our thoughts, but we do not express them in our behavior or in what we say - we express them in words.

If mental processes cannot be expressed in what we say and do in the way that mental states can, by the same token mental states cannot be described by their owner in the way that mental processes can. I can describe what it is or was like to have a particular sensation or experience, what my after images, mental pictures, or dreams are or were like. It makes no sense to ask me to describe what it is like to have an intention or to expect something. It makes some sense to ask me to describe what it was like to be angry or confused, but if you ask me to do so, what I describe are the sensations and thoughts that I had at the time, not the anger that was expressed or the confusion that was shown in my thoughts, in what I said and in my behavior.

The distinction between mental states and mental processes may seem a fine one, but it is a distinction which is vital to the theory of psycho-physical identity in the form in which I hold it. To explain why this is so, it may be helpful to say something about the reasons which originally led Smart and myself to formulate this view. I cannot speak for Feigl⁵ here who came to hold a very similar view independently by a rather different route.

At the time when this thesis was being hammered into shape at the University of Adelaide, both Smart and myself were strongly influenced by Ryle and *The Concept of Mind*. Both of us, though for slightly different reasons, wanted to get rid of the notion of extra-physical mental states and processes.

We both thought that Ryle's dispositional theory had effectively and permanently knocked the ghost out of such concepts as "intelligence," "knowledge," "comprehension," "memory," "belief," and "motives"; but we were worried about the apparently irreducibly subjective character of another group of concepts clustering around the notions of "sensations," "dreams," and "mental images." We were aware of Wittgenstein's⁶ attempt to reduce pain to pain behavior but were unconvinced by it, although Smart's adoption of the identity thesis was delayed by a feeling that it might somehow prove possible to develop a more defensible version of the Wittgensteinian view.

Admittedly we did not consider Putnam's functional-state theory in this connection, not merely, I think, because it was not then available, but because we did not think we needed a theory to do the job which in my view the functional-state theory does. As I see it, the functional-state theory is a theory designed to meet objections to a behavioral-disposition theory of mental states, capacities, and tendencies similar to those which Putnam outlines in his paper against a behavioral-disposition theory of pain. The objections to Ryle's dispositional theory of mental states, capacities, and tendencies are now well known, but in the early nineteen fifties they were only faint whispers and we did not seriously consider them. We were concerned not with the

⁵ H. Feigl, "The 'Mental' and the 'Physical'," in *Minnesota Studies in the Philosophy of Science*, Vol. II, eds. H. Feigl *et al.*, Minneapolis, 1968, pp. 370-497.

⁶ Wittgenstein, *op. cit.*, paragraphs 367, 370.

inadequacy of the dispositional theory in those cases where it appears at first sight to provide a reasonably plausible and convincing account, but with those cases where Ryle himself makes no attempt to apply it and, as in the case of sensation,⁷ has to apologize for falling in with what he calls "the official story." And the reasons which led us (and Ryle presumably) to reject the dispositional account in the case of sensations, mental images, and dreams, namely their episodic and describable character, would, I am convinced, have led us to reject the functional-state theory as applied to these concepts had we considered it at the time. Certainly nothing that Putnam has said convinces me that the objections which convinced us that the dispositional theory of sensations will not do, do not apply with equal force to the functional-state theory.

I am conscious at this point that I may be overstating my case in that what I mean by a functional-state theory may not in fact be what Putnam means by a functional-state theory. Indeed I am inclined to think that there are two functional-state theories or, as I should prefer to call them, a functional-state theory and a functional-process theory, and that what is wrong with Putnam's paper is that he confuses the two. He is led into this confusion, I suggest, partly by a sense of the word 'state' in which it can quite properly be used to refer to the condition of continuous process at a specific point in time, the sort of thing that is caught by a still photograph of a moving object, and partly by the discontinuous step-like character of the operations carried out by the sort of electronic hardware on which his theoretical model is implicitly based, and in which it differs markedly from the continuous stream-like character of such biological processes as consciousness or the circulation of the blood. This confusion is reflected in his presentation of what I should prefer to call a functional-process theory of pain as an alternative to and hence, by implication, as incompatible with the psycho-physical identity thesis.

