Facts of the Matter*

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It was emphasized by rationalists and empiricists alike that inquiry should begin with clear ideas. I agree about the clarity, but I balk at ideas. The British empiricists themselves balked at abstract ideas. *Nihil in mente,* they declared in their orotund British measures, *quod non prius in sensu.* They echoed their nominalist ancestors, for whom abstract ideas were *flatus vocis*—words, words, words.

What then about concrete ideas? Even a strictly sensory idea is elusive unless it is reinforced by language. This point was made by Wittgenstein. Unaided by language, we might treat a great lot of sensory events as recurrences of one and the same sensation, simply because of a similarity between each and the next; and yet there can have been a serious cumulative slippage of similarity between the latest of these events and the earliest of them. But if we have learned society's word for the sensation, then social intercourse will arrest the drift and keep us in line. We will be saved by the statistical fact that the speakers have not all drifted in the same direction.

Let us therefore recognize that the whole idea idea, abstract and concrete, is a frail reed indeed. We must seek a firm footing rather in words. The point was urged by John Home Tooke only shortly after Hume's time, in 1786. Tooke held that Locke's essay could be much improved by substituting the word 'word' everywhere for the word 'idea.' What is thereby gained in firmness is attended by no appreciable loss in scope, since ideas without words would have come to little in any event. We think mostly in words, and we report our thoughts wholly in words. Let us then take one leaf from the old-time philosophy and another from John Home Tooke. Philosophical inquiry should begin with the clear, yes; but with clear words.

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And what words are those? It will not do to say that they are the words that express clear ideas, or the words that clearly express ideas, for we are fleeing the idea idea. For a standard of clarity of language we must look rather to the social character of language and the use of language in communication. Bypassing the idea idea, we can still do something with clarity of communication. The vehicle of communication is the sentence, and one mark of clarity of communication is agreement as to the truth of the sentence. This is a very fallible criterion, but it is a beginning. Let us see what we can do to improve it.

If one party affirms a sentence and the other party assents, this gives little evidence of communication; for a purely random verdict would be affirmative half the time. However, there is some safety in numbers. Instead of relativizing our clarity criterion to two communicants, we may relativize it to increasing sectors of the speech community. We might consider what proportion of the community would be prepared to agree to the truth or falsity of a sentence, and we might take this figure as a measure of the clarity of the sentence.

This is better, but it still will not do. One difficulty is that there are cults, fads, and slogans that can sweep a community, prompting widespread agreement to the truth of sentences that a clear thinker would not rate as clear in the slightest. Another and opposite difficulty is that people can disagree regarding the truth of a sentence even when the sentence would be said to be clear. Now both of these difficulties can be met by appealing once again to numbers: by appealing to what Mill called concomitant variation.

For this purpose we direct our attention to a special sort of sentences, *occasion* sentences. These are the sentences that admit of verdicts and truth values not once for all but from one occasion of utterance to another, depending on what is going on in the neighborhood. They are sentences like 'It's raining', 'This is red', 'That's his uncle', 'He owes me money', There goes a rabbit'. Historical truths are not among them, nor are scientific hypotheses, nor credos, nor slogans. Now we might measure the clarity of an occasion sentence by the readiness of witnesses to agree in their verdicts on it from occasion to occasion. By this standard 'It's raining' and 'This is red' rate high; 'There goes a rabbit' not quite so high; 'That's his uncle' rates lower; 'He owes me money' lower still. There are three possible responses—assent, dissent, and abstention—and we may also distinguish degrees of hesitation. The great value of this standard of clarity lies in its linking of language to nonlinguistic reality.

The occasion sentences that pass this clarity test with high marks are what I call observation sentences. They often take the form simply of

single nouns or adjectives—'Rabbit', 'Raining'—but for our purposes they are best thought of still as sentences, admitting of assent or dissent in the light of each present local situation. They are expressions that we have learned to associate with publicly observable concurrent circumstances. Previous speakers have taught us some of these expressions by direct conditioning to the circumstances. They are circumstances which, thanks to their public character, can be appreciated jointly by us and our teachers. Some of these observational expressions also are learned indirectly by some of us, through explanations in other words; but all could be learned in the direct way, such is their observational character. They are our introduction to language, for they are the expressions that we can learn to use without learning to use others first. It is through them that language and science imbibe their empirical content. It is back to or toward them, also, that a scientist reverts when he is mustering evidence for a disputed hypothesis; for the distinctive trait of an observation sentence is that present witnesses will usually agree about it on the spot.

