Neural Activity and Experience

by Robert L. Latta

It has been said that the mind-brain problem is more difficult than any other, in any field of inquiry. It has been said, too, that no solution is possible. Neither assertion is correct. In fact, the solution comes fairly easily once several points which apparently have escaped notice are taken into account. The crux of the matter is this: In effect, in stating the problem, a theorist makes two very different presentations of one and the same item. The one presentation, that of the neural activity in the case, is of a type employable in any connection whatever: for instance, in presenting or representing a hippopotamus, a bus, or a fire. The other, that of the experience, is of a unique type employed and indeed employable in just one special connection—viz., in presenting an experience. The fact that one term of the problem, the experience in question, unlike the other, the corresponding neural activity, occurs in time but not in space and is had in a certain sense or way by a subject of experience poses a residual difficulty. It is quite possible, however, to remove this difficulty, for the mind-brain problem lies at a lower conceptual level, as it were, than the objective/subjective distinction, but this entails that it is not necessary to conceive the term in question as an experience, and that it is an error to run the mind-brain problem and that of the objective/subjective distinction together. Quite apart from this, it is possible to explain why the term in question, conceived as an experience, has the two characteristics in question.

In the following, all descriptions of neurological phenomena, such as "in the auditory area of the brain," are to be taken to be stand-ins for full, accurate descriptions, which for the most part are not available at present.

Imagine that a man, henceforth to be called "the questioner," gathers three others together in a room—a clarinetist, a neuroscientist, and a metaphysician. He asks the clarinetist to play a four-measure theme, asks the neuroscientist to describe the neural activity which in response occurs in the auditory area of the metaphysician's brain and receives a full and accurate reply, and then asks the metaphysician the following question:

Precisely what is the connection between the neural activity just described and the auditory experience you just had, or to put it another way, the sound you just heard? Let us call this the four-person situation.

Now imagine the following: The questioner gathers four others—the clarinetist, the neuroscientist, a music-lover named Shimano, and the metaphysician. The clarinetist plays, the neuroscientist describes the neural activity which occurs in the auditory area of Shimano's brain, and then the questioner asks the metaphysician: Precisely what is the connection between the neural activity just described and the auditory experience Shimano just had, or to put it another way, the sound she just heard? Let us call this the five-person situation. It is essentially the same as the four-person one. In both cases alike, essentially, the question is: What is the connection between this neural activity and that auditory experience or sound?

It is to be assumed that Shimano's experience is a musical one which goes well beyond the bare experience of hearing a sound, and, if only in that musical experience has a large intellectual component, that the corresponding neural activity goes well beyond the auditory area of her brain. No attempt shall be made, however, to take this complication into account.

It is possible to put the question more loosely, as follows: What is the connection between the neural activity which occurs in the auditory area of a person's brain on a given occasion, and the auditory experience or sound which corresponds to it?

In the following, for the most part, the discussion shall be conducted in terms of the five-person situation.

The question just described serves, of course, to illustrate a much broader one. This may be described as the question of the connection between neural activity on the one hand and experience, consciousness, or mental life (or mental phenomena or events) on the other, and may be called the mind-brain problem. Needless to say, it is not all neural activity but only that of a certain type (or perhaps more accurately, certain types) that is in question here. A great deal of neural activity, even in the brain, has to do with the regulation of body temperature and such things, though it is clear that it is not entirely insulated from neural activity of the type in question.

The thesis that a particular occurrence of neural activity of the type in question and the corresponding experience are numerically identical, that they are simply the same thing, shall be called the identity thesis.