As I see it, it is not the functional-process theory which is incompatible with the psycho-physical identity thesis, but another theory, the functional-state theory proper. The functional-process theory, which is the sort of theory, I think, Putnam is trying to develop, can in principle be made to yield a valid account of pain and other mental processes. This theory, I shall argue, is in no way incompatible with and is in fact complementary to the psycho-physical identity theory. The functional-state theory proper, which is incompatible with psycho-physical identity, provides an excellent account of mental states, capacities, and tendencies; but it fails as an account of pain and other mental processes. Since, however, the psycho-physical identity theory is not intended to cover mental states, capacities and tendencies, there is no conflict between the two theories provided each is restricted to its proper domain.

Since I am not as familiar as Putnam is with Turing machines and probabilistic automata and how one ought to talk about them, I propose, in stating the difference between these two theories to use the analogy of a machine that I do know how to talk about, namely, the automobile. Automobiles lack a great many features which human beings possess, but like any functioning system they have what I want to call functional states or performance characteristics and they have functional processes going on inside them, and these are different. A functional state in my sense is a performance characteristic like the car's horsepower. Performance characteristics like horsepower provide a very good conceptual analogy in my view not only for capacities like knowledge and intelligence, but also for tendencies like beliefs and motives. Like an individual's beliefs and motives a car's horsepower determines the way it behaves when driven in a way which it is not quite natural to describe as causal; and it is just about as implausible to

⁷ Ryle, *op. cit.*, p. 200.

suggest that horsepower statements are reducible to a complex set of hypothetical statements about how the car would behave in an indeterminate variety of situations as it is to say this about belief and motive statements.

It is less easy, perhaps, to find a convincing analogy for mental states in the automobile, since automobiles do not generally exhibit the phenomenon of spontaneous recovery from changes in their performance characteristics, apart from those, such as ease of starting, which vary with the weather. Nevertheless, it makes sense to talk of carbon deposits in the cylinder head or a dragging brake as altering the performance characteristics of the machine, even though these changes have no special names and cannot normally be reversed without recourse to surgery.

The important thing about functional states considered as performance characteristics of the machine is that they are characteristics of the whole functioning unit under consideration, and not of its individual parts. The performance characteristics depend, of course, on the physical dimensions and characteristics of the machine; but the horsepower is not the same thing as the constructional feature on which it depends. Clearly if we apply this analogy to mental states, capacities, and tendencies we do not want to say that they *are* the physical states of the brain microstructure. The most we could possibly want to claim is that they are characteristics of the individual as a functioning unit which he has by virtue of the current state of the microstructure of his brain.

Now there are some philosophers, and I am not altogether clear whether Putnam is one of these, who want to say that having a pain is a performance characteristic of the whole person and not of any one of its parts in the way that the horsepower of a car is a characteristic of the machine as a whole or at least of the engine as a whole and not of any of its individual parts. But if, as I have argued, having a pain is a process, this cannot be right. The only processes that can apply to the car as a whole are its actual movements, accelerating, turning corners, slowing down, etc. These surely correspond to the individual's overt behavior; and having a pain or a dream, with all due respect to the Wittgensteinians, is not primarily a matter of overt behavior. Nor does Putnam want to say that it is.

But if having a pain is a process and is not the overt behaviour of the system as a whole, the only sort of process it can be is a process involving some specific part or parts of the controlling machinery. In terms of the automobile analogy, it must be, to use an example which I owe to Putnam himself in conversation, something like the pumping process which occurs in the car's fuel pump. Now it is perfectly true, as Putnam, I think, would want to point out, that we can specify this pumping process in terms of its functional properties in the total system without saying anything about its physical realization. We can characterize the pumping process in functional terms without knowing anything about the size or other physical characteristics of the actual pump involved and its precise physical location within the machine as a whole. But this does not mean that we cannot go on to ask what form the physical realization actually takes and where it is physically located. It always makes sense to ask what the physical realization and physical location of a functionally defined process are in a given case, in a way that it does not make sense to ask for a specification of the physical realization and physical location of a performance characteristic such as horsepower.