Earlier I made Wittgenstein's point: how public language anchors experience, arresting drift. Now we are noting the converse: how public experience anchors language. The observation sentence is the anchor line.

I remarked that the use of an observation sentence often is and always could be acquired directly by conditioning. This process is also called induction. By either name it is the learning process at its simplest. If an event resembles an earlier one, the subject tends to expect its sequel to resemble the sequel of the earlier one. The expectation hinges thus on similarity in some sense—similarity by the subject's own lights. This relation is one of subjective similarity, and no significance need be sought for it apart from the consequent inductive expectations themselves. From a behavioral point of view a subject's expectations are shown by his overt behavior, arid his similarity standards are shown by the pattern of his expectations.

Expectations are in large part fulfilled, despite the subjectivity of similarity standards; ours is a fairly friendly world. Evolutionary biology explains this by the fact that those standards are largely innate and thus favored by natural selection according to their survival value.

Primitive inductive learning is evident in the acquisition of various observation sentences. To acquire an observation sentence is to learn when to expect a veteran speaker to approve one's utterance of it, or to assent to it on his own account. This can be learned from sample instances by induction: by extrapolating to further cases along lines of subjective similarity. These linguistic inductions tend to be highly suc-

cessful—more so still than the general run of inductions in our fairly friendly world. The reason is that, whereas one's inductions regarding nature owe their success only to a rough congruity between one's similarity standards and the trend of events in nature, on the other hand one's inductions regarding the veteran speaker's assent to the observation sentence owe their success to a sharing of similarity standards by the speaker and oneself. Heredity, environment, and social interaction have fostered such sharing of similarity standards to a high degree.

Direct conditioning or simple induction does not suffice for the acquisition of language generally. The learning process has to be more elaborate when we move on to grammatical constructions, to past and future tenses, to conditionals and conjecturals and metaphors, and to theoretical and abstract terms. It is evident that these further linguistic structures are based, however precariously, on the observational vocabulary that was learned by direct confrontation and simple conditioning. The superstructure is cantilevered outward from that foundation by imitation and analogy, by trial and error. In the course of mastering it we may check up now and again by noting the reaction of the listener. But it is in the observational vocabulary that language makes its principal contact with experience. It is this part of language that we first learn to apply, and to which we retreat when a check point is needed.

The situations that command assent to a given observation sentence will not be quite alike. They will be similar by our lights and by the lights of other speakers. But we can count on a curious tolerance of spatial reorientation in these similarity standards. We can see why if we reflect that the language learner and his informant are not situated eye to eye. They see things from unlike angles, receiving somewhat unlike presentations. The learner is thus made to associate with his presentation a word or occasion sentence that was elicited from the informant by a somewhat different presentation. It will have to be a versatile word or sentence indifferently applicable throughout a whole group of presentations.

My talking of observation sentences rather than observation terms is a matter of first things first. We can learn to assent to and dissent from observation sentences as wholes, under appropriate stimulatory conditions, with no thought of what sentences or parts of sentences to count as terms or what objects to count them as referring to. And now what happens when at last we can be said to use some of these sentences or parts of sentences as terms denoting some sort of supposed objects?

The main thing to settle, in the way of fixing the objects, is their individuation: we have to fix standards of sameness and difference. Now it is clear that at this point little or no attention will be paid to differences

of perspective; for we saw that such differences are bound to be transcended in the learning of words. What are posited as objects for the terms to refer to will be, primarily, objects that are counted identical under changes of perspective. This explains the primacy of bodies. If clarity can be ascribed to things as well as to words, then bodies are things at their clearest. If inquiry is to begin with what is clear, then let us begin as physicalists.