Let us assume that the identity thesis is true. Many things fall into place imme-

diately. The occurrence of one term, in the five-person situation, the neural activity in the auditory area of Shimano's brain or her auditory experience, is a necessary condition of the occurrence of the other in that they are the same thing. They occur simultaneously in that they are the same thing. The neural activity varies through time in parallel with the sound Shimano hears with respect to pitch, loudness, and tone color—the upper and lower registers of the clarinet have markedly different tone colors—because, the apparent differences notwithstanding, the neural activity and the sound are the same thing. For instance, as for loudness, some such parallel as the following obtains—though this is not to say that it is specifically this parallel which obtains in fact: As the sound Shimano hears becomes louder, the neural activity becomes more intense in physical terms. The physical process which begins with the production of physical sound by the clarinetist, runs through the operations of Shimano's auditory system—middle ear, inner ear, etc.—and brain, and ends with muscular movements in her face and body appears to be complete in itself because it is complete in itself. These muscular movements appear equally to express both neural activity and experience because they do express both, because these are the same thing.

The identity thesis answers the questioner's question simply and directly. It entails no excursion into metaphysical never-never land. It entails both that Shimano's auditory experience is no more illusory, no more unreal, than the neural activity in her brain and that in principle, at any rate, it lies equally within the scope of scientific inquiry.

In fact, there is only one thing which does not fall into place immediately: The two terms in question appear to be very different indeed. For the most part, what can be said of the neural activity, in terms of watts and ohms, for instance, simply cannot be said of the auditory experience, and vice versa. The qualification "for the most part" is necessary because with respect to the parallels just mentioned, what can be said of the one can be said of the other, at least in a way—or at any rate it's quite possible that this is so to a greater or lesser extent. Thus, for instance, if in fact it happens, as proposed above for expository purposes, that the physical intensity of the neural activity varies directly with the loudness of the sound Shimano hears, then it can be said that as that sound intensifies, so does the neural activity.

In the following, a presentation of something, an item X, is to be understood to be a presentation in the everyday sense of the word which identifies and gives substantial information about X. Thus, for instance, a good, clear panoramic photograph of New York City taken from a helicopter, with the caption "New York City," counts as a

presentation of New York. The act of gesturing downwards from the helicopter at the scene shown in the photograph and saying to one's fellow passenger "This is New York" also counts as a presentation. Each of these two presentations relates to New York, in an obvious sense. Similarly, a photograph taken from the surface of the planet Venus which shows a mountain range, accompanied by the identifying statement "This is the morning star," and another which shows a plain, accompanied by the statement "This is the evening star," constitute two presentations, both of which relate to Venus. The presentation which consists in a panoramic photograph of New York with the caption "New York City" shall be called a representation, for it is natural to call it such, but the one which consists in gesturing downwards from the helicopter at the scene shown in the photograph and saying "This is New York" shall not, for it employs as its material, as it were, not a photograph, a drawing, or the like, but rather the item itself.

It is hardly necessary to point out that these definitions, if that is the correct description, are lacking in fullness and mathematical precision. They serve nevertheless.

The neuroscientist describes the gross and fine structure of Shimano's brain and in particular of the auditory area, and then describes the neural activity which occurs there on the occasion in question. He uses photographs and diagrams and describes physical, chemical, and biological transactions in words and mathematical and chemical formulas, etc. This shall be called the neurological account.

The neurological account constitutes a presentation and more specifically a representation of the neural activity in question. It identifies and gives substantial information about that neural activity. It identifies it as the neural activity which is in question. It is not that activity itself, but a representation of it. By hypothesis it is full and accurate, and hence, in making it, it is natural to say "This is the neural activity"—that is, natural to say "is" rather than "represents." But of course it is no mistake to say "represents."

The questioner, for his part, establishes conditions in which it is possible to make a presentation of a particular auditory experience, sees to it that one occurs, and makes a presentation of it. He gathers the others, asks the clarinetist to play a theme, and then refers to "the auditory experience Shimano just had." This presentation gives substantial information about the item in question in that it brings it about that an interlocutor, viz., the metaphysican, knows what kind of item it is and knows in some detail what it is like. It shall be called the experiential presentation. It is not, of course, the same thing as the auditory experience. It presents that which the auditory experience is.