Furthermore, the functionally defined process and its physical realization are not two independent causally related things in the way that a performance characteristic and the structural characteristics on which it depends are two independent causally related things. It is true that the functional description of a process is only contingently related to the description of its physical realization. Fuel pumps differ in design and in the details of their construction, although they all

have the same functional description in relation to the machine as a whole, and no conclusions about the design or position of the fuel pump of my car follow from the statement that it has one. But this does not mean that the physical description and the functional description refer to two different things, and no one but a Platonist would think that they did.

I have a great deal of sympathy with Putnam's attempt to construct a machine model in terms of which it is possible to specify in functional terms what is involved in someone's having a pain. Where I cannot agree with him is in claiming that his theory is an alternative hypothesis which is somehow incompatible with the psycho-physical identity hypothesis. I would prefer to regard this type of enterprise as one of the essential steps in a program designed to give some empirically testable substance to the psycho-physical identity hypothesis. I have spoken in the past⁸ of the materialist thesis as a scientific hypothesis, and I still believe that in an important sense this is right; but as it stands it is more in the nature of a proposal or "schematon", to use Putnam's term, for the construction of hypotheses than an actual hypothesis. We can see this if we ask the Popperian question, "What evidence would count against it?" Clearly, as it stands, we should have to know all that there is to know about the brain before we could be certain that it contains nothing which satisfies the logical criteria that have to be satisfied in order for us to be able to say that this brain process is that mental process; and how would we ever know that we knew all that there was to know? Only when we can formulate hypotheses which assert the identity of specific mental processes with specific brain processes, do we have a genuine scientific theory which is susceptible to empirical disconfirmation. And it is only when we begin to specify in precise functional terms what sort of processes these might be, that it becomes at all possible to make concrete suggestions as to their possible physical realizations.

Our present situation is rather like that of a man who is trying to work out from the way it performs, from the noises that it makes, and from a superficial inspection of the working parts, how an automobile works. Above the din of the motor he hears from time to time what he identifies as a pumping noise and wants to know where and what it is that is doing the pumping. He cannot locate the sound because of the background noise and all he has to go on is the hypothesis that there is some kind of pump operating. So he follows Putnam and starts to construct a theory of how such a thing as an automobile might work and what function a pump might have in such a system. Once he hits on the notion that a system such as this would require a pump to pump fuel from the fuel reservoir to the fuel injection system and can locate the fuel tank and fuel injection system with a fair degree of certainty, he knows where to look to find the fuel pump. But if he followed Putnam's advice he would not attempt to locate the fuel pump for fear that his first hypothesis might turn out to be wrong. He would have to remain satisfied with the tantalizing knowledge that somewhere in the machinery there must be one.

Putnam argues that one of the virtues of his theory, as compared with the psycho-physical identity theory, is that it is consistent with any number of possible theories about the nature of the physical realization of pain conceived as a functional state, including dualism, which he interprets as the view that pains "qua" functional states have "transphysical realizations". I have two comments⁹ to make about this contention. In the first place the psycho-physical identity theory considered as a philosophical thesis is no less consistent with any hypothesis about the physical realization of mental processes than is a theory such as Putnam's. For the psycho-physical identity theory considered as a philosophical thesis is not the thesis that sensations, etc.,

⁸ U.T.Place, "Materialism as a Scientific Hypothesis", *Philosophical Review*, lxix, 1960, PP.101-104.

⁹ I owe the suggestion that I should comment on this part of Putnam's paper to Professor R.N.Smart.

are brain processes; it is the thesis that this statement makes sense, not the thesis that it is true. What is maintained is that this is a scientific hypothesis which, like any scientific hypothesis, may turn out to be false.