The move from sentences to terms is already a major step in language learning. On the one hand there is the simple observation sentence 'Rabbit', comparable to 'Red' or 'It's raining'; it commands assent in the presence of rabbits. On the other hand there is the term 'rabbit', which denotes the rabbits. A speaker may be said to have mastered this term, and to have achieved objective reference, only when he has learned to subject the term to all the grammatical apparatus of particles and constructions that go to implement objective reference: the apparatus of singular and plural, of definite and indefinite articles, of pronominal cross reference, of identity and distinctness, and of counting. When he has come this far, he has risen above the primitive base afforded by observation sentences, and has ventured somewhat out onto the cantilevered superstructure. Language learning at this stage is beyond the reach of simple induction; it proceeds by imitation and analogy in more complicated ways.[1]

Various of the one-word observation sentences like 'Rabbit' and 'Apple', which were themselves learned in the simple inductive way, will now spawn terms in their likeness—terms denoting bodies. The terms are already theoretical. A body is conceived as retaining its identity over time between appearances. Whether we encounter the same body the next time around, the same apple, for instance, or only another one like it, is a question not to be settled by simple induction. It is settled, if at all, by inference from a network of hypotheses that we have internalized little by little in the course of acquiring the nonobservational superstructure of our language. These hypotheses are supported only indirectly by past observation: they owe their plausibility to our having inferred other consequences from them that were borne out by observation. Such is the continuing method of science: not simple induction, but the hypothetico-deductive method.

Bodies are basic to our way of thought, as objects go. They are the paradigmatic objects, clearer and more perspicuous than others. Imitation and analogy continue their work, however, not stopping with an ontology of bodies. Grammatical analogy between general terms and singular terms encourages us to treat a general term as if it designated a single object, and thus we come to posit a realm of objects for the

general terms to designate: a realm of properties, or sets. What with the nominalizing also of verbs and clauses, a vaguely varied and very untidy ontology grows up.

The common man's ontology is vague and untidy in two ways. It takes in many purported objects that are vaguely or inadequately defined. But also, what is more significant, it is vague in its scope; we cannot even tell in general which of these vague things to ascribe to a man's ontology at all, which things to count him as assuming. Should we regard grammar as decisive? Does every noun demand some array of denotata? Surely not; the nominali/ing of verbs is often a mere stylistic variation. But where can we draw the line?

It is a wrong question; there is no line to draw. Bodies are assumed, yes; they are the things, first and foremost. Beyond them there is a succession of dwindling analogies. Various expressions come to be used in ways more or less parallel to the use of the terms for bodies, and it is felt that corresponding objects are more or less posited, *pari passu;* but there is no purpose in trying to mark an ontological limit to the dwindling parallelism.

It is only our somewhat regimented and sophisticated language of science that has evolved in such a way as really to raise ontological questions. It is an object-oriented idiom. Any idiom purports to tell the truth, but this idiom purports, more specifically, to tell about objects. Its referential apparatus, the apparatus for referring to objects, is explicit; there is no question of a dwindling parallelism. Just what those objects are—what else besides bodies—is still as may be; but it becomes a significant question, and it can be variously answered in various scientific systems of the world.

The basic structure of the language of science has been isolated and schematized in a familiar form. It is the predicate calculus: the logic of quantification and truth functions. In representing it thus I do not mean to take issue with those quantum physicists who recommend a different logic of a non-truth-functional kind, but I set them aside in order not to complicate the picture. Also I do not mean to deprecate alternative formulations of standard logic, such as predicate-functor logic; but as long as these are intcrtranslatable with the classical predicate calculus, we lose nothing in adhering to the latter. Ради concreteness, then, let us adhere to it; for it is familiar.

Language thus regimented has a simple grammar. There is a lexicon of predicates. Each atomic sentence of the language consists of a predicate, say an n-place predicate, adjoined to *n* variables. The rest of the sentences are built up of the atomic ones by truth functions and quantification.

Thus the only singular terms are the variables, used for quantification. It would be all right to allow also names as further singular terms and to allow functors for building complex singular terms from the names and the variables. But we can pass over these further conveniences; for there are well-known ways of dispensing with them, however inconveniently, by systematic paraphrasing of contexts.

When language is thus regimented, its ontology comprises just the objects that the variables of quantification admit as values. Some of the turns of phrase in ordinary language that seem to involve novel sorts of objects will disappear under the regimentation. Still we must not expect to end up with bodies as the only values of the variables. Much of the positing of abstract objects that seems to go on in ordinary language proves to be gratuitous and eliminable, but much of it also proves valuable. How *sets* can pay their way is classically illustrated by the definition of the *closed iterate* of a two-place predicate. Ancestor, for instance, is the closed iterate of parent. Neither parenthood nor ancestry has to do with sets, but sets enable us to define ancestor in terms of parent. For every predicate in our language we can express also its closed iterate, if we allow ourselves to quantify over sets as values of our variables.

