these concepts. But once the pictorial appeals connected with the evidential roots of our physical or neurophysiological concepts are dismissed as irrelevant, they no longer pre-empt those places in the conceptual system of which we may then say that they denote some raw feels.

For these reasons I think that once the proper safeguards are applied, no category mistakes are made if we combine phenomenal and physical terms, as indeed we do quite ingeniously not only in ordinary discourse but also in the language of psychology. There is no reason why we should not say, e.g., “The anticipation of success quickened his pace”; “Morbid and tormenting thoughts caused his loss of appetite”; “Touching the hot stove caused intense pain”; “His repressed hostilities finally produced a gastric ulcer”; etc. Category mistakes do arise from confusions of universals with particulars; or of dispositions with occurs. The first sort of category mistake certainly consists in a violation of the Russellian rule of types. I am not sure whether the second sort can always be reduced to the first. But the original diagnosis made especially by Carnap in his early (phenomenalistic) work (60) of the mind-body perplexities as Russellian-type confusions is no longer acceptable. Physical concepts are not logical constructions out of phenomenal concepts.

A more serious objection to identification comes from reflections upon Leibniz’s principle of the identity of indiscernibles. Since we have not only admitted, but repeatedly emphasized the empirical nature of the \( \psi \Phi \) identification, one may well ask how we can speak of identity if its confirmation requires the observation of empirical regularities. The most direct confirmation conceivable would have to be executed with the help of an autocerebroscope. We may fancy a “complete autocerebroscopist” who while introspectively attending to, e.g., his increasing feelings of anger (or love, hatred, embarrassment, excitement, or to the experience of a tune-as-heard, etc.) would simultaneously be observing a vastly magnified visual “picture” of his own cerebral nerve currents on a projection screen. (This piece of science fiction is conceived in analogy to the fluoroscope with the help of which a person may watch, e.g., his own heart action.) Along the lines of the proposed realistic interpretation he would take the shifting patterns visible on the screen as evidence for his own brain processes. Assuming the empirical core of parallelism or isomorphism, he would find that a “crescendo” in his anger, or in the melody heard, would be corresponded by a “crescendo” in the “correlated” cortical processes. (Similarly for “accelerandos,” “ri-

dardandos,” etc. Adrian’s and McCulloch’s experiments seem to have demonstrated a surprisingly simple isomorphism of the shapes of geometrical figures in the visual field with the patterns of raised electric potentials in the occipital lobe of the cortex.) According to the identity thesis the directly experienced qualia and configurations are the realities in themselves that are denoted by the neurophysiological descriptions. This identification of the denotata is therefore empirical, and the most direct evidence conceivably attainable would be that of the autocerebroscopically observable regularities.

Any detailed account of the \( \psi \Phi \) identities is a matter for the future progress of psychophysiological research. But in the light of the scanty knowledge available even today, it is plausible that only certain types of cerebral processes in some of their (probably configurational) aspects are identical with the experienced and acquaintance-unknown raw feels. A “psychological physiology” \* which frames hypotheses about neural structures and processes on the basis of a knowledge of the characteristics and the regularities in the changes of phenomenal fields must therefore always remain extremely sketchy. Knowledge by acquaintance of phenomenal fields alone cannot possibly yield more than a few strands of the total nomological net of neurophysiological concepts required for the explanation of molar behavior. The identification is therefore restricted to those elements, properties, or relations in the neural processes which (in dualistic parlance) are the “correlates” of the raw feels. In our monistic account this is tantamount to the identity of the denotata directly labeled by phenomenal terms, with the denotata of neural descriptions. These latter denotata are acquaintance-unknown to the neurophysiologist, except if he uses the autocerebroscope himself.

Now it is clear that neural correlates (to speak for the sake of easier exposition once more dualistically) are denoted by concepts which are much richer in meaning than the corresponding phenomenal concepts. The neurophysiological concepts refer to complicated, highly ramified patterns of neuron discharges, whereas their raw-feel correlates may be simple qualities or relations in a phenomenal field. How can, e.g., a uniform patch of greenness, a single musical tone, a stinging pain be identical with a complex set of neural events? Here again it is essential to distinguish between the scientific and the philosophical components of

\* Advocated by W. Köhler (184, 185) and critically discussed by C. C. Pratt (260).
this question. Our psychophysiological ignorance is still too great to permit anything more than bold guesses on the scientific side.

There has been talk of “thresholds” and “fusion”; i.e., it is assumed that raw feelings emerge only if the intensities of the neural patterns have reached a certain degree; and that complex neural patterns may be “fused” so that the emerging quality “appears” simple and uniform. This sort of talk, though dangerously apt to mislead, is not entirely illegitimate. Talk of thresholds, limens, and fusion is of course quite customary and proper in psychophysics, but its extension to psychophysiology is precarious. It makes perfectly good sense, and is true, to say that the white and black sectors on a swiftly rotating disk phenomenally fuse and yield a uniformly gray appearance. It makes perfectly good sense also, and is equally true, that the intensity of physical stimuli (like light, sound, pressure on one’s skin, concentration of chemical substances in the air, etc.) must surpass a certain lower limiting value, if they are to effect a sensation in any of the various modalities (sight, hearing, touch, smell, etc.).

If these facts have any analogies in the intra-cerebral sphere, it would have to be assumed that one area of the cortex “taps” or “scans” other areas and could thus not come to react unless the input reaches a certain intensity. Likewise, one would have to assume that the effect in the second area reflects only certain gross features of the intricate and multifarious process patterns in the first. These would be the analogies of psychophysiological thresholds and fusions. Finally, one may assume that the second area (which corresponds to the sensing of the raw feels) is connected with another area corresponding respectively to awareness or judgment (as in introspection) and finally to a motoric area of the cortex which innervates expressive responses or speech.* May I say again that I don’t for a moment insist on the scientific adequacy of this particular model. I am not trying to do armchair neurophysiology. All I am concerned to point out is that models are conceivable which would enable us to remove the obstacles arising from the apparent disparities of phenomenal unity versus physical multiplicity; phenomenal spatialities and physical space; phenomenal time and physical time; phenomenal purposiveness and physical causality; etc. I am now going to outline these considerations very briefly.

* I am indebted to R. Carnap for suggesting (in conversations) this sort of brain model.
of one part of my cerebral processes upon another. Of course in this case, just as in the case of memory (recollection), our thinking is essentially mediated by symbols; and therefore “intentionality” (cf. section IV F) plays an important role here. But the symbolic representation of past events or of future events is effected by processes occurring now; i.e., these representations are causal factors in the determination of current behavior. Just as there is no need for a curious notion of “final” causes (or, in Lecomte de Noiti’s phrase, of “telefinality”), there is no need for the assumption of a literal presence of the past in present recollections. Whatever the adequate and detailed neurophysiological account of memory traces may ultimately turn out to be, it is these memory traces and not some direct and mysterious apprehension of past events which will causally account for the facts of recollection and of the modification of behavior through learning processes.

