

LECTURE III: JANUARY 29, 1970

What's been accomplished, if anything, up to now? First, I've argued that a popular view about how names get their reference in general doesn't apply. It is in general not the case that the reference of a name is determined by some uniquely identifying marks, some unique properties satisfied by the referent and known or believed to be true of that referent by the speaker. First, the properties believed by the speaker need not be uniquely specifying. Second, even in the case where they are, they may not be uniquely true of the actual referent of the speaker's use but of something else or of nothing. This is the case where the speaker has erroneous beliefs about some person. He does not have correct beliefs about another person, but erroneous beliefs about a certain person. In these cases the reference actually seems to be determined by the fact that the speaker is a member of a community of speakers who use the name. The name has been passed to him by tradition from link to link.

Second, I've argued, even if in some special cases, notably some cases of initial baptism, a referent is determined by a description, by some uniquely identifying property, what that property is doing in many cases of designation is not giving a synonym, giving something for which the name is an abbreviation; it is, rather, fixing a reference. It fixes the reference by some contingent marks of the object. The name denoting that

object is then used to refer to that object, even in referring to counterfactual situations where the object doesn't have the properties in question. An example was the case of a meter.

Finally, at the end of the talk last time we were talking about statements of identity. Statements of identity should seem very simple but they are somehow very puzzling to philosophers. I cannot be sure in my own case whether I have all the possible confusions that can be generated by this relation straightened out. Some philosophers have found the relation so confusing that they change it. It is, for example, thought that if you have two names like 'Cicero' and 'Tully' and say that Cicero is Tully, you can't really be saying of the object which is both Cicero and Tully that it is identical with itself. On the contrary, 'Cicero is Tully' can express an empirical discovery, as we mentioned before. And so some philosophers, even Frege at one early stage of his writing, have taken identity to be a relation between names. Identity, so they say, is not the relation between an object and itself, but is the relation which holds between two names when they designate the same object.

This occurs even in the more recent literature. I didn't bring the book along, but J. B. Rosser, the distinguished logician, writes in his book, *Logic for Mathematicians*,⁴⁹ that we say that $x = y$ if and only if 'x' and 'y' are names for the same object. He remarks that the corresponding statement about the object itself, that it in no way differs from itself, is of course trivial; and so, presumably, cannot be what we mean. This is an especially unusual paradigm of what the identity relationship should be because it would apply very rarely. As far as I know, outside the militant black nationalist movement no one has ever been named 'x'. Seriously speaking, of course, 'x' and 'y' in the open sentence ' $x = y$ ' are not names at all, they are variables. And they can occur with identity as bound variables in a closed sentence. If you say for every x and y, if $x = y$ then

⁴⁹ New York, McGraw-Hill (1953), see Chapter VII, 'Equality'.

$y = x$, or something like that—no names occur in that statement at all, nor is anything said about names. This statement would be true even though the human race had never existed or, though it did exist, never produced the phenomenon of names.

If anyone ever inclines to this particular account of identity, let's suppose we gave him his account. Suppose identity were a relation in English between the names. I shall introduce an artificial relation called 'schmidentity' (not a word of English) which I now stipulate to hold only between an object and itself.⁵⁰ Now then the question whether Cicero is schmidetical with Tully can arise, and if it does arise the same problems will hold for this statement as were thought in the case of the original identity statement to give the belief that this was a relation between the names. If anyone thinks about this seriously, I think he will see that therefore probably his original account of identity was not necessary, and probably not possible, for the problems it was originally meant to solve, and that therefore it should be dropped, and identity should just be taken to be the relation between a thing and itself. This sort of device can be used for a number of philosophical problems.

We have concluded that an identity statement between names, when true at all, is necessarily true, even though one may not know it *a priori*. Suppose we identify Hesperus as a

⁵⁰ Of course, the device will fail to convince a philosopher who wants to argue that an artificial language or concept of the supposed type is logically impossible. In the present case, some philosophers have thought that a relation, being essentially two-termed, cannot hold between a thing and itself. This position is plainly absurd. Someone can be his own worst enemy, his own severest critic and the like. Some relations are reflexive such as the relation 'no richer than'. Identity or schmidentity is nothing but the smallest reflexive relation.