It must be emphasized that when we reckon the ontology as comprising just the values of the variables, we are assuming the strictly regimented notation: just predicates, variables, quantifiers, and truth functions. Admission of additional linguistic elements can upset this ontological standard. Thus suppose someone adopts outright an operator for forming the closed iterates of predicates, instead of defining it with help of an ontology of sets. Are we to say that he has saved on ontology? I say rather that he has shelved the ontological question by switching to a language that is not explicit on ontology. His ontology is indeterminate, except relative to some agreed translation of his notation into our regimented one.

Another way in which quantification over sets or numbers or other abstract objects can sometimes be avoided is by admitting a modal operator of necessity, if we can see our way to making appropriate sense of this device.[2] Here again we are presented not with an ontological saving but with a question of foreign exchange.

We have just been seeing how the values of the variables may understate the ontology in the presence of some foreign notations. Other foreign notations may work oppositely. If idioms of prepositional attitude were admitted, such as *'x* believes that p', then the variables might seem to overreach the ontology; for x can believe that $(\exists y)(y$ is a unicorn) without there being any unicorns. The ontological question

for such a language, as for ordinary language generally, makes sense only relative to agreed translations into ontologically regimented notation. A language is not necessarily defective in being thus ontologically indecisive; it is just not a language of the object-oriented type.

Translation of ordinary language into the regimented idiom is not determinate. For some sentences there are various acceptable regimentations not equivalent to one another in point of ontology, and for some sentences there is no acceptable regimentation at all. In general this translation venture is significant only when undertaken systematically for a substantial corpus of sentences, a branch of science, rather than for stray sentences in isolation. Many sentences that seem from their grammatical form to talk of abstract objects of various sorts will be translated into regimented sentences that are innocent of those ontic commitments, for the translator will favor ontic economy where he can. Regiment as he will, however, he cannot make do with just bodies. By quantifying over classes he increases the yield of his apparatus, as illustrated by the closed iterates. By quantifying over numbers and functions he is able to make systematic use of measurement and thus to develop his scientific theory along quantitative lines.

These sets, numbers, and functions are posited, as denizens of the universe supplementary to the primordial bodies, in order to strengthen and simplify the over-all theory. To do so is not to repudiate physicalism. The physicalist does not insist on an exclusively corporeal ontology. He is content to declare bodies to be *fundamental* to nature in somewhat this sense: there is no difference *in the world* without a difference in the positions or states of bodies. I say 'in the world' so as not to include differences between abstract objects, as of mathematics.

My qualification 'in the world' may seem to deprive the statement of content, as if to say that there is no difference in the *physical* world without a difference in the positions or states of bodies. I may better phrase the matter in terms of *change:* there is no change without a change in the positions or states of bodies. This serves still to exempt mathematical objects, which are changeless.

One application of this physicalist principle is to dispositions. There is no change even in unactualized dispositions without physical change, no difference in dispositions without physical difference. But the main thrust of the doctrine, of course, is its bearing on mental life. If a man were twice in the same physical state, then, the physicalist holds, he would believe the same things both times, he would have the same thoughts, and he would have all the same unactualized dispositions to thought and action. Where positions and states of bodies do not matter, there is no fact of the matter.

It is not a reductionist doctrine of the sort sometimes imagined. It is not a Utopian dream of our being able to specify all mental events in physiological or microbiological terms. It is not a claim that such correlations even exist, in general, to be discovered; the groupings of events in mentalistic terms need not stand in any systematic relation to biological groupings.[3] What it does say about the life of the mind is that there is no mental difference without a physical difference. Most of us nowadays are so ready to agree to this principle that we fail to sense its magnitude. It is a way of saying that the fundamental objects are the physical objects. It accords physics its rightful place as the basic natural science without venturing any dubious hopes of reduction of other disciplines. It has further important implications that we tend not to see.

If there is no mental difference without a physical difference, then there is pointless ontological extravagance in admitting minds as entities over and above bodies; we lose nothing by applying mentalistic predicates directly to persons as bodies, much in the manner of everyday usage. We still have two species of predicates, mental and physical, but both sorts apply to bodies. Thus it is that the physicalist comes out with an ontology of just physical objects, together with the sets or other abstract objects of mathematics; no minds as additional entities.