If the identity thesis is true, then the neurological account and the experiential presentation relate to the same item, for in this case the neural activity in question and the auditory experience are the same thing. The neurological account imparts a certain conception of that item, in a word, as a pattern of electrochemical activity in "soggy gray matter," to quote one theorist's graphic description, and the experiential presentation another very different conception of it, as an auditory experience. If, then, under the assumption of the identity thesis, it is possible to explain why these two conceptions differ in just the ways they do and are similar in just the ways they are, this removes the sole obstacle to acceptance of this thesis. But this is indeed possible.

The neurological account represents the neural activity in the auditory area of Shimano's brain in the same way in which one represents a hippopotamus, a bus, a fire, or any other thing, process, or event which does not constitute neural activity of the type in question: by means of photographs, diagrams, words, mathematical and chemical formulas, etc. Now, still assuming that the identity thesis is true, let us picture the workings of this representation in neurological terms. In an obvious sense, it represents *through* neural activity in the visual area plus neural activity in the verbal-cognitive area of the metaphysician's brain. The neuroscientist's effort at description succeeds, of course, only if it has a complex effect of a certain description on the metaphysician's brain. It is essential to note, however, that the neurological account does not represent through a duplicate in the auditory area of the metaphysician's brain of the item it represents, the neural activity in the auditory area of Shimano's brain. In presenting the neurological account, the neuroscientist does not ask the clarinetist to play the theme again for the metaphysician.

Needless to say, spoken language has an auditory aspect, and consequently if the neuroscientist chooses to communicate by means of it, his representation works in part through neural activity in the auditory area of his interlocutor's brain. In principle and indeed in practice, however, he need not use spoken language, and for present purposes it is permissible to assign all neural responses to the neuroscientist's utterances to "the verbal-cognitive area." In the following this shall be done.

If, on the other hand, we picture the workings of the experiential presentation in neurological terms, the result is very different indeed. It presents in a quite different way than the neurological account, in a way in which neural activity of the type in question but nothing else at all can be presented—viz., in the four-person situation, through the very item in question, the neural activity in the auditory area of the metaphysician's brain,

which by hypothesis is the same thing as the auditory experience in question, or, in the five-person one, through a more or less exact duplicate of the very item in question, the neural activity in the auditory area of Shimano's brain, in the metaphysician's. In the former situation, the questioner brings it about that neural activity occurs in the auditory area of his interlocutor the metaphysician's brain, and then refers to "the auditory experience you just had." But this presentation, of course, works through the neural activity just mentioned, though not exclusively through it, for it also works through neural activity in the verbal-cognitive area. The latter situation is not essentially different. Here, the questioner brings it about that neural activity occurs in the auditory area of Shimano's brain and closely similar neural activity in the same area of the metaphysician's, and it is through the latter that the presentation imparts to the metaphysician the more or less full knowledge it does of the character of Shimano's auditory experience.

The upshot, then, is this: In picturing the workings of the neurological account in neurological terms, it will do to imagine the visual and verbal-cognitive areas lighting up, as in a positron emission tomographic (PET) scan, and in picturing those of the experiential presentation, it will do to imagine the auditory area lighting up and the verbal-cognitive area lighting up in a very different pattern.

This, however, points the way to an explanation, by reference to the identity thesis, of the differences and similarities between the two conceptions in question. Still assuming that this thesis is true, to begin with, the very fact that the patterns of neural activity through which the neurological account and the experiential presentation work are very different suffices to account for the fact that the neural activity as it appears in the former presentation and the auditory experience as it appears in the latter are very different even though in fact they are the same thing. But beyond this, it is not difficult to explain the specific differences and similarities which appear.

The neurological account gives a full picture of the neural activity in the auditory area in the same way in which a zoologist's account gives a full picture of a hippopotamus, an engineer's account a full picture of a bus, a chemist's account a full picture of a fire, etc. In itself, it presents nothing of the content of the auditory experience precisely in that it does not to even the slightest extent work through the neural activity which constitutes that experience (in the four-person situation), or a duplicate of it (in the five-person one). It does, however, give a picture of the form of the sound with respect to pitch, loudness, and tone color, in that the neural activity it depicts fully and accurately has the same or at any rate an equivalent form.