I hope to elaborate on the utility of this device of imagining a hypothetical language elsewhere.

certain star seen in the evening and Phosphorus as a certain star, or a certain heavenly body, seen in the morning; then there may be possible worlds in which two different planets would have been seen in just those positions in the evening and morning. However, at least one of them, and maybe both, would not have been Hesperus, and then that would not have been a situation in which Hesperus was not Phosphorus. It might have been a situation in which the planet seen in this position in the evening was not the planet seen in this position in the morning; but that is not a situation in which Hesperus was not Phosphorus. It might also, if people gave the names 'Hesperus' and 'Phosphorus' to these planets, be a situation in which some planet other than Hesperus was called 'Hesperus'. But even so, it would not be a situation in which Hesperus itself was not Phosphorus.⁵¹

Some of the problems which bother people in these situations, as I have said, come from an identification, or as I would put it, a confusion, between what we can know *a priori* in advance and what is necessary. Certain statements—and the identity statement is a paradigm of such a statement on my view—if true at all must be necessarily true. One does know *a priori*, by philosophical analysis, that if such an identity statement is true it is necessarily true.

One qualification: when I say 'Hesperus is Phosphorus' is necessarily true, I of course do not deny that situations might have obtained in which there was no such planet as Venus at all, and therefore no Hesperus and no Phosphorus. In that case, there is a question whether the identity statement 'Hesperus is Phosphorus' would be true, false, or neither true

⁵¹ Recall that we describe the situation in our language, not the language that the people in that situation would have used. Hence we must use the terms 'Hesperus' and 'Phosphorus' with the same reference as in the actual world. The fact that people in that situation might or might not have used these names for different planets is irrelevant. So is the fact that they might have done so using the very same descriptions as we did to fix their references.

nor false.⁵² And if we take the last option, is 'Hesperus = Phosphorus' necessary because it is never false, or should we require that a necessary truth be *true* in all possible worlds? I am leaving such problems outside my considerations altogether. If we wish to be somewhat more careful, we could replace the statement 'Hesperus is Phosphorus' by the conditional, 'If Hesperus exists then Hesperus is Phosphorus', cautiously taking only the latter to be necessary. Unfortunately this conditional involves us in the problem of singular attributions of existence, one I cannot discuss here. In particular, philosophers sympathetic to the description theory of naming often argue that one cannot ever say of an object that it exists. A supposed statement about the existence of an object really is, so it's argued, a statement about whether a certain description or property is satisfied. As I have already said, I disagree. Anyway, I can't really go into the problems of existence here.

I want to mention at this point that other considerations about *de re* modality, about an object having essential properties, can only be regarded correctly, in my view, if we recognize the distinction between a prioricity and necessity. One might very well discover essence empirically.

There are some examples of alleged essential properties in an article by Timothy Sprigge.

The internalist [which means the believer that there are some essential properties] says that the Queen must have been born of royal blood. [He means that *this person* must have been of royal blood.] The anti-essentialist says there would be no contradiction in a news bulletin asserting that it had been established that the Queen was not in fact the child of her supposed parents, but had been secretly adopted by them, and therefore the proposition that she is of royal blood is synthetic . . .

⁵² The same three options exist for 'Hesperus is Hesperus', and the answer must be the same as in the case of 'Hesperus is Phosphorus'.

For a time [the anti-essentialist] is winning. Yet there comes a time when his claims appear a trifle too far fetched. The internalist suggests that we cannot imagine that particular we call the Queen having the property of at no stage in her existence being human. If the anti-internalist admits this, admits that it is logically inconceivable that the Queen should have had the property of, say, always being a swan, then he admits that she has at least one internal property. If on the other hand he says that it's only a contingent fact that the Queen has ever been human, he says what it is hard to accept. Can we really consider it as conceivable that she should never have been human?⁵³

'At no stage in her existence' and 'always' are justifications Sprigge presumably introduces to allow such possibilities as her right now being changed into a swan—by a wicked witch, I guess. (Or a benign witch.)

One confusion I find in this discussion is that in the first case Sprigge talks about whether there would be any contradiction in supposing that we had an *announcement* that the Queen was born of parents different from the ones she actually had. And in that there is no contradiction. Similarly, though, there is no contradiction in an *announcement* that the Queen, this thing we thought to be a woman, was in fact an angel in human form, or an automaton cleverly constructed by the royal family, who did not want the succession to pass to that bastard so-and-so, or something. Neither of these announcements represent things that we couldn't possibly *discover*, either. What is the question we are asking when we ask whether it's necessary, concerning this woman, that she should either have been of royal blood or have been human? Royal blood is a little complicated, because in order for it to be necessary for her to have been of royal blood it has to be necessary that this particular family line at some time attained to royal power; but the latter fact seems to

⁵³ 'Internal and External Properties', *Mind* 71 (April, 1962), pp. 202-03.

be contingent. Therefore I suppose it *is* contingent that her blood should ever have been royal.