We have already seen that there are problems in specifying the evidence which would constitute a decisive disconfirmation of the hypothesis. Nevertheless, supposing for the sake of argument that we did have good reasons for thinking that we had examined all the possible physical realizations in terms of brain activity that could conceivably be suggested, and shown that none of them satisfied the relevant criteria which would enable us to identify them as the sensations reported by the subject, we would then be forced to conclude that the hypothesis is false. And if the hypothesis, although sensible, is nevertheless false and there are no physical processes which could conceivably be identified as the mental processes in question, we should then have no alternative but to conclude that some form of dualism must be true. How we could ever hope to formulate a dualistic hypothesis in such a way that it would become empirically disconfirmable, in the way that I have suggested the brain process hypothesis can and should be made empirically disconfirmable, is beyond me. This, however, is a problem that can safely be left until we find ourselves forced by the empirical evidence into the situation of having to adopt such a theory, a situation which is not likely to arise in the foreseeable future, if it arises at all.

The fact that the psycho-physical identity thesis has the same implication in this respect as Putnam's functional-state or, as I should prefer to call it, functional-process theory strongly suggests that this theory is not so much an alternative to the psycho-physical identity thesis as another way of saying the same thing. But if so, and this brings me to my second comment, there is something wrong with Putnam's contention that the functional-state (process) theory is an empirical hypothesis. For it is only in the capacity of a philosophical thesis that the psycho-physical identity thesis is compatible with dualism, which would suggest that in so far as it is consistent with dualism the functional-state (process) theory is likewise a philosophical thesis rather than an empirical hypothesis. There is, in any case, something rather implausible about an alleged scientific hypothesis which is going to be right however the facts turn out. Immunity from empirical disconfirmation is not as Putnam seems to think a virtue in a scientific theory, though it may be a virtue in a philosophical one.

What Putnam is doing, I suggest, is giving us an analysis or elucidation of the concept of pain in terms of a machine model. The facts which would count against his theory are not psychological facts or neurophysiological facts; they are logical or perhaps we should say linguistic facts, facts about the use of the word 'pain'. The theory he outlines in his paper is an account of what a machine would have to be like for us to be able to ascribe pain to it. And it is the contention implicit in this enterprise that machines are conceivable to which the concept of pain can be properly ascribed, which would appear to be logically equivalent to the contention of the psycho-physical identity theorist that statements like "having a pain is a brain process" makes sense.

For if it makes sense to ascribe pain to a mechanical system and the brain is such a system, as it clearly is, then it must make sense to ascribe pain to the brain. And as we have seen, to say that it makes sense to ascribe pain to the brain is not to say that pain actually *is* something going on in the brain, only that it may be.

The conclusion that Putnam is providing a conceptual elucidation of the concepts of pain, rather than developing a scientific hypothesis, appears at first sight to have some embarrassing consequences. For if what he is doing in describing a machine to which the concept of "having a pain" could be properly ascribed, it would seem to follow that the only sense in which having a

pain could be said to be the relevant functional state of the machine would be a sense in which this is analytically true. And to say this would be to say that the functional description means the same as the pain statement, which is plainly false.

I suggest that in order to defend the validity of Putnam's enterprise we need to draw a distinction between two things which I propose to call "a conceptual analysis" and "a conceptual elucidation". By "a conceptual analysis" I mean a set of statements which taken together jointly assert all that is asserted and only what is asserted by the *analysandum*. In this case the *analysans* is offered as a translation of the *analysandum*, and the meaning relation between them is symmetrical. The *analysans* expresses everything that the *analysandum* expresses and vice versa. It may be doubted whether there are any statements which are susceptible to conceptual analysis in this sense; but on any view there must be at least some that are not, and it seems very possible that pain statements are a case in point. It may nevertheless be the case that there are statements which are not susceptible to conceptual analysis, which are susceptible to what I want to call "conceptual elucidation". In doing what I call "conceptual elucidation" a piece of theoretical apparatus is constructed in the Putnamian manner in terms of which it is possible to assert all that is asserted by the *elucidandum*. In this case, however, the *elucidans* does not assert only what is asserted by the *elucidandum*, since it will have implications deriving from the theoretical apparatus in which it is embedded which the *elucidandum* does not have. The *elucidans*, in so far as it is correct, expresses everything that the *elucidandum* expresses, but not vice versa. The meaning relation between them is asymmetrical.