Note that the situation is not symmetrical. The converse move of dispensing with bodies in favor of minds is not open to us, for we would not allow that there is no physical difference in the world without a mental difference—not unless we were idealists.

I have been talking easily of physical predicates, physical differences, as over against mental ones. Until this notion is better defined or delimited, my formulations of physicalism are inadequate. Thus take the dictum 'no mental difference without a physical difference.' We must not explain 'physical difference' merely as any difference between bodies; this would trivialize the dictum. For, even if we were to recognize minds as entities distinct from bodies and merely associated with them, it would be trivial to say that there is no difference in states of mind without a difference in the associated bodies. The bodies differ at least to the extent of being associated with minds that arc in those different states.

Thus the dictum tells us nothing until we define 'physical difference' more narrowly. Similarly for my preceding versions of physicalism: 'no difference in the world without a difference in the positions or states of bodies', 'no change without a change in the positions or states of bodies'. We must say what to count as states of bodies.

One major motivation of physics down the centuries might be said

to have been just that: to say what counts as a physical difference, a physical trait, a physical state. The question can be put more explicitly thus: what minimum catalogue of states would be sufficient to justify us in saying that there is no change without a change in positions or states?

Thus take primitive atomic theory. Atoms are posited, small analogues of the primordial bodies. Here, as in the positing of sets or other mathematical objects, one motive is simplification of the over-all system of the world. But here we may recognize also the deeper motive of fixing the notion of a physical difference, a physical state. According to primitive atomic theory with its uniform atoms, any physical difference is a difference in the number or arrangement or trajectories of the component atoms.

Physicalism, on these terms, would say that where there are no such atomic differences there are no differences in matters of fact—and in particular no mental differences. But it would never have held out hope of actually describing mental states or even most gross bodily states in terms of the number, arrangement, and trajectories of atoms.

Atoms have since given way to a bewildering variety of elementary particles. Latter-day physicists have been finding even that the very notion of particle is inappropriate at points; paradoxes of identification and individuation arise. There are indications that the utility of the particle model, the extrapolation of the primordial body into the very small, is now marginal at best. A field theory may be more to the point: a theory in which various states are directly ascribed in varying degrees to various regions of space-time. Thus at last bodies themselves go by the board—bodies that were the primordial posits, the paradigmatic objects most clearly and perspicuously beheld. Sic *transit gloria mundi.*

What then is the brave new ontology? There are the real numbers, needed to measure the intensity of the various states, and there are the space-time regions to which the states are ascribed. By identifying each space-time point with a quadruple of real or complex numbers according to an arbitrary system of coordinates, we can explain the space-time regions as sets of quadruples of numbers. The numbers themselves can be constructed within set theory in known ways, and indeed in pure set theory; that is, set theory with no individuals as ground elements, set theory devoid of concrete objects. The brave new ontology is, in short, the purely abstract ontology of pure set theory, pure mathematics.[4] At first we just tolerated these abstract objects as convenient adjuncts to our central corporeal ontology because of the power and simplification that they contributed. In the end, like the camel who got his nose under the tent, they have taken over.

A lesson to be drawn from this debacle is that ontology is not what

mainly matters. When bodies first came into my story I warned that they, even they, were theoretical. All theoretical entities are here strictly on sufferance; and all entities are theoretical. What .were observational were not terms but observation sentences. Sentences, in their truth or falsity, are what run deep; ontology is by the way.

The point gains in vividness when we reflect on the multiplicity of possible interpretations of any consistent formal system. For, consider again our standard regimented notation, with a lexicon of interpreted predicates and some fixed range of values for the variables of quantification. The sentences of this language that are true remain true under countless reinterpretations of the predicates and revisions of the range of values of the variables. Indeed any range of the same size can be made to serve by a suitable reinterpretation of the predicates. If the range of values is infinite, any infinite range can be made to serve; this is the Skolem-Löwenheim theorem. The true sentences stay true under all such changes.