Let's try and refine the question a little bit. The question really should be, let's say, could the Queen—could this woman herself—have been born of different parents from the parents from whom she actually came? Could she, let's say, have been the daughter instead of Mr. and Mrs. Truman? There would be no contradiction, of course, in an announcement that (I hope the ages do not make this impossible), fantastic as it may sound, she was indeed the daughter of Mr. and Mrs. Truman. I suppose there might even be no contradiction in the discovery that—it seems very suspicious anyway that on either hypothesis she has a sister called Margaret—that these two Margarets were one and the same person flying back and forth in a clever way. At any rate we can imagine discovering all of these things.

But let us suppose that such a discovery is not in fact the case. Let's suppose that the Queen really did come from these parents. Not to go into too many complications here about what a parent is, let's suppose that the parents are the people whose body tissues are sources of the biological sperm and egg. So you get rid of such *recherché* possibilities as transplants of the sperm from the father, or the egg from the mother, into other bodies, so that in one sense other people might have been her parents. If that happened, in another sense her parents were still the original king and queen. But other than that, can we imagine a situation in which it would have happened that this very woman came out of Mr. and Mrs. Truman? They might have had a child resembling her in many properties. Perhaps in some possible world Mr. and Mrs. Truman even had a child who actually became the Queen of England and was even passed off as the child of other parents. This still would not be a situation in which *this very woman* whom we call 'Elizabeth II' was the child of Mr. and Mrs. Truman, or so it

seems to me. It would be a situation in which there was some other woman who had many of the properties that are in fact true of Elizabeth. Now, one question is, in this possible world, was Elizabeth herself ever born? Let's suppose she wasn't ever born. It would then be a situation in which, though Truman and his wife have a child with many of the properties of Elizabeth, Elizabeth herself didn't exist at all. One can only become convinced of this by reflection on how you would describe this situation. (That, I suppose, means in many cases that you won't become convinced of this, at least not at the moment. But it is something of which I personally have been convinced.)

How could a person originating from different parents, from a totally different sperm and egg, be *this very woman*? One can imagine, *given* the woman, that various things in her life could have changed: that she should have become a pauper; that her royal blood should have been unknown, and so on. One is given, let's say, a previous history of the world up to a certain time, and from that time it diverges considerably from the actual course. This seems to be possible. And so it's possible that even though she were born of these parents she never became queen. Even though she were born of these parents, like Mark Twain's character⁵⁴ she was switched off with another girl. But what is harder to imagine is her being born of different parents. It seems to me that anything coming from a different origin would not be this object.

In the case of this table,⁵⁵ we may not know what block of wood the table came from. Now could *this table* have been made from a completely *different* block of wood, or even of water cleverly hardened into ice—water taken from the Thames River? We could conceivably discover that, contrary to what we now think, this table is indeed made of ice from

⁵⁴ In *The Prince and The Pauper*.

⁵⁵ Of course I was pointing to a wooden table in the room.

the river. But let us suppose that it is not. Then, though we can imagine making a table out of another block of wood or even from ice, identical in appearance with this one, and though we could have put it in this very position in the room, it seems to me that this is *not* to imagine *this* table as made of wood or ice, but rather it is to imagine another table, *resembling* this one in all external details, made of another block of wood, or even of ice.^{56, 57}

⁵⁶ A principle suggested by these examples is: *If a material object has its origin from a certain hunk of matter, it could not have had its origin in any other matter.* Some qualifications might have to be stated (for example, the vagueness of the notion of hunk of matter leads to some problems), but in a large class of cases the principle is perhaps susceptible of something like proof, using the principle of the necessity of identity for particulars. Let 'B' be a name (rigid designator) of a table, let 'A' name the piece of wood from which it actually came. Let 'C' name another piece of wood. Then suppose B were made from A, as in the actual world, but also another table D were simultaneously made from C. (We assume that there is no relation between A and C which makes the possibility of making a table from one dependent on the possibility of making a table from the other.) Now in this situation $B \neq D$; hence, even if D were made by itself, and no table were made from A, D would not be B. Strictly speaking, the 'proof' uses the necessity of distinctness, not of identity. However, the same types of considerations that can be used to establish the latter can be used to establish the former. (Suppose $X \neq Y$; if X and Y were both identical to some object Z in another possible world, then $X = Z$, $Y = Z$, hence $X = Y$.) Alternatively, the principle follows from the necessity of identity plus the 'Brouwersche' axiom, or, equivalently, symmetry of the accessibility relation between possible worlds. In any event, the argument applies only if the making of D from C does not affect the possibility of making B from A, and vice-versa.