Similar considerations would seem to apply to the perennial puzzles concerned with the problems of the nature of the “self,” i.e., the unity of the ego, or the unity of consciousness. Here, as in the other puzzles just discussed, the phenomenological descriptions may be correlated with the neurophysiological explanations. Phenomenally there may or may not be a “central core,” the “I,” in all my experiences. We may admit, following Hume and the later empiricists in the Humean tradition, that there is no distinct element, datum, or impression that could properly be regarded as the self. But it is hard to deny that in the directly given data and in their succession throughout experienced time, there is a certain feature of centralization, coordination, organization, or integration—the reader may choose whichever term seems most suitable. This unitary organization seems to rest on the ever-present potentialities of recollecting a great many events or sequences of events of one’s (sic!) past; the ever-present possibility of the occurrence of somatic data (referring to one’s own body); the existence of a set of dispositions or behavior tendencies, including those ascribed (psychoanalytically) to the superego (i.e., in plain language our set of values and ideals as incorporated in one’s conscience); and finally that conception of one’s self which is largely a result of the realization of one’s own character and personality, adequately or often very inadequately derived from interpretations of one’s own behavior and one’s social role as perceived by oneself or by others in the social context.

Whichever of these aspects are in some sense phenomenally “given”—and I suggest a good many may well be so given—these aspects very likely “correspond” to (or according to my view, are identical with) certain relatively stable patterns of cerebral structures and functions. In the pathological cases of split or of alternating personalities (of the Sally Beauchamp, or of the Dr. Jekyll and Mr. Hyde varieties), it has often been suggested that we deal with cerebral subsystems, each having “organic unity” in itself, but only one of them dominating in the determination of behavior during certain intervals of time. If according to psychoanalytic theory large parts of the id as well as of the superego are unconscious, this may well be interpreted by assuming that certain portions of the cerebral processes are blocked off (this corresponds to “repressed”) from the areas of awareness and of verbal report.

Having rendered plausible the scientific feasibility of at least a parallelistic account of some of the striking and remarkable features of mental life, I return now to the philosophical or logical crux of the identity thesis. We have stressed that the (empirical) identification of the mental with the physical consists in regarding what is labeled in knowledge by acquaintance as a quale of direct experience as identical with the denotatum of some neurophysiological concept. The scientific evidence for parallelism or isomorphism is then interpreted as the empirical basis for the identification. The step from parallelism to the identity view is essentially a matter of philosophical interpretation. The principle of parsimony as it is employed in the sciences contributes only one reason in favor of monism. If isomorphism is admitted, the dualistic (parallelistic) position may be retained, but no good grounds can be adduced for such a duplication of realities, or even of “aspects” of reality. The principle of parsimony or of inductive (or hypothetsico-deductive) simplicity does oppose the operationistic predilection for speaking of two (or more) concepts if the evidential facts, though completely correlated, are qualitatively heterogeneous.

Our view of “triangulation” under such conditions of convergence has, I trust, shown the operationist view to be by far too restrictive. But there is still the logical question how concepts with such fundamentally different evidential bases can be interpreted as (empirically) identifiable. In the case of the concept of the electric current (cf. above section V C) as measured by its magnetic, chemical or thermal, etc., effects, the identification of the several operationally introduced concepts is plausible enough. But, it will again be asked, how can we speak
of identity in the entirely different psychophysiological case where one of the concepts is characterized by the direct applicability of subjective acquaintance terms and the other (the physiological) is introduced on an intersubjective basis and thus has its evidential roots in the sensory data of any qualified observer? I think the answer is not so difficult any more. If we first consider “acquaintance” in its ordinary usage, we can certainly say that Anthony Eden is acquainted with Queen Elizabeth II, and I am not (never having had the opportunity of meeting her). Nevertheless, I can lay claim to some knowledge about the Queen, based on newspaper reports, pictures, and the like. It is surely the same person that Eden and I know, each in his way. Closer to the point, I know by acquaintance what it is to have an eidetic musical-image experience (I occasionally “hear with my inner ear” entire passages from symphonies, string quartets, etc. in their full tone colors). Someone else lacking this sort of experience does not know it by acquaintance, but he can know about it, especially if he is a skillful experimental psychologist. It would be unparsimonious to assume that the psychologist and I are referring to two different (but correlated) processes.

Now, direct acquaintance with “private” raw feels is describable also in the intersubjective language of science. Its ultimate explanation may again have to refer to various cerebral areas, one of which (speaking for ease of exposition again dualistically) “corresponds” to sensing, another to judging, and possibly another yet corresponds to (introspective) reporting. I conclude that acquaintance statements differ only in the type and domain of evidence, but not in regard to their reference, from certain neurophysiological statements. Since the neural apparatus of introspection differs most markedly from that of (external) perception, it should not be surprising that knowledge by acquaintance (now taken in its narrow epistemological sense) is so much more crude, undetailed, and imprecise, than knowledge based on sense perception, especially when this is aided by the instruments of science.

Direct awareness, as we have pointed out before, usually furnishes only qualitative or topological orderings of the contents of phenomenal fields. It could not by itself inform us about the cerebral localization of subjective experience. A very crude (but, if taken literally, I fear highly misleading) analogy might help illuminate this point. A man lost in a jungle perceives the trees and undergrowth in his immediate environment. But the location of this very same part of the jungle can be determined in a much more accurate and encompassing manner by a cartographer making his measurements from the vantage point of an airplane or balloon high above the jungle. This simile is misleading, of course, in that both the lost wanderer and the cartographer use sensory perception as evidential bases for their knowledge claims. This clearly differs from the case in which I report (or “say” as Ryle puts it), e.g., a feeling of anxiety and a behavioral psychologist infers my anxiety from the “symptoms,” or a neurophysiologist recognizes it in the “corresponding” cerebral processes. Nevertheless, I fail to see that the difference, important though it is in many ways, affects the argument for the identification of the referents of the introspective avowal, with those of the two scientific descriptions.

I conclude that $\psi \Phi$ identity as I conceive it is then still an identity of indiscernibles as defined by Leibniz and Russell. But as the clarification of the “paradox of analysis” (cf. Feyerabend, 120) and of related puzzles about belief sentences should by now have made amply clear, mutual substitutivity even of logically synonymous expressions holds only in non-pragmatic contexts. The empirical synonymy of $\psi$ and $\Phi$ terms (or, more cautiously perhaps, their empirical co-reference) a fortiori does not allow for substitutivity in pragmatic contexts. By this I mean that the “salva veritate” condition is fulfilled only in contexts of substitution which do not depend on what we know, or what evidence we have for our knowledge claims. As we pointed out before, there are or were many people (primitive, ancient, etc.) who have no idea of the association of mental life with cerebral processes. But it is nevertheless as justifiable to speak of identity here as it is in the case of “Walter Scott = the author of the Waverley novels,” regardless of whether this fact is known or unknown to a given person. In this particular and well-worn example the identity concerns an individual. But, not being a nominalist, I see no difficulties in the identity of a universal, named or described in various ways. Psychophysiological identity may be identity of particulars (this twinge of pain with a specific cerebral event at a certain time), or of universals (pain of a certain kind, and a type of cerebral process).