If I am right in this interpretation of Putnam's enterprise, we have here another remarkable parallel between Putnam's theory and the psycho-physical identity thesis. It is sometimes argued in objecting to the psycho-physical identity view that is something *A* is identical with something else *B*, anything that is predicable of *A* must be predicable of *B* and vice versa. It is then objected¹⁰ that sensations cannot be identical with brain processes, since there are things which can be predicated of sensations that cannot be predicated of brain processes, and things that can be predicated of brain processes that cannot be predicated of sensations. Now it is not difficult to show that there are things predicable of brain processes - the number and location of the neurons, the nature of the physico-chemical processes involved, etc. - which are not predicable of mental processes. It is much more difficult to show that sensations have properties that brain processes could not have. I have argued¹¹ that there is no case for ascribing properties to sensations which brain processes could not have, provided we remember that the properties we are talking about are the properties of the process of having or experiencing a given sensation, rather than the properties of the sensations themselves treated as if they could somehow exist independently of someone's experiencing or having them; and I have yet to see a convincing refutation of this contention.¹² To show that there are properties predicable of having sensations

¹⁰ See for example James W. Cornman, "The Identity of Mind and Body", *Journal of Philosophy*, LIX, 1962, pp.486-492.

¹¹ "Is Consciousness a Brain Process?", pp.49-50 in the original article and pp.108-109 in Chappell, *op.cit.*

¹² The most difficult objection to meet is that of Kurt Baier ("Smart on Sensations", *Australasian Journal of Philosophy*, 1962, pp.57-68), who argues that privacy is a property of mental processes that brain processes in principle cannot have. Baier's objection is best met, I suggest, by pointing out that the privacy of mental processes is not a property. It is merely the absence of a property (public observability) which is in some sense predicable of brain processes. Of the adjectives listed by Cornman, *op.cit.*, p. 490 only 'intense', 'unbearable', and 'fading' are predicable of the experience itself. I find no difficulty in predicating these of brain processes.

which cannot in principle be predicated of brain processes would undoubtedly constitute a decisive refutation of the thesis in the form in which I hold it, since the hypothesis that the experiencing of *this* sensation is *that* brain process could only be verified by showing that the relevant brain process has all the properties that the mental process has. It is not, however, an objection to the thesis in the form in which I hold it that the brain processes have, as they clearly do have, properties that the mental process does not have.

What many people who discuss the psycho-physical identity thesis seem to overlook is that the identity relation that is being asserted between brain processes and mental processes is not a symmetrical relationship of equivalence. The thesis is that mental processes are brain processes and nothing else, but not the thesis that certain brain processes are mental processes and nothing else. Clearly any brain process that might be identified as being a given mental process would have many other properties besides being that mental process, just as an electric discharge through the atmosphere has many other properties besides being lightning. We do not want to say that an electric discharge through the atmosphere is lightning and nothing else; nor do we want to say that the old packing case is this table and nothing else, although we do or might want to say the converse. For this reason it is somewhat misleading to talk about the putative relationship between mental process and brain processes as a relationship of identity, particularly when addressing oneself to those who are accustomed to the notion of identity used in formal logic. In my original paper on this subject I referred to the "is" that relates lightning to electric discharge and which I wanted to say could sensibly be said to relate consciousness and brain processes as an "is" of composition rather than as an "is" of identity;¹³ and this still seems to me a much better way of stating the thesis.¹⁴

To stress the asymmetry of the identity that is being asserted here is also to my mind a much better way than the method Putnam adopts of meeting the objection that to assert identity

¹³ "Is Consciousness a Brain Process?", pp.45-46 in the original article and pp.102-103 in Chappell, *op.cit.*