Perhaps then our primary concern belongs with the truth of sentences and with their truth conditions, rather than with the reference of terms. If we adopt this attitude, questions of reference and ontology become incidental. Ontological stipulations can play a role in the truth conditions of theoretical sentences, but a role that could be played as well by any number of alternative ontological stipulations. The indecisiveness of ordinary language toward questions of reference is the more readily excused.

What now of physicalism? To profess materialism, after all this, would seem grotesquely inappropriate; but physicalism, reasonably reformulated, retains its vigor and validity. Our last previous formulation came to this: there is no difference in the world without a difference in the number or arrangement or trajectories of atoms. But if we make the drastic ontological move last contemplated, all physical objects go by the board—atoms, particles, all—leaving only pure sets. The principle of physicalism must thereupon be formulated by reference not to physical objects but to physical vocabulary. Let us take stock of the vocabulary.

Our language still has the standard regimented form; there are the truth functions, the quantifiers and their variables, and a lexicon of predicates. The variables now range over the pure sets. The predicates comprise the two-place mathematical predicate $\in$ of set membership and, for the rest, physical predicates. These will serve to ascribe physical states to space-time regions, each region being a set of quadruples of numbers. Presumably regions are always wanted rather than single points—sometimes because of indeterminacy at the quantum level and

sometimes for more obvious reasons, as in the case of temperature or entropy. A state may be ascribed outright, for example leftward spin, or quantitatively, for example temperature. In the one case the form of predication is 'Fx', combining a one-place predicate and a variable whose relevant values are sets of quadruples of numbers. In the other case the form is 'Fx/, combining a two-place predicate and two variables. The relevant values of one of the variables are again sets of quadruples of numbers, and those of the other variable are single real numbers measuring the quantitative state. Thus this two-place predicate 'F' might read 'the temperature in degrees Kelvin of the region . . . is. . . .' Also there may by polyadic predicates ascribing relations, absolute or quantitative, to pairs of regions, or to triples, or higher. In any event the lexicon of physical predicates will be finite, such being the way of lexica.

A nice contrast emerges, incidentally, between physical law and physical description. The laws favor no specific space-time regions as values of the variables. Thus they are independent of the parochial specificity that goes into our choice of spatio-temporal coordinates. The specificity shows itself only in more mundane pursuits such as astronomy, geography, and history, where it is welcome.

But this is by the way. What now is the claim of physicalism? Simply that there is no difference in matters of fact without a difference in the fulfillment of the physical-state predicates by space-time regions. Again this is not reductionism in any strong sense. There is no presumption that anyone be in a position to come up with the appropriate state predicates for the pertinent regions in any particular case.

This formulation, 'fulfillment of physical-state predicates by space-time regions,' is decidedly unfinished. The space-time regions are sets of quadruples of numbers, determined according to some system of coordinates that I have not paused over. The physical-state predicates are the predicates of some specific lexicon, which I have only begun to imagine, and which physicists themselves are not ready to enumerate with conviction. Thus I have no choice but to leave my formulation of physicalism incomplete. I suggested before that a major purpose of physics has been to find a minimum catalogue of states—elementary states, let us call them—such that there is no change without a change in respect of them. This is true equally of physics today.

In conclusion I want to relate physicalism to my perennial criticisms of mentalistic semantics. Readers have supposed that my complaint is ontological; it is not. If in general I could make satisfactory sense of declaring two expressions to be synonymous, I would be more than pleased to recognize an abstract object as their common meaning. The method is familiar: I would define the meaning of an expression as the set of its

Synonyms. Where the trouble lies, rather, is in the two-place predicate of synonymy itself; it is too desperately wanting in clarity and perspicuity.

Translation proceeds, presumably, by interlinguistic equivalence of synonymy of sentences. So, in order to make the problem of synonymy graphic, I developed a thought experiment in radical translation—that is, in the translation of an initially unknown language on the strength of behavioral data.[5]1 argued that the translations would be indeterminate, in the case of sentences at any considerable remove from observation sentences. They would be indeterminate in this sense: two translators might develop independent manuals of translation, both of them compatible with all speech behavior and all dispositions to speech behavior, and yet one manual would offer translations that the other translator would reject. My position was that either manual could be useful, but as to which was right and which wrong there was no fact of the matter.

My present purpose is not to defend this doctrine. My purpose is simply to make clear that I speak as a physicalist in saying there is no fact of the matter. I mean that both manuals are compatible with the fulfillment of just the same elementary physical states by space-time regions.