I am finally going to tackle more specifically and pointedly the question: What is the difference that makes a difference between the parallelism and the identity doctrines? The pragmatist-positivist flavor of this question suggests that it concerns empirically testable differences. But I have already admitted that there are no such differences and
that there could not be any, as far as conceivable empirical evidence is concerned. Is the identity thesis then a piece of otiose metaphysics? Whether it is metaphysics depends of course on what one means by "metaphysics". As I see it, the question is not only similar, but indeed intimately related, to such "metaphysical" issues as realism versus phenomenalism, or the modality versus the regularity view of causality. As most philosophers nowadays realize, these issues, unlike disputes regarding scientific theories cannot be decided by empirical tests. These questions concern the explication of the meaning of concepts and assumptions. They are a subject matter for logical analysis.

As to whether there is a tenable meaning of "causal necessity" related to regularity, but not reducible to it, is a highly controversial issue today. My own reflections favor a view of causal modalities (possibility, necessity, impossibility) which explicates the use of these terms metalinguistically, and nevertheless does not conflict with Hume's basic, and in my opinion irrefutable, contention; viz., that (if I may put it in my own way) the only evidence we can ever have for the assertion of causal connections must be observed regularities. There is, as I see it, no test for causal necessity over and above the tests for regularity. But this does not preclude meaning from the distinction between accidental and necessary universal synthetic statements. A world is conceivable in which a certain metal with a high melting point (say, e.g., platinum) everywhere and always in the infinite history of that world occurs in the solid state, simply because the temperature in that world "happens" never anywhere to surpass a certain upper limit. In such a world the universal statement "(x,y,z,t)(Pt \supset S_{x,y,z})", i.e., "platinum is everywhere and always solid" would be a true universal statement. But the counterfactual conditional "if the temperature were ever to reach or surpass a certain value, platinum would melt" might even be deducible from the basic laws of physics of that world. The universal statement in question is accidentally true. It is not a consequence of a basic law of nature; its truth depends on certain contingent features of the initial and boundary conditions of the fancied world. This shows that there are meaningful distinctions for which no conceivable empirical test could be designed.

Even closer to our problem is the issue between realism and phenomenalism. As I have shown elsewhere (110), there is again no testable difference between these two interpretations of factual knowledge, but there are excellent reasons for the repudiation of phenomenalism and hence for the acceptance of a realistic epistemology. To relegate the issue to the limbo of metaphysics is a lazy man's way of saving himself the troubles of careful analysis. But close attention to the logic of evidence and reference shows that phenomenalism, even in its most liberal forms does not and cannot substantiate its translatability doctrine; and that only a view which relates phenomenal evidence synthetically to statements about physical objects is ultimately tenable.

It is precisely because realists locate both the evidence and the evidenced within the nomological net, that they can give a more adequate account of the relation between "the knower and the known" than positivists, pragmatists, or operationists have ever been able to provide. And it is for this very same reason, that our view of the nature of physical concepts enables us to identify some (of course very few only!) of their referents with the referents of raw feel terms. Dazzled by the admittedly tremendous importance of the evidential basis for our knowledge claims, positivists have regrettably neglected the very objects of those knowledge claims. They have myopically flattered them into the surface of evidence, and thus prevented themselves from giving a viable account of the concepts of physics; and they have merely evaded or repressed the mind-body problem which they thought would vanish if their "reductions"—phenomenalistic or behavioristic—were accepted. Ingenious and tempting though their more sophisticated endeavors of reduction have been, they did not succeed. This is why I felt that an explicit reinstatement and defense of a realistic solution of the mind-body problem would be timely and worthwhile.

VI. A Budget of Unsolved Problems. Suggestions for Further Analyses and Research

Although I have proposed what I believe to be at least a fairly circumspect sketch of an adequate solution of the mind-body problems, there are a number of specific component issues which require a great deal of further clarification and investigation. Since I am more interested in the continuing endeavors in this field than in having said the "last word" about it (that's almost inconceivable, in philosophy at any rate!), I shall now attempt to state and discuss succinctly a number of questions to which I have no entirely satisfactory answer at present. I should be immensely pleased if others were to take up these questions in their own work.
The foregoing analyses and discussions were intended to bring to a level of full awareness many of the repressed difficulties of our problem. I have been especially concerned to separate, as well as I could, the scientific from the philosophical issues. And I have tried to show that there are no insuperable logical difficulties for an identity theory of the mental and the physical. I shall again divide the discussion into two parts. The first (A, B, C) will be concerned with open philosophical questions and difficulties. The second (D) will appraise much more briefly the acceptability of identity theory in the light of possibly forthcoming heterodoxical scientific discoveries.

A. Is There a Phenomenal Language? The Relations of Meaning, Evidence, and Reference. The central core of the proposed solution rests upon the distinction between evidence and reference. No matter what indirect (behavioral) evidence we use for the ascription of mental states, the mental state ascribed is not to be confused with the evidence which only lends support to the ascription. A fortiori, we must eliminate the still worse confusion of the pictorial appeals (attached to evidential terms) with the conceptual meaning or the reference of neurophysiological concepts. The only case in which pictorial appeals or imagery may be thought to play an essential role in knowledge claims is at the ultimate phenomenal basis of the confirmation of all knowledge claims. And, as we have pointed out, if and only if these knowledge claims are so extremely restricted as to refer exclusively to a currently experienced datum, then—in this very special case—evidence and reference coincide. “Now green”, “now anger”, “now green spot on a gray background”, “stinging pain suddenly increasing”, etc. might be examples. The last example shows that the indexical term “now” need not appear in the phenomenal sentence; but of course the sentence is in the present tense, and this is presumably equivalent with the occurrence of the indexical “now”.

It is difficult to decide whether indexical terms (i.e., egocentric particulars like “now”, “I”, “here”, “this”) are indispensable constituents of singular phenomenal sentences. There are, of course, many examples of universal statements which contain only phenomenal terms as descriptive signs (in addition to purely logical signs): “Orange is more similar to red than it is to green”; “Whatever is colored is extended (in the visual field)”; “Anger always subsides after some time”; etc. There is also the difficult question whether phenomenal sentences can contain proper names (or something like topological coordinates) for elements in the phenomenal fields. One of my examples suggested that one might use proper names for the small bright spots on the dark background of a visual field and thus describe their relative positions in terms of such relations as “to the left of”, “above”, and “far below”. It seems clear that there is a danger of logical paradoxes, engendered by category mistakes, if we try to mix phenomenal sentences of this sort with the usual behaviorally based ascriptions of mental states to organisms. In these behavioral ascriptions the organism (or the person?) is the individual which is represented by the subject term of the sentence; the predicate is then something like “sees green”, “sees an array of bright spots on a dark background”. There can then be no direct translation of sentences in which the subject terms denote elements in a phenomenal field, into sentences in which the subject terms denote individual organisms. But perhaps there can be an empirical coreference between statements about some (configurational) aspects of neural fields and those about phenomenal fields.