⁵⁷ In addition to the principle that the *origin* of an object is essential to it, another principle suggested is that the *substance* of which it is made is essential. Several complications exist here. First, one should not confuse the type of essence involved in the question 'What properties must an object retain if it is not to cease to exist, and what properties of the object can change while the object endures?', which is a temporal question, with the question 'What (timeless) properties could the object not have failed to have, and what properties could it have lacked while still (timelessly) existing?', which concerns necessity and not time and which is our topic here. Thus the question of whether the table could have *changed* into ice is irrelevant here. The question

These are only examples of essential properties.⁵⁸ I won't

whether the table could *originally* have been made of anything other than wood is relevant. Obviously this question is related to the necessity of the origin of the table from a given block of wood and whether that block, too, is essentially wood (even wood of a particular kind). Thus it is ordinarily impossible to imagine the table made from any substance other than the one of which it is actually made without going back through the entire history of the universe, a mind-boggling feat. (Other possibilities of the table not having been wooden originally have been suggested to me, including an ingenious suggestion of Slote's, but I find none of them really convincing. I cannot discuss them here.) A full discussion of the problems of essential properties of particulars is impossible here, but I will mention a few other points: (1) Ordinarily when we ask intuitively whether something might have happened to a given object, we ask whether the universe could have gone on as it actually did up to a certain time, but diverge in its history from that point forward so that the vicissitudes of that object would have been different from that time forth. *Perhaps* this feature should be erected into a general principle about essence. Note that the time in which the divergence from actual history occurs may be sometime before the object itself is actually created. For example, I might have been deformed if the fertilized egg from which I originated had been damaged in certain ways, even though I presumably did not yet exist at that time. (2) I am not suggesting that only origin and substantial makeup are essential. For example, if the very block of wood from which the table was made had instead been made into a vase, the table never would have existed. So (roughly) *being a table* seems to be an essential property of the table. (3) Just as the question whether an object *actually* has a certain property (e.g. baldness) can be vague, so the question whether the object essentially has a certain property can be vague, even when the question whether it actually has the property is decided. (4) Certain counterexamples to the origin principle appear to exist in ordinary parlance. I am convinced that they are not genuine counterexamples, but their exact analysis is difficult. I cannot discuss this here.

⁵⁸ Peter Geach has advocated (in *Mental Acts*, Routledge and Kegan Paul, London, 1957, Section 16, and elsewhere) a notion of 'nominal essence' different from the type of essential property considered here. According to Geach, since any act of pointing is ambiguous, someone who baptizes an object by pointing to it must apply a sortal property to disambiguate his reference and to ensure correct criteria of identity over time—for example, someone who assigns a reference to 'Nixon' by pointing to him must say, 'I use "Nixon" as a name of that *man*', thus removing his hearer's temptations to take him to be pointing to a nose or a time-slice. The sortal is then in some sense part of the meaning of the name; names do have a (partial) sense after all, though their senses may not be complete enough to determine their references,

dwell on them further because I want to go on to the more general case, which I mentioned in the last lecture, of some identities between terms for substances, and also the properties of substances and of natural kinds. Philosophers have, as I've said, been very interested in statements expressing theoretical identifications; among them, that light is a stream of photons, that water is H_2O , that lightning is an electrical discharge, that gold is the element with the atomic number 79.

To get clear about the status of these statements we must first maybe have some thoughts about the status of such substances as gold. What's gold? I don't know if this is an example which has particularly interested philosophers. Its interest in financial circles is diminishing because of increased stability of currencies.⁵⁹ Even so gold has interested many people. Here

as they are in description and cluster-of-descriptions theories. If I understand Geach correctly, his nominal essence should be understood in terms of a prioricity, not necessity, and thus is quite different from the kind of essence advocated here (perhaps this is part of what he means when he says he is dealing with 'nominal', not 'real', essences). So 'Nixon is a man', 'Dobbin is a horse', and the like would be *a priori* truths.

I need not take a position on this view here. But I would briefly mention the following: (1) Even if a sortal is used to disambiguate an ostensive reference, surely it need not be held *a priori* to be true of the object designated. Couldn't Dobbin turn out to belong to a species other than horses (though superficially he looked like a horse), Hesperus to be a planet rather than a star, or Lot's guests, even if he names them, to be angels rather than men? Perhaps Geach should stick to more cautious sortals. (2) Waiving the objection in (1), surely there is a substantial gap between premise and conclusion. Few speakers do in fact learn the reference of a given name by ostension; and, even if they picked up the name by a chain of communication leading back to an ostension, why should the sortal allegedly used in the ostension be, in any sense, part of the 'sense' of the name for them? No argument is offered here. (An extreme case: A mathematician's wife overhears her husband muttering the name 'Nancy'. She wonders whether Nancy, the thing to which her husband referred, is a woman or a Lie group. Why isn't her use of 'Nancy' a case of naming? If it isn't, the reason is *not* indefiniteness of her reference.)