¹⁴ Professor J. J. C. Smart (personal communication) argues that once an identification of this kind becomes a matter of established scientific fact it becomes possible to apply to the original ordinary discourse concept all the predicates which are applicable to the scientific concept with which it has been identified, and that therefore the relationship is a genuine symmetrical identity and not, as I have argued, an asymmetrical relationship in which the predicates applicable to the ordinary discourse concept apply to the scientific concept, but not *vice versa*. Consideration of cases such as "lightning is an electric discharge through the atmosphere", "temperature is the amplitude of atomic motion", and "water is H₂O" suggests that Smart is right in his contention that once the identification becomes a matter of established scientific fact, there are no predicates predicable of the scientific concept with a scientist, at least, would be unwilling to apply to the ordinary discourse concept. I would maintain, however, that when and in so far as this state of affairs is reached, the ordinary discourse concept has undergone a definite change of meaning in the direction of assimilation to the scientific concept with which it has been identified and that the identity relation has, by virtue of this process of assimilation, ceased to be a *synthetic* relation and become *analytic*. A liquid which had the appearance and all the commonly recognised properties of water would not now be called "water" by the chemist if its chemical formula was not H₂O. It would no longer be an exception to what was once an empirical hypothesis to the effect that what the layman calls "water" is always a substance with the chemical formula H₂O. I would contend that so long as the identity remains a matter of empirical hypothesis the relationship is asymmetrical in the sense that the predicates applying to the scientific concept can only be applied to the ordinary discourse concept on the assumption that the hypothesis is correct. To anyone who questions the hypothesis, they remain logically inapplicable or at least of doubtful application in the way that it must at one time have appeared logically inappropriate to apply the concept of "wave-length" to the ordinary concept "light".

between pains and brain processes, or between pains and the functional states of a probabilistic automaton involves a change in the ordinary meaning of the word 'pain'. Putnam tries to dodge this objection, to which his theory is as much exposed as is the psycho-physical identity theory, by saying that we have no precise criteria for a change of meaning here. I am unhappy about this solution. For to say we have no precise criteria for deciding when a "change of meaning" or "an extension of usage" has occurred would appear to suggest that we have no means of deciding such issues, and hence that the very substantial part of linguistics and philosophy that is based on the assumption that such decisions can be reached is a complete waste of time. Now it may well be true that we do not have any precise criteria, which can be stated at the present time, for deciding whether or not we are using a word in the same or in different senses from one occasion to another. But it does not follow from this that we have no way of deciding such issues. People do not usually need to consult a rule book or a lexicon to decide whether a word or expression means the same thing in one context as it does in another. Nor do they have to learn any rules by heart to be able to do so. It may be helpful for certain theoretical purposes to talk as if people apply rules and criteria when they decide issues of this kind; but if so, it is important to remember that these rules and criteria are rules and criteria of a rather peculiar kind, which people can apply perfectly well without being able to state the rules and criteria they are applying. We can only state what the rules and criteria are by studying the way they are applied. The ability to make the relevant distinctions is logically prior to and presupposed by any attempt to state the criteria involved and hence no consequences about the possibility or impossibility of deciding such issues follow from the fact that we cannot state criteria we apply in deciding them.

I should prefer to defend Putnam's theory, and my own in so far as it involves his, by saying that it is not an objection to a functional characterization of pain in terms of a machine model that this characterization involves (as we can surely agree it does) a change in the meaning of 'pain' in the sense of introducing new conceptual elements which are not implied by the current use of the term. This is not an objection to his thesis, because he is offering an elucidation of the concept of pain in terms of a machine model, not a translation. It is, however, an objection to such a characterization that it involves a change of meaning in the sense of failing to include some feature which is built into our current concept of pain. This must be evidence against any theory of what pain is, since "pain" is an ordinary discourse concept and hence any account of what we mean by 'pain' which is inconsistent with the way the term is ordinarily used is not an account of 'pain' as we ordinarily use the word.