The precise logical explication of empirical identity or coreference is fraught with many difficulties. Some of these stem from the tendency to think of meaning as intension, and then to conceive of intension in terms of its simplest picturable examples. Blueness is an intension indeed, but what are the intensions of “energy”, “entropy”, “electric field strength”, “electric charge”, “neuron discharge”, “reverberating neural circuit”? In all these other cases the intensions are non-intuitive and can be specified only by postulates and correspondence rules. Similarly non-intuitive are the elements of the corresponding extensions, or the denotata. It does seem to me that we can rightly say that both the intension and the extension of the theoretical concepts of the physical sciences are largely unknown by acquaintance, and that only a very small selection of them can therefore be identified with the intensions and extensions of concepts-by-acquaintance. But of course the latter presuppose the existence of a phenomenal language. It has indeed been seriously questioned as to whether there is a phenomenal language at all. In the usual, and full-fledged sense, “language” means a symbolic system with specifiable syntactical (formation and transformation) rules, semantical (designation) rules, and pragmatic (verification) rules. Scraps and bits of phenomenal phraseology seem to fulfill these requirements, but an overall system like that of the physical language does not seem attainable.
Herbert Feigl

The difficulties are further complicated by the question on which level of analysis we are to specify elements and relations described by phenomenal sentences. There is a long history of objections against the Hume-Mach-Russell-Price analysis of experience into “hard” and “soft” data. Phenomenologists, Gestalt psychologists, and more recently many analytic philosophers have raised serious objections not only against the atomism or elementarism of the sense-data doctrine, but also against any doctrine of immediacy or of the given.*

I have throughout this essay maintained and argued that genuinely phenomenal or acquaintance terms are indispensible, not only for the reconstruction of the indirect confirmation of practically all our knowledge claims, but also as labels for the referents of some knowledge claims—whether they are about my own raw feels or that of other humans or animals. I have allowed for the possibility that the “hard data” (i.e., those data which we can talk about with a minimum of inference) are not preanalytically but only postanalytically “given.” But on just what level of psychological, introspective, phenomenological, or logical analysis we find those data which stand in the required one-one correspondence to neural events, is an open question. With W. Köhler I am inclined to think that an analysis which stops at a relatively simple configurational level (but does not proceed further to “atomize” the given) may well yield the desired items on the $\psi$-side of the $\psi$-$\Phi$ isomorphism. But phenomenal description, even of the Gestalt type, is no easy matter.

B. Unitary or Dual Language Reconstruction? In most of the crucial parts of the present essay I have taken a unitary language to be the ideal medium of epistemological reconstruction. By this I mean the following: Both the phenomenal terms (designating raw feel data) and the illata terms (designating unobservables) occur in the language of commonsense or of science, and they are connected by strands in the nomological net. I believe that if this sort of unitary language is constructed with care, category mistakes can be avoided. This reconstruction differs essentially from the dual language reconstruction pursued by Carnap and W. Sellars (cf. their essays 73, 315). Purely phenomenal terms are there excluded, presumably owing to their conviction that category mistakes as well as solipsism would be unavoidable if we chose a phenomenal basis of reconstruction. But with the reinstatement of realism, i.e., with the insistence on the synthetic character of the strands in the nomological net, solipsism is no longer a consequence, and category mistakes can be avoided if we dismiss pictorial appeals as cognitively irrelevant, and if we take care to distinguish sharply between universals and particulars, among phenomenal as well as among non-phenomenal terms.

I admit, of course, that there are certain distinct advantages in the dual language reconstruction. All evidentiary statements are then couched in terms of the observation language; and the observation language is conceived as intersubjectively meaningful right from the beginning. The connections between the observation language and the theoretical language are formulated with the help of correspondence rules. This type of reconstruction is very illuminating in the analysis of the meaning and the confirmation of scientific theories. But, as I have pointed out, it does not do full justice to statements about the data of direct experience, whether they are one’s own or someone else’s. In our unitary language the “partition” between the data and the illata is located very differently. The correspondence rules in the unitary language would ultimately be statements of $\psi$-$\Phi$ correlations, i.e., of the raw-feel denotations of neurophysiological terms. Since precise knowledge of these correlations is only a matter of hope for a future psychophysiology, the unitary language is largely in the “promissory note” stage. It is therefore not very illuminating if our epistemological reconstruction is to reflect the progress of knowledge in our very unfinished and ongoing scientific enterprise. For this purpose, the dual language reconstruction is much more adequate.

But if we are satisfied with relatively low probabilities for the strands in the nomological net, the unitary reconstruction might do the job too. As a sketch for a reconstruction of an ideally finished science, however, the unitary language approach is preferable. What this would amount to can at present be indicated only by some sort of “science-fiction” illustration: Suppose that we had a complete knowledge of neurophysiology and that we could order all possible human brain states (if not metrically, then at least topologically) in a phase space of $n$ dimen-

* For some impressive arguments against atomism see W. Köhler (183, 184, 185), Brunswik (56), Wallraff (340); and against immediacy, Lean (193), Chisholm (75), Wittgenstein (357), Rhee (278), Quinton (270), W. Sellars (315). Others like Ryle (294), Black (38), and Quine (268) have denied the possibility of a phenomenal language altogether. W. Sellars admits phenomenal concepts only as theoretical terms in a language of behavior theory.
Herbert Feigl

vations. Every point in this phase space would then represent a fully specific type of brain state. And, taking isomorphism for granted, a subset of these points would also represent the total set of possible mental states.

Suppose further that we could teach children the vocabulary of the language of brain states. If this requires n-tuples of numbers, then simple expressions like “17-9-6-53-12” (or even abbreviatory symbols for these) might be inculcated in the child’s language. If we took care that these expressions take the place of all introspective labels for mental states, the child would immediately learn to speak about his own mental states in the language of neurophysiology. Of course, the child would not know this at first, because it would use the expression, e.g., “17-9-6-53-12” as we would “tense-impatient-apprehensive-yet hopefully-expectant.” But having acquired this vocabulary, the child, when growing up and becoming a scientist, would later have no trouble in making this terminology coherent with, and part of, the conceptual system of neurophysiology, and ultimately perhaps with that of theoretical physics. Of course, I not only admit, but I would stress, that, in this transformation there is a considerable change in the meaning of the original terms. But this change may be regarded essentially as an enormous enrichment, rather than as a radical shift or a “crossing of ontological barriers.” In other words, introspection may be regarded as an approach to neurophysiological knowledge, although by itself it yields only extremely crude and sketchy information about cerebral processes. This sort of information may concern certain Gestalt patterns, certain qualitative and semiquantitative distinctions and gradations; but it would not, by itself, contain any indication of the cerebral connections, let alone localizations.

