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MATERIALISM AS A SCIENTIFIC HYPOTHESIS

IN discussing the logical status of the thesis that sensations are processes in the brain, J. J. C. Smart[1] contends that I was partly right and partly wrong in maintaining that this thesis could and should be interpreted as a straightforward scientific hypothesis.[2] He argues that in so far as the issue is between a brain-process thesis and a heart, liver, or kidney thesis the issue is empirical and can be decided by experiment. But in so far as the issue is between materialism on the one hand and epiphenomenalism, psycho-physical parallelism, interactionism, and so forth, on the other, the issue is nonempirical. I shall argue that Smart is partly right and partly wrong in maintaining that the issue between the kind of materialism which both he and I would wish to defend and the rival doctrines of epiphenomenalism, psycho-physical parallelism, interactionism, and so forth, is a non-empirical issue.

In my own paper on this topic[3] I argued that there are certain logical conditions which must be satisfied to enable us to say that a process or event observed in one way is the same process or event as that observed in (or inferred from) another set of observations made under quite different conditions.[4] In that paper I suggested only one logical criterion, namely, that the process or event observed in or inferred from the second set of observations should provide us with an explanation, not of the process or event observed in the first set of observations, but of the very fact that such observations are made. I illustrated this point by comparing the case where the movements of the sun and the moon observed astronomically are used to explain the movement of the tides observed geophysically

[1] J. J. C. Smart, "Sensations and Brain Processes," *Philosophical Review*, LXVIII (1959), 141-156. The reference is to remarks on pp. 155-156. I should say that I am in substantial agreement with the remainder of Smart's paper.

[2] U. T. Place, "Is Consciousness a Brain Process?," *British Journal of Psychology*, XLVII (1956), 44-50.

[3] *Op. cit.*, pp. 47-48.

[4] This problem is discussed in more general terms in two papers by H. Feigl. In "The Mind-Body Problem," *Revue Internationale de Philosophie*, IV (1950), reprinted in H. Feigl and M. Brodbeck (eds.), *Readings in the Philosophy of Science* (New York, 1953), pp. 612-626; the relevant passage will be found, in the latter volume, from the bottom of p. 621 to the top of p. 623. See also pp. 438-445 of "The 'Mental' and the 'Physical,'" published in H. Feigl, M. Scriven, and G. Maxwell (eds.), *Minnesota Studies in the Philosophy of Science*, II (Minneapolis, 1958), pp. 370-497.

with the case where observations interpreted in terms of the motion of electric charges are used to explain, not a separate event called "lightning," but the fact that we see and hear the sort of things we do on a stormy night.[5] I would now want to add to this the rather obvious additional criterion that the two sets of observations must refer to the same point in space and time, allowing for such things as the time taken by the transmission of light and sound, distortions in the transmitting media, the personal equation of the observer, and differences in the precision with which location is specified in the two sets of observations.

For the purposes of the present argument it does not matter whether this account of the logical criteria used to establish the identity of an event described in terms of two different procedures of observation is correct or not. What is important is that there must be some logical criteria which we use in deciding whether two sets of correlated observations refer to the same event or to two separate but causally related events. The problem of deciding what these criteria are is a logical problem which cannot be decided by experiment in any ordinary sense of the term; and since we cannot be certain that the criteria are satisfied in the case of sensations and brain-processes unless we know what the criteria are, the issue is to that extent a philosophical issue. Moreover, even if we agree on the nature of these logical criteria, it is still open to the philosopher to question the logical propriety of applying them in the case of sensations and brain-processes.