On the other hand, the experiential presentation presents the full auditory experience in that it does work through the neural activity in the auditory area (in the four-person situation), or a duplicate of it (in the five-person one). It gives no picture at all of the content of the neural activity because it doesn't work in the right way for this. The neural activity is the auditory experience or sound as it appears in a presentation which works the same way as a presentation of a hippopotamus, a bus, or a fire, but the experiential presentation doesn't work this way at all. It does, however, give the form of the neural activity with respect to those neurological factors which correspond to pitch, loudness, and tone color, in that the sound it presents fully has the same or at any rate an equivalent form.

It is not surprising that a musical sound is not to be heard in a visual-verbal representation of it. It is a mistake to scrutinize the neurological account for traces of the content of the auditory experience. There are none there, simply in that this account does not, to repeat, work through the neural activity in the auditory area which constitutes that experience, or a duplicate of it.

Now for the residual difficulty mentioned in the introductory paragraph: The auditory experience in question, like any other experience, occurs in time but not in space, whereas the corresponding neural activity occurs in time and space. The experience, moreover, is had by a subject of experience, Shimano, whereas the neural activity is not had—certainly not in the same way, at any rate. But these two differences suggest that the experience and the neural activity are not numerically identical.

To begin with, there are of course many differences between Shimano's auditory experience and the neural activity which corresponds to it. If there were none, there would be no mind-brain problem. To point out two additional differences not yet considered, then, does not suffice to refute the identity thesis.

On the other hand, these particular differences go unexplained in the primary argument, just stated. There is, however, a solution. The crux of it is this: The mind-brain problem, to repeat, lies at a lower conceptual level than the objective/subjective distinction. Hence it is not necessary to conceive the term in question, Shimano's auditory experience, as an experience in order to state and solve this problem. The difficulty, then, appears only if the problem is formulated on a conceptual level higher than necessary. It is superfluous.

It is easy to fall to the supposition that the mind-brain problem is essentially one of relating something subjective, experience, to something objective, neural activity, or even

that it comes down, quite simply, to the question of the connection between the subjective realm and the objective. This is an error. To borrow heavily from P. F. Strawson, who shows the way here, it is possible to subtract the objective/subjective distinction, as it were, from the conceptual scheme, the way of talking and thinking about things, which people do in fact employ, and thus arrive at a simplified scheme. To be sure, to subtract this distinction is to subtract a great deal. Within a conceptual scheme within which the objective/subjective distinction does not figure and hence nothing counts as subjective, there is no such thing as experience, or an experience, for experience is something essentially subjective, something that is to be ascribed to a subject of experience. There is, moreover, no such thing as a subject of experience, and hence, further, no such thing as a person in the ordinary sense, and hence no such thing as other persons or myself. Within the simplified scheme, moreover, nothing counts as objective either, and thus there is no such thing as the objective world, the world which predates and outlasts *my experience* and *that of others* and turns independently of it, to use expressions which cannot be used within this scheme. This, of course, is why the objective/subjective distinction is in fact employed.

There is no reason, however, a theorist working within the simplified scheme (who of course fails to recognize himself or anyone else as a theorist or a person) cannot recognize red, blue, color, sounds, sound, pitch, loudness, tone color, odors, tastes, heat and cold, pressure, pain and pleasure, beauty and ugliness, humor, what happened, what will happen, what might happen, memory, thought, imagination, presentation, and representation. To be sure, his understanding of these things is somewhat impoverished as compared with ours. For instance, to him sound, that which we conceive as the subjective phenomenon of sound, is simply something of a certain quality which occurs in time. It is sound more or less in the sense in which a young child understands the term. To him, to say that A, an account or description for instance, presents X is simply to say this, and not that A presents X to S, a subject. That is to say, he is capable of recognizing that A presents X but incapable of carrying this thought this last step, for lack of the objective/subjective distinction. To borrow from Strawson again, in principle, it is possible for him to notice that everything that occurs ("occurs," not "occurs in his experience") depends on the state of a certain unique body (not "his body"), and possible for him to discover that a musical theme of a certain description occurs ("occurs," not "is heard") when neural activity of a certain description occurs in a certain area of the brain of that body. From this point he can proceed to state the problem under discussion here