C. One-one Correspondence and the “Riddle of the Universe.” The isomorphism of the mental and the physical consists, according to our interpretation, in a one-one correspondence of elements and relations among the phenomenal data with the elements and relations among the referents of certain neurophysiological terms. And we proposed to explain this isomorphism in the simplest way possible by the assumption of the identity of phenomenal data with the referents of (some) neurophysiological terms. The question arises whether the identity view could be held if we were, for empirical reasons, forced to abandon ψ-Φ one-one correspondence and to replace it by a doctrine of one-many correspondence. As was pointed out previously, the physicalistic predictability of the occurrence of mental states would in principle still be unique, if one-many correspondence holds true. Comparison with an example of the identification of purely physical concepts may shed some light on this issue. Macro-temperature, as thermometrically ascertained, corresponds in one-many fashion to a multitude of micro-conditions, viz., a very large set of molecular states. Strictly speaking, this correspondence holds between one state description on the macro-level with a specifiable infinite disjunction of state descriptions pertaining to the micro-level. Since, as we have also pointed out, this correspondence is empirically ascertained, there is here as little reason to speak of logical identity as in the ψ-Φ case. Nevertheless, we have seen that it makes sense, and what sense it makes, to regard the relation of temperature to mean molecular kinetic energy as an example of a theoretical identity.

In the mind-body case, just as in the temperature case, prediction of the ensuing micro- (and ultimately even macro-) constellations on the basis of information about, respectively, the mental state, or the macro-temperature state, could not be unique under the supposition of one-many correspondence. This is obvious for the temperature example in the light of the principles of statistical mechanics. Analogously, the precise behavior subsequent to the occurrence of a specified mental state would not be predictable either. This is not too disturbing by itself. After all, even if one-one correspondence held true, the neural correlates of a mental state would form only a very insignificant part of the relevant total initial conditions. Talk of identity in the case of one-many correspondence, however, would seem unjustified, because here we are (ex hypothesi) acquainted with the phenomenal datum, and the corresponding disjunction of cerebral states could not plausibly be identified with that individual datum.

Even if one-one correspondence is assumed, there is an intriguing objection * against the identity view. According to the view presented in section V, there is no empirically testable difference between the identity and the parallelism doctrines. We said that the step toward the identity view is a matter of philosophical interpretation. But, so the objection maintains, if identity is assumed, it would be logically impossible to have a stream of direct experience (a “disembodied mind”)

* Raised in Minnesota Center for Philosophy of Science discussions by Mr. H. Gavin Alexander.
survive bodily death and decay. It is further asserted that this would not be a logically entailed consequence of parallelism. For it could well be maintained that the one-one correspondence holds only during the life of the person, but that as drastic an event as bodily death marks the limits of this correspondence. Mental states could then occur independently of physical correlates.

Thus it would seem as if our philosophical identity theory implied consequences which are testably different from those of parallelism. This is quite paradoxical. My tentative reply to this argument is twofold. First, \( \psi \Phi \) identification being empirical, it could of course be mistaken. But if the identity does hold, then survival is indeed logically impossible. This is logically quite analogous to the conditional: If the law of the conservation of energy holds, then a perpetuum mobile (of the “first kind”) is thereby logically excluded. But, of course, the energy law has only empirical validity and might some day be refuted by cogent empirical evidence. Second, and perhaps more important, the parallelism doctrine, as I understand it, holds that there is a \( \psi \Phi \)-one-one correspondence and that this correspondence is a matter of universal and irreducible law. This seems to me to exclude disembodied minds just as much as does the identity thesis. I therefore think that the identity thesis is a matter of epistemological and semantic interpretation, and does not differ in empirical consequences from a carefully formulated parallelism.

Another perplexity was formulated in Leibniz’s monadology, and in different form presented by E. Dubois-Reymond as one of his famous unsolvable “riddles of the universe.” If I may put the core of the puzzle in modern form, it concerns the irreducible (synthetic) character of the \( \psi \Phi \) correlations. Wherever we find co-existential or correlational regularities in nature, we hope to find a unitary explanation for them, and in many cases scientific theories have provided fruitful and well-confirmed explanations of this sort. But in the case of the \( \psi \Phi \) correlation we seem to be confronted with a fundamentally different situation. There is no plausible scientific theory anywhere in sight which would explain just why phenomenal states are associated with brain states. Many philosophers have resigned themselves to regard the \( \psi \Phi \) correlations as “ultimate,” “irreducible,” “brute facts.” Since any explanation presupposes explanatory premises which at least in the context of the given explanation must be accepted, and since even the introduction of higher explanatory levels usually reaches its limit after three or four “steps up,” one might as well reconcile oneself to the situation, and say that “the world is what it is, and that’s the end of the matter.” Now, I think that it is precisely one of the advantages of the identity theory that it removes the duality of two sets of correlated events, and replaces it by the much less puzzling duality of two ways of knowing the same event—one direct, the other indirect.

Nevertheless, there are some “brute facts” also according to the identity theory. But they are located differently. Besides the basic physical laws and initial conditions, there are according to our view the only empirically certifiable identities of denotation of phenomenal and of physical terms. But this identity cannot be formulated in laws or law-like sentences or formulas. The identity amounts merely to the common reference of acquaintance terms on the one hand and unique physical descriptions on the other. Any other way of phrasing the relation creates gratuitous puzzles and avoidable perplexities. For example, it is misleading to ask, “Why does a mental state ‘appear’ as a brain state to the physiologist?” The brain-state-as-it-appears-to-the-physiologist * is of course analyzable into phenomenal data forming part of the direct experience of the physiologist. The “brute fact” simply consists in this, that the phenomenal qualities known by acquaintance to one person are known (indirectly) by description to another person on the basis of phenomenal (evidential) data which, in the vast majority of cases, are qualitatively quite different from the data had by, or ascribed to, the first person. I see nothing paradoxical or especially puzzling in this account of the matter.

A little reflection upon the autocerebroscopic situation shows clearly that the correspondence between, e.g., musical-tones-as-directly-experienced and certain excitation patterns in the temporal lobes of one’s brain as represented by visual patterns (perceived on the screen) is simply a correlation between patterns in two phenomenal fields. The conceptual neurophysiological account of the visual data in this case consists in explanatory hypotheses about cerebral processes which are causally responsible for the production of the image on the screen, and these are in turn causally responsible for the emergence of certain patterns in the visual field. Strictly speaking, and in the light of physical

* No matter whether the physiologist observes someone else’s brain, or—autocerebroscopically—his own.
laws, there must even be a minute time lag between the moment of
the occurrence of a neural event in the temporal lobe and its "repre-
sentation" via the autocerebroscope in one's own visual field. The
experienced patterns in the visual field are in this situation the causal
consequences of (among other things) the auditory data. Disregarding
the small time lag we could here speak of a parallelism indeed. But this
is a parallelism between the data (or patterns) in different sense modal-
ities; or, in the case of visual experience autocerebroscopically "repre-
sented" by other visual data, within one and the same modality. (May
I leave it to the reader to think this through and to find out for him-
self that this special case of autocerebroscopy does not involve any para-
doxical consequences.)