⁵⁹ I may have spoken too soon. That is what some financial pages said when these lectures were delivered, January, 1970.

is what Immanuel Kant says about gold. (He was a wealthy speculator who kept his possessions under his bed.) Kant is introducing the distinction between analytic and synthetic judgements, and he says: 'All analytic judgements depend wholly on the law of contradiction, and are in their nature *a priori* cognitions, whether the concepts that supply them with matter be empirical or not. For the predicate of an affirmative analytic judgement is already contained in the concept of the subject, of which it cannot be denied without contradiction. . . . For this very reason all analytic judgements are *a priori* even when the concepts are empirical, as, for example, "Gold is a yellow metal"; for to know this I require no experience beyond my concept of gold as a yellow metal. It is, in fact, the very concept, and I need only analyze it without looking beyond it.'⁶⁰ I should have looked at the German. 'It is in fact the very concept' sounds as if Kant is saying here that 'gold' just means 'yellow metal'. If he says that, then it's especially strange, so let's suppose that that is not what he's saying. At least Kant thinks it's a *part* of the concept that gold is to be a yellow metal. He thinks we know this *a priori*, and that we could not possibly discover this to be empirically false.

Is Kant right about this? First, what I would have wanted to do would have been to discuss the part about gold being a metal. This, however, is complicated because first, I don't know too much chemistry. Investigating this a few days ago in just a couple of references, I found in a more phenomenological account of metals the statement that it's very difficult to say what a metal is. (It talks about malleability, ductility, and the like, but none of these exactly work.) On the other hand, something about the periodic table gave a description of

⁶⁰ *Prolegomena to Any Future Metaphysics*, Preamble Section 2.b. (Prussian Academy edition, p. 267). My impression of the passage was not changed by a subsequent cursory look at the German, though I can hardly lay claim to any real competence here.

elements as metals in terms of their valency properties. This may make some people think right away that there are really two concepts of metal operating here, a phenomenological one and a scientific one which then replaces it. This I reject, but since the move will tempt many, and can be refuted only after I develop my own views, it will not be suitable to use 'Gold is a metal' as an example to introduce these views.

But let's consider something easier—the question of the yellowness of gold. Could we discover that gold was not in fact yellow? Suppose an optical illusion were prevalent, due to peculiar properties of the atmosphere in South Africa and Russia and certain other areas where gold mines are common. Suppose there were an optical illusion which made the substance appear to be yellow; but, in fact, once the peculiar properties of the atmosphere were removed, we would see that it is actually blue. Maybe a demon even corrupted the vision of all those entering the gold mines (obviously their *souls* were already corrupt), and thus made them believe that this substance was yellow, though it is not. Would there on this basis be an announcement in the newspapers: 'It has turned out that there is no gold. Gold does not exist. What we took to be gold is not in fact gold.'? Just imagine the world financial crisis under these conditions! Here we have an undreamt of source of shakiness in the monetary system.

It seems to me that there would be no such announcement. On the contrary, what would be announced would be that though it appeared that gold was yellow, in fact gold has turned out not to be yellow, but blue. The reason is, I think, that we use 'gold' as a term for a certain *kind* of thing. Others have discovered this kind of thing and we have heard of it. We thus as part of a community of speakers have a certain connection between ourselves and a certain kind of thing. The kind of thing is *thought* to have certain identifying marks. Some of these marks may not really be true of gold. We might

discover that we are wrong about them. Further, there might be a substance which has all the identifying marks we commonly attributed to gold and used to identify it in the first place, but which is not the same kind of thing, which is not the same substance. We would say of such a thing that though it has all the appearances we initially used to identify gold, it is not gold. Such a thing is, for example, as we well know, iron pyrites or fool's gold. This is not another kind of gold. It's a completely different thing which to the uninitiated person looks just like the substance which we discovered and called gold. We can say this not because we have changed the *meaning* of the term gold, and thrown in some other criteria which distinguished gold from pyrites. It seems to me that that's not true. On the contrary, we *discovered* that certain properties were true of gold in addition to the initial identifying marks by which we identified it. These properties, then, being characteristic of gold and not true of iron pyrites, show that the fool's gold is not in fact gold.

We should look at this in another example. It says somewhere in here:⁶¹ 'I say "The word 'tiger' has meaning in English". . . . If I am then asked "What is a tiger?" I might reply "A tiger is a large carnivorous quadrupedal feline, tawny yellow in color with blackish transverse stripes and white belly," (derived from the entry under "tiger" in the *