and to answer it as above, or differently for that matter. He can recognize the great dissimilarity between the neural activity and the sound, the parallels, the neurological account as a representation, a presentation of a sound (his version of the experiential presentation, which is a presentation of an experience), and so on.

The mind-brain problem, then, stands even after the objective/subjective distinction has been subtracted away. It is indeed essentially a problem of relating sights, sounds, pains, thoughts, etc., to neural activity, but it is not essentially one of relating something subjective to something objective. This is why it is possible to alternate between the expressions "the auditory experience" and "the sound." The former presupposes the objective/subjective distinction, but the latter doesn't.

In a nutshell, the neural activity is the sound, and it is possible, but not necessary, to conceive the sound as an experience. If it is felt that this statement clarifies, this is because it strips from the mind-brain problem all questions concerning the objective/subjective distinction. To be sure, this distinction poses an interesting problem in its own right, but this problem is not to be confused with the mind-brain problem.

Nevertheless, it is best, though not strictly necessary, to attempt to explain why the two differences in question exist between the item in question as it appears in the experiential presentation and as it appears in the neurological account. To this end, it is necessary to delve into the grounds of the objective/subjective distinction. Here too Strawson has shown the way.

In his *Individuals*, Strawson argues with admirable thoroughness and rigor that in practice a particular experience, in the sense of a particular which is an experience, or vice versa, is ascribed to a particular subject of experience, such as Shimano, which is conceived to have it in "a logically nontransferable way," that is, in such a way that it does not make sense to assert that a different subject might have had it instead, because through this procedure it can be assigned a unique place in the one universal system of particulars and thereby identified, and hence can be recognized as a particular. The system in question is fundamentally a spatio-temporal one, but a particular experience, as of a flash of light which in fact is due to a random discharge in one of the optic nerves of a particular person, cannot in the nature of the case simply be assigned a spatio-temporal position within it. In cases in which it is possible to assign a particular, as a flash of light due to an explosion in the atmosphere, a spatio-temporal position within this system, it is conceived as something objective, not as an experience. As for a particular occurrence of neural activity, it is of course possible to assign it such a position,

or, if the brain in which it occurs moves, series of positions. To conceive the item in question here as an experience, then, which is to say to recognize it at all, instead of simply referring to *that sound*, is to conceive it as a particular which lacks spatial position but is had by the subject of experience Shimano in a logically nontransferable way. For detail and depth, the reader is referred to Strawson's *Individuals*, and to his review of Wittgenstein's *Philosophical Investigations*.

The primary argument, to return to it, then, can be generalized to cover all experience of all sorts. With the exception of the difficulty just considered, which can be removed in the ways just described in outline, it removes all obstacles to acceptance of the identity thesis and thus may be said to establish its truth. It entails a picture of the mind-brain problem which encapsulates: In point of fact, a particular experience and the corresponding neural activity are one and the same item. In stating the mind-brain problem, a theorist presents this item through neural activity of a certain description in the brain of his interlocutor, and in the process says "This is the experience I'm talking about." Then he proceeds to present it, the same item, through neural activity of a very different description, and in the process says "This is the neural activity I'm talking about." Then he proceeds to ask as to the connection between that which appears in the one presentation and that which appears in the other, and gives many erroneous answers. It occurs to him, of course, that the two terms in question might simply be the same thing, but he cannot see how this is possible. But at bottom the solution is simple: He has presented one item in two different ways.