Another puzzle that may be raised is the question as to whether the
proposed identity theory does not involve the undesirable consequences
of epiphenomenalism. It should be obvious by now that our solution
of the mind-body problem differs quite fundamentally from material-
ist epiphenomenalism in that: (1) it is monistic, whereas epiphenomenalism
is a form of dualistic parallelism; (2) the "physical" is interpreted as a conceptual system (or as the realities described by it), but
not as the primary kind of existence, to which the mental is appended
as a causally ineffectivizable luxury, or "shadowy" secondary kind of exis-
tence; (3) quite to the contrary, mental states experienced and/or know-
able by acquaintance are interpreted as the very realities which are also
denoted by a (very small) subset of physical concepts. The efficacy of
pleasure, pain, emotion, deliberation, volitions, etc. is therefore quite
definitely affirmed. In this respect monism shares the tenable and de-
ensible tenets, without admitting the objectionable ones, of interac-
tionism.

Speaking "ontologically" for the moment, the identity theory regards
sentience (qualities experienced, and in human beings knowable by ac-
quaintance) and other qualities (unexperienced and knowable only by
description) the basic reality. In avoiding the unwarranted panpsychistic
generalization, it steers clear of a highly dubious sort of inductive meta-
physics. It shares with certain forms of idealistic metaphysics, in a very
limited and (I hope) purified way, a conception of reality and combines
with it the tenable component of materialism, viz., the conviction that
the basic laws of the universe are "physical." This means especially,
that the teleology of organic processes, the goal directeness or pur-

posiveness of behavior are macro-features, and that their explanation can
be given in terms of non-theological concepts and laws which hold for
the underlying micro-levels. In other words, the monistic theory here
proposed does not require irreducibly teleological concepts in its ex-
planatory premises.

In this connection there is, however, a perplexity which may give us
pause. Inasmuch as we consider it a matter of empirical fact and hence
of logical contingency just which physical (neurophysiological) concepts
denote data of direct experience (raw feels), one may wonder whether
the causal efficacy of raw feels is satisfactorily accounted for. There are
countless teleological processes in organic life which, unless we be pan-
psychists or psychovitalists, must be regarded as occurring without the
benefit of sentience. For example, consider the extremely "ingenious"
processes of reproduction, growth, adaptation, restitution, and regenera-
tion, which occur in lower organisms as well as in many parts of human
organisms. On the other hand, the causal efficacy of attention, aware-
ness, vigilance, pleasure, pain, etc. on the human level is so striking
that one is tempted, with the panpsychists, to assume some unknown-
by-acquaintance qualities quite cognate with those actually experienced.

The new puzzle of epiphenomenalism would seem to come down to
this: An evolutionary, physiological, and possibly physical explanation
of adaptation, learning, abient or adient, goal-directed behavior can be
given without any reference whatever to raw feels. The distribution
of raw feels over the various possible neural states could be entirely
different from what in fact it is. For example, raw feels might be asso-
ciated with the peristaltic movements of the stomach or with coronary
self-repair, and not with cortical processes. But, I repeat, such different
distribution of raw feels or even their complete absence would still not
prevent an adequate explanation of teleological behavior. Of course if
we accept the actual distribution, i.e., the total set of \( \psi - \varphi \)-correlation
rules as ultimate parallel laws, and interpret these according to the
identity theory, then we can quite legitimately speak of the efficacy of
raw feels. This is so, because the raw-feel terms are then precisely in
those loci of the nomological net where science puts (what dualistic
parallelism regards as) their neural correlates. But if the biopsychologi-
cal explanations offered by the theories of evolution and of learning
can thus incorporate the efficacy of raw feels, those theories presuppose,
but do not by themselves explain, the \( \psi - \varphi \) correlations.
That pleasure or satisfaction reinforces certain forms of adient behavior can be formulated in the manner of the law of effect (cf. Meehl, 220). But in the ultimate neurophysiological derivation of this empirical law of behavior, the correlation of pleasure or gratification with certain cerebral states is not required. Behaviorists, especially “logical behaviorists,” have taken too easy a way out here in simply defining the pleasurable as the behaviorally attractive and the painful as the behaviorally repellent. The “illumination” of certain physically described processes by raw feels is plainly something a radical behaviorist cannot even begin to discuss. But if the synthetic element in the ψ-Φ relations that we have stressed throughout is admitted, then there is something which purely physical theory does not and cannot account for. Is there then a kind of “brute fact” which our monistic theory has to accept but for which there is possibly no explanation, in the same sense as there can be (within a naturalistic empiricism) no explanation for the fact that our world is what it is in its basic laws and conditions? Possibly, however, I see a riddle here only because I have fallen victim to one of the very confusions which I am eager to eliminate from the mind-body problem. Frankly, I suspect some sort of “regression” rather than “repression” has engendered my bafflement. If so, I should be most grateful for “therapeutic” suggestions which would help in clearing up the issue. Possibly, the solution may be found in a direction which appears plausible at least for the somewhat related puzzle of the “inverted spectrum.”

This ancient conundrum, we have seen, is not satisfactorily “dissolved” by Logical Behaviorism. A “captive mind” is logically conceivable, and might know by acquaintance that his sense qualia do not stand in one-one correspondence to his autocerebroscopically ascertained neural states. If physical determinism is assumed, then it is true that such knowledge would have to remain forever private and uncommunicable. But under these conditions a systematic interchange of the qualia for one person at different times and as between different persons is logically conceivable. It would of course ex hypothesi not be intersubjectively confirmable, and thus never be a possible knowledge claim of science. But the logical conceivableability of the inverted spectrum situation demonstrates again the empirical character of the ψ-Φ correspondence. This empirical character is, however, (as we have also emphasized) extremely fundamental in that it is closely bound up with the basic prin-
Herbert Feigl

basic nature of our world (just as the basic natural laws characterize
our kind of world and differentiate it from others kinds), then perhaps
the inference from a neural state to its ("correlated") raw feel is at
least as "necessary" (though of course not purely deductive) as is the
inference from, e.g., the atomic structure of a chemical compound to
its macro-physical and chemical properties.

I hope that readers sympathetic to my admittedly speculative grop-
ings will try to formulate in logically more precise and lucid form what
I have been able to adumbrate only so vaguely. Such readers should in
any case keep in mind one of the ideas which seem to me indispensable
for an adequate solution of the phenomenalism-realism as well as the
mind-body problems: The paradigm of symbolic designation and deno-
tation is to be seen in the relation of a token of a phenomenal term
to its raw-feel referent. All non-phenomenal descriptive terms of our
language, i.e., all physical terms (no matter on which level of the ex-
planatory hierarchy) designate (or denote) entities which—within the
frame of physical knowledge—are unknown by acquaintance. But if our
"hypercritical" realism is accepted, we must ascribe denotata to all those
physical terms which designate individuals, properties, relations, struc-
tures, fields, etc., i.e., entities which can justifiably be said to be described
(i.e., uniquely characterized) on the basis of evidential data by Russel-
dian descriptions on one or the other level in the hierarchy of logical
types. "To exist" means simply to be the object of a true, uniquely de-
scriptive statement. But since such descriptive knowledge (on a sensory
evidential basis) by itself never enables us deductively to infer the
acquaintance qualities of its objects, there is always a possibility for
some sort of modal identification of a datum with a specifiable descrip-
tum. This is the central contention of the present essay.