Radical translation proceeds in the light of observed behavior, and behavioral criteria will ordinarily decide in favor of one translation rather than another. When they do, there is emphatically a fact of the matter by microphysical standards; for clearly any difference in overt behavior, vocal or otherwise, reflects extravagant differences in the distribution of elementary physical states. On the other hand my doctrine of indeterminacy had to do with hypothetical manuals of translation both of which fitted all behavior. Since translators do not supplement their behavioral criteria with neurological criteria, much less with telepathy, what excuse could there be for supposing that the one manual conformed to any distribution of elementary physical states better than the other manual? What excuse, in short, for supposing there to be a fact of the matter?

We have here an illustration of what I consider the proper function of behaviorism. Mental states and events do not reduce to behavior, nor are they explained by behavior. They are explained by neurology, when they are explained. But their behavioral adjuncts serve to specify them objectively. When we talk of mental states or events subject to behavioral criteria, we can rest assured that we are not just bandying words; there is a physical fact of the matter, a fact ultimately of elementary physical states.

We learn mentalistic idioms, like other idioms, from elder speakers of our language, in distinctive and intersubjectively observable circumstances. Those circumstances differ from others in respect of the distribution, however inscrutable, of elementary physical states. As long as we use such an idiom in a form and in circumstances closely similar to the original ones, we communicate information; there is a fact of the matter. But our mentalistic idioms, like other idioms, go on growing and stretching by analogy. Factual content becomes meanwhile more tenuous and more elusive and can disappear altogether.

Thus consider the propositional attitudes; consider belief. There are unproblematical attributions of belief—unproblematical attributions even to dumb animals. Observation of behavior would normally prompt us to agree that the dog believes his master is coming, or that he believes the ball is under the sofa. When we attribute a belief about ancient history to someone, on the other hand, we are dependent on what he says—even though we are loath to equate belief with lip service. If the believer is a foreigner, our attribution may be subject also to the vagaries of translation of his testimony into our language. In some cases factual content is lacking; in others it is sparse and ill defined.

I do not advise giving up ordinary language, not even mentalistic language. But I urge awareness of its pitfalls. There is an instructive parallel between questions of reference, on the part of ordinary language, and questions of factuality. Let me recall what I said earlier when discussing ontology. Ordinary language is only loosely referential, and any ontological accounting makes sense only relative to an appropriate regimentation of language. The regimentation is not a matter of eliciting some latent but determinate ontological content of ordinary language. It is a matter rather of freely creating an ontology-oriented language that can supplant ordinary language in serving some particular purposes that one has in mind.

Now factuality is similar. Ordinary language is only loosely factual, and needs to be variously regimented when our purpose is scientific understanding. The regimentation is again not a matter of eliciting a latent content. It again is a free creation. We withdraw to a language which, though not limited to the assigning of elementary physical states to regions, is visibly directed to factual distinctions—distinctions that are unquestionably underlain by differences, however inscrutable, in elementary physical states. This demand is apt to be met by stressing the behavioral and the physiological.

Within these limits there is still much scope, of course, for better and worse. The terms that play a leading role in a good conceptual apparatus are terms that promise to play a leading role in causal explanation; and

causal explanation is polarized. Causal explanations of psychology are to be sought in physiology, of physiology in biology, of biology in chemistry, and of chemistry in physics—in the elementary physical states.

NOTES

1. See W. V. O. Quine, *The Roots of Reference* (LaSalle, 111.: Open Court, 1973), for a speculative account of the steps involved.

2. See Hilary Putnam, "Mathematics without Foundations," *Journal of* Philosophy 64 (1967) 5-22.

3. See Donald Davidson, "Mental Events," Lawrence Foster and J. W. Swanson, eds., *Experience and Theory* (Amherst: University of Massachusetts Press, 1970), pp. 79-101; "The Material Mind," P. Suppes et al., eds., *Logic, Methodology, and Philosophy of Science* 4 (Amsterdam: North-Holland Publishing Co., 1973), pp. 709-22.

4. I develop the point a little more fully in "Whither Physical Objects?" Boston *Studies in the Philosophy of Science* 39 (1976) : 303-10.

5. In *Word and Object* (Cambridge: Technology Press of the Massachusetts Institute of Technology, 1960), chap. 2.