That which follows is a list of comments of varied import.

In order to solve the mind-brain problem, it is necessary to take into account the two presentations described here, the neurological account and the experiential presentation, and extremely helpful if not necessary to picture their workings in neurological terms. If one fails to take these two presentations into account, and consequently thinks, quite simply, in terms of *this thing* neural activity on the one hand and *this thing* experience, consciousness, or mental life on the other, then the problem becomes unsolvable. Some theorists, for instance, attempt to understand how it is that experience arises from neural activity according to natural principles, while others are tempted to appeal to miraculous circumstances, such as divine intervention, to explain how the two remain aligned, as it were. Both these approaches stem from a failure to perceive that two presentations of two very different types figure in the problem, and both are futile.

The impression that experience or consciousness somehow "emerges from" or "is

generated by" neural activity arises when unwittingly a theorist superimposes the experiential presentation, as it were, on the neurological account. It is like laying one tracing on top of another quite different one. The theorist wonders how one of the things which appear comes out of the other. The question carries a false presupposition and thus is, of course, unanswerable. The solution is to see that that which one faces, as it were, is not one presentation of two things, but rather two different presentations of one thing.

There is, to repeat, only one thing in all the universe which it is possible to present through itself, in the neurological sense: neural activity of the type in question here. The reason is simply that there is nothing but this which constitutes neural activity of the type through which things can be presented. It is not possible, for instance, to present a hippopotamus, a bus, or a fire through itself, because none of these things constitutes neural activity. It is not possible to present neural activity of a different type through itself because it does not constitute neural activity of the requisite type. This circumstance gives rise to the impression that everything in the universe, including neural activity of the special type in question here, forms one realm, a complete one, solid as it were, while experience forms quite another, somehow incomplete and ethereal. This is an illusion. Everything in the universe including the neural activity in question does indeed form one realm (or it may be assumed that it does until cosmologists show that it doesn't in some way or other), but experience does not form a separate realm alongside the universe.

The conclusions reached thus far carry straightforward implications for many often-put questions. Let us consider just two.

First, what is the difference between "the physical" and "the mental"? To begin with, it is necessary to decide whether the latter is to be taken to exclude or include subconscious events and processes. But either way, the answer is simple, so far as it can be given at present: The mental consists in neural activity of a certain type or types the nature of which remains for the most part to be discovered. One might feel tempted to give a different answer: that the mental consists in neural activity of the type or types in question presented in a certain special way—viz., through itself. This, however, answers a different question—viz., why the mental appears to be so different from the physical.

A team designs a new computer of unprecedented complexity. Does it have a mental life? That is, does it have experiences? In principle, it is possible to answer this question definitively by examining that which corresponds to neural activity in the computer, though of course this approach presupposes a full and accurate knowledge of the nature of the neural activity which constitutes mental life or experience.

We judge whether old Fogerty or his pet cat is conscious, or more generally whether they have experiences, as in sleep, by their behavior. But the behavior in question is of a piece with neural activity of the type in question. That is, the neural activity and the behavior form the end-points of a continuous back-and-forth process wherein through time each shapes the other in whole or in part. In fact, it is precisely because the behavior is of a piece with the neural activity that it constitutes valid procedure to judge by it. In principle, it is safer to judge by the neural activity, for it is the same thing as the experience, whereas the behavior, or that which an observer takes to be the relevant behavior, is something diverse and hence might prove to be an unreliable basis for judgment. It has come about that we judge by the behavior and not the neural activity because in several important ways the former but not the latter is open to observation.

Perhaps, however, it is best to state the case as follows: At bottom, to judge by Fogerty's behavior whether he has experiences, and to judge by the neural activity in his brain whether he has experiences, and, by extension, to judge by "neural activity" whether the computer has experiences, is not to follow two much less three different procedures. At bottom, it is to follow one and the same procedure, and this procedure is either valid in all three cases or invalid in all three. It is, of course, valid.