D. Some Remarks on the Philosophical Relevance of Open Scientific
Questions in Psychophysiology. There are many problems of predomin-
antly scientific character among the various mind-body puzzles. These
await for their solution the further developments of biology, neuro-
physiology, and especially of psychophysiology.* We have touched on

* The following works and articles strike me as especially important, or at least
suggestive, in these fields: Boring (40); Köhler (183, 184); Wiener (349); Hebb
(145); Herrick (154); Adrian (3, 4, 5); Brain (46); Eccles (92); Ashby (9); McCul-
loch (214, 215); von Foerster (122, 123); Blum (59); Brillouin (49); Culberson
(80); Colby (76); Gellhorn (132); Krech (188, 189). Northrop's (240) exuberant
and enthusiastic appraisal of the significance of cybernetics for the mind-body prob-

many of these issues in various parts and passages of the present essay.
Speaking (again for ease of exposition only) the language of parallel-
ism, there are, e.g., the following issues to be decided by further research
concerning the specific \$\phi \Phi \$ correspondences:

1. The problem of the cerebral localization of mental states and func-
tions: Classical and recent experiments indicate quite specific localiza-
tion for many processes. On the other hand, the findings of Lashley, 
Köhler, and others demonstrate a principle of mass action or of the
equipotentiality of various cerebral domains.

2. The problem of the relation of phenomenal (visual, tactual, kin-
aesthetic, auditory, etc.) spatialities to physical space: The time-honored
puzzle regarding (Lotze's) "local signs" is, as far as I know, not com-
pletely resolved. The question is by what neural mechanisms are we
able to localize narrowly circumscribed events (like sensations of touch
or of pain) more or less correctly on our skin or within our organism?
Can we assume projection areas in the cortex which through learning
processes come to interconnect afferent neural impulses in the different
sensory modalities, and thus enable us to localize, e.g., visually what is
first given as a tactual or pain sensation?

3. The problem of the nature of memory traces: Current fashion
makes much of the reverberating circuits in neural structures. But it
seems that while this explanation may do for short-range memory, it is
probably not sufficient for long-range memory. Whether the lowering
of neural or synaptic resistance is to be explained by "neurobiotaxis,"
by thickenings of the bud ends of dendrites, or by some chemical
(quantum-dynamical) change in the neurons, is at present quite dubious.

4. The problem of the "spacious present": The fact that the direct
experience of one conscious moment embraces the events in a short
stretch of finite duration, and not just an "infinitesimal" of physical
time, presents a puzzle that is intriguing especially from a philosophical
point of view. It is difficult, but I think not impossible to conceive of
scanning mechanisms which "take note" of freshly accumulated traces,
and even involve an extrapolative aspect as regards the immediate
future.

5. The problem of the recollection of ordered sequences of past ex-
periences: How can a brain process at a given time provide a correct

lemma indicates at least one philosopher's response to the challenge of this new border-
land discipline.
simultaneous representation of such a sequence? Philosophers are used to distinguishing a sequence of remembrances from the remembrance of a sequence of events. It seems that the latter can in certain instances occur in one moment of the specious present. Thus I seem to be aware of the sequence of themes and developments in the first movement of Beethoven’s Seventh Symphony, and this awareness does not seem to require a quick internal rehearsal. It seems to be “all there at once.” I also can, usually with fair reliability, recall the temporal sequence of many events in my life (various voyages, lecture engagements, first, second, third, etc. visits to Paris, and so on). Is it again some sort of “scanning” mechanism which might account for this? Driesch (87) considered it outright impossible to conceive any neurophysiological mechanism which would explain these phenomena, and believed that only a dualistic interactionism (involving a strictly immaterial mind or self, consonant with the rest of his vitalistic doctrines) could render justice to them. While I know of no obviously workable neural model that would do the trick, I think that Driesch, here as elsewhere, declared the defeat of naturalistic explanations prematurely. Present-day scientific findings and scientific theorizing have in so many cases shown the feasibility of physicochemical explanations of biological phenomena, so that we have good reasons to expect a successful solution of the problem of remembrance of past event-sequences.

6. The problems of “quality,” “fusion,” and “thresholds”: I have dealt with these as best I could above (section V E), but there is no doubt that future research is needed in order to provide an adequate explanation for these striking phenomena.

7. The problems of “wholeness” (Gestalt), teleological functioning and purposive behavior: These also were discussed above (section IV E). The contributions of Gestalt theory and its doctrine of isomorphism have been largely absorbed in current psychophysiology (cf. especially Hebb, 145). Similarly significant and hopeful are the analyses of negative feedback processes as provided by cybernetics. The doctrines of “General Systems Theory,” though related in spirit to cybernetics, Gestalt theory, and mathematical biophysics, are however very dubious from a logical point of view (cf. Buck, 57). We have also discussed the related issue of emergent novelty. If “absolute emergence” (Pap, 244) is a fact, then perhaps some such account as that given by Meehl and Sellars (221) may be considered seriously. I still expect that future scientific research will demonstrate the sufficiency of physical explanations. But if I should be wrong in that, a theory involving genuine emergence would seem to be a much more plausible alternative than dualistic interactionism. Such a theory would, however, have important philosophical implications. Inference to mental states would rest on presupposed nomological relations between physical brain events and mental states which could be defined only in terms of the theoretical concepts of a physical language. There would still be empirical identity between the referents of some (theoretical) physical terms and the referents of phenomenal terms, but the scientific explanation of behavior would be markedly different from purely physical explanations. Some of the philosophical puzzles of the mind-body problem might be resolved even more plausibly under this hypothesis. For example, the question regarding the “inverted spectrum” could be answered, quite straightforwardly, on the basis of normal inductive or analogical inference. Directly given qualia, represented by (theoretical) physical terms in our scientific account would then be functionally related to those brain processes which are described in physical (theoretical) terms. The principle of sufficient reason would then tell us that to assume any deviation from the highly confirmed functional relationships between mental states and physical brain states would be just as arbitrary as, e.g., the assumption that some electric currents are associated with magnetic fields of an entirely different structure than are others (despite the complete similarity of the electric currents in every other respect). As I have indicated before, the validity of the emergentist theory falls in any case under the jurisdiction of future empirical research.

8. The problem of a neurophysiological account of selfhood: This important though controversial notion describes a form of organization or integration of experiences and dispositions which on the neural side corresponds first to the relatively stable structure of the brain and the other parts of the nervous system, as well as to certain unified forms of functioning. To what extent the psychoanalytic concepts of the ego, superego, and id may be “identified” with such structures and functions is still very unclear. Very likely, the psychological notions will appear only as first crude approximations, once the detailed neurophysiological facts are better known.

9. The problems of neurophysiological theories which will account for the unconscious processes assumed by various “depth psychologies,”
especially psychoanalysis: One of the philosophically intriguing questions here is whether we can explicate such psychoanalytic concepts as “repressed wishes”, “unconscious anxiety”, “Oedipus complex”, etc. as dispositions, or whether unconscious events also need to be assumed. Even outside the sphere of Freudian preoccupations, there are for instance the often reported cases of “waking up with the solution of a mathematical problem.” One wonders whether the brain did some “work” during sleep, and if so, whether “unconscious thoughts” might not be part of a first-level explanation of this sort of phenomenon. I am inclined to think that both dispositions and events are required, and that the future development of science may well produce more reliable neurophysiological explanations than the currently suggested (and suggestive) brain models (cf. Colby, 76).

10. Much more problematic than all the questions so far discussed in this section are the implications of the alleged findings of psychical research. Having been educated in the exercise of the scientific method, I would in the first place insist on further experimental scrutiny of those findings. But if we take seriously the impressive statistical evidence in favor of telepathy, clairvoyance, and precognition, then there arises the extremely difficult problem of how to account for these facts by means of a scientific theory. I know of no attempt that gives even a plausible suggestion for such a theory. All hypotheses that have been proposed so far are so utterly fantastic as to be scientifically fruitless for the present. But logical analyses (e.g., C. D. Broad, 52; M. Scriven, 304) which make explicit in which respects the facts (if they are facts!) of psychical research are incompatible with some of the guiding principles of (“Victorian”) science are helpful and suggestive. It is difficult to know whether we stand before a scientific revolution more incisive than any other previous revampings of the frame of science, or whether the changes which may have to be made will only amount to minor emendations.

Concluding Remark. An essential part of the justification of the philosophical monism proposed in this essay depends upon empirical, scientific assumptions. Only the future development of psychophysiology will decide whether these assumptions are tenable. Since I am not a laboratory scientist (though I did some laboratory work in physics and chemistry in my early years), I cannot responsibly construct psychophysiological hypotheses. Nor did I intend to close the doors to alternative philosophical views of the relations of the mental to the physical. What I did try to show, however, is that monism is

(1) still very plausible on scientific grounds,
(2) philosophically defensible in that it involves no insurmountable logical or epistemological difficulties and paradoxes.

I realize fully that I could deal only with some of the perplexities which have vexed philosophers or psychologists throughout the ages, and especially in recent decades. Just where the philosophical shoe pinches one, just which problems strike one as important—that depends, of course, on a great many more or less accidental personal, educational, or cultural factors. Despite my valiant efforts to deal with what strike me as important and baffling questions, I may of course not even have touched on other facets which some of my readers might consider as the essential problems of mind and body. May others come and deal with them!

NOTE AND REFERENCES

Since this essay has almost the dimensions of a monograph, I feel I should acknowledge my sincere indebtedness to the countless philosophers and scientists who have helped me by their publications as well as (in many instances) by personal discussion or correspondence to reach whatever clarity I may claim to have achieved. It is impossible to mention them all, but some stand out so distinctly and prominently that I should list them. Naturally, I have learned from many of these thinkers by way of disagreement and controversy. In any case none of them is to be held responsible for whatever may be wrong or confused in my views. My first acquaintance with philosophical monism goes back to reading the work of Aloys Riehl (279); I found essentially the same position again in Moritz Schlick (298), some of whose work I had studied before I became his student in Vienna in 1922. I have profited enormously (although he may well think, not sufficiently) from discussions with my kind and patient friend R. Carnap intermittently throughout more than thirty years. During my Vienna years (1922–30) I was greatly stimulated by discussions also with Schlick, Wittgenstein, Victor Kraft, Otto Neurath, E. Kaila, Karl Popper, Edgar Zilsel, et al. I was greatly reinforced in my views by my early contact with the outstanding American critical realist C. A. Strong (in Fiesole, Italy, 1927 and 1928). Along similar lines I found corroborated in the work of Roy W. Sellars, Durant Drake, Richard Gätschenberger, and in some of the writings of Bertrand Russell. Discussions (and many controversies) during my American years, beginning in 1930, with E. G. Boring, S. S. Stevens, P. W. Bridgman, C. I. Lewis, A. N. Whitehead, H. M. Sheffer, V. C. Aldrich, S. C. Pepper, E. C. Tolman, C. L. Hull, B. F. Skinner, K. Lewin, E. Brunswik, W. Köhler, Albert Einstein, H. Reichenbach, F. C. S. Northrop, and Philipp Frank, proved most stimulating.

During the last three and a half years of the activities of the Minnesota Center for Philosophy of Science I had the tremendous advantage of intensive discussions not only with my colleagues Paul E. Meehl, Wilfrid Sellars, and Michael Scriven, each of whom disagrees with me on several different fundamental points, and each for different reasons, but I also profited from discussions with such visitors or collaborators as Gilbert Ryle, C. D. Broad, Anthony Flew, Peter Strawson, Ernest Nagel, C. G. Hempel, A. Kaplan, Arthur Pap, Herbert Bohnert, Henry Mehilberg, Hilary Putnam,
Herbert Feigl

Gavin Alexander, William Rozeboom, and Adolf Grünbaum. Last, but not least, I owe a great debt of gratitude to my students at Minnesota who during many a year of seminar work in the philosophical problems of psychology have helped me through their criticisms to arrive at clearer formulations of my ideas and to eliminate various difficulties, mistakes, and confusions. It has been a veritable Odyssey of ideas for me, and I am by no means sure I have “arrived”!

In the following rather ample bibliography I have tried to assemble references not only to those materials actually discussed or quoted in my essay, but also a great deal of what seemed to me of systematic significance for future philosophical work in the area. With the appending volume of philosophical writings in recent decades, many a valuable book or article becomes all too soon forgotten, and many go entirely unnoticed. Scholars or students who wish to tackle the “world knot” may find most of these books or articles stimulating, and many of them illuminating.

As regards my earlier publications on the mind-body problem, I now regard my presentation (103) of 1934 as partly confused. The later rather compact presentation (112) of 1950 presents on the whole an adequate preview and summary of my present outlook (though I am no longer satisfied with some of the illustrative analogies used there). A fuller discussion of my identity theory in relation to Carnap’s present (largely unpublished) version of physicalism and to the issues of the empiricist criterion of factual meaningfulness is contained in my essay (116) in the forthcoming Carnap volume of P. A. Schilpp’s Life of Living Philosophers.


Herbert Feigl


97. Elsasser, W. M. The Physical Foundation of Biology. (Unpublished manuscript completed in 1956.)


THE “MENTAL” AND THE “PHYSICAL”

Herbert Feigl


THE “MENTAL” AND THE “PHYSICAL”

Herbert Feigl

255. Peppert, S. C. A Neutral Identity Theory. (Unpublished manuscript)

THE "MENTAL" AND THE "PHYSICAL"

Herbert Feigl


496

THE “MENTAL” AND THE “PHYSICAL”