For the sake of argument, however, let us assume that these

[5] Feigl in Feigl and Brodbeck, *op. cit.*, p. 623 top, gives another example, that of temperature and molecular movement, which brings out the same point, although Feigl's interpretation of it differs from my own. He distinguishes between the identity of things observed under different conditions, as in the case of the same mountain observed from different viewpoints by different observers (p. 622 near top), and the identity of concepts, as in the case of 2^3 and $\sqrt{64}$ (p. 622 bottom). The identity of things is established empirically, while the identity of concepts is established either deductively, as in the case of 2^3 and $\sqrt{64}$, or empirically, as in the case of temperature and molecular motion, by the empirical verification of a scientific theory within which it is possible to define one concept in terms of the other. I prefer to regard the temperature, lightning, and sensation-brain-process cases as examples of a special variety of the identity of things in which an identity is asserted between a state, process, or event and the micro-processes of which it is composed. I suspect, however, that the difference between Feigl's position and my own on this point is not as fundamental as it appears at first sight.

philosophical issues have been settled and that they have been settled in favor of the materialist hypothesis. We now find ourselves faced with a purely empirical issue, namely, whether there is in fact a physiological process, be it in the brain, the heart, the liver, the kidney or the big toe, which satisfies the logical criteria required to establish its identity with the sensation process. As it happens, we already know enough to be quite sure that, if there is such a process, it must be situated in the brain, and even within the brain there are extensive areas that can be ruled out with virtual certainty as possible loci of consciousness—areas, for example, where brain lesions produce motor disturbances without any change in consciousness other than an awareness of the disability itself and emotional reactions to the problems it creates. But the empirical problem is not, as Smart seems to think, simply a matter of determining the precise anatomical location of this physiological process. It is still an open question whether there is, even in this relatively circumscribed area, a process which satisfies the logical criteria required to establish its identity with the sensation process.[6] Even assuming that we know what these criteria are and are satisfied that they are applicable in this case, we cannot regard the question as finally settled until a process satisfying the necessary criteria has been discovered or until we are sure that we know enough about the brain to be certain that no such process exists.

Until such time as this issue is settled by further psycho-physiological research, materialism remains an empirical hypothesis—the hypothesis that there exists, presumably in the brain, a physiological process which satisfies the logical criteria required to establish its

[6] We certainly cannot say that a process has been discovered which satisfies the criteria I have suggested, that is, a process an understanding of which enables us to explain the peculiarities of sensations, mental images, and dreams as reported by the individual in whom they occur. We can, of course, explain a great many of the peculiarities of sensation in terms of the stimulus pattern impinging on the receptors, the anatomy and physiology of receptor organs, and the cerebral projection of afferent nerve fibres; but what we want, if I am right, and what we have not yet got, is the clear identification of a process in the brain which "incorporates" a relatively small part of the total stimulus pattern impinging on the receptors at any one moment in the way that the sensation process does, that is capable of assuming forms determined by factors endogenous to the brain as in dreams and mental imagery, and that has the sort of function in the individual's thought processes and his adaptation to his environment which his sensations and mental imagery appear to have.

identity with the sensation process. If this hypothesis is confirmed, the need disappears for alternative theories designed to explain the relationship between sensation, considered as an independent non-physiological process, and the physiological processes with which it is correlated. Theories like epiphenomenalism could then only be made tenable by refusing to accept the logical criteria put forward as establishing the identity of a process characterized by reference to two entirely different observation procedures or their application to the case of brain-processes and sensation. Given a solution of the logical issues favorable to materialism, these theories can be ruled out on empirical grounds in a way that Gosse's theory of creation[7] cannot be ruled out.

In practice, of course, those who object to the materialist hypothesis are much more likely, and indeed would be much better advised, to make their stand among the logical issues I have mentioned than to accept the logical criteria put forward as establishing the identity of a physiological process with the sensation process and pin their hopes on the failure of scientific research to discover a process satisfying these criteria. It is among these philosophical issues that the real battle will be fought. To this extent Smart is right when he says that the issue between materialism on the one hand and epiphenomenalism, psycho-physical parallelism, and so forth, on the other will not be decided by a program of experimental research. But this does not affect my contention that materialism can and should be treated as a straightforward scientific hypothesis. It may be that the logical criteria for establishing the identity of the object of two types of observation are logically inapplicable to the case of sensations and brain-processes. If so, I am just plain wrong in claiming that materialism can be treated as a scientific hypothesis; but if the criteria are applicable, I am right. I am not partly right and partly wrong.

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[7] Smart, *op. cit.*, pp. 155-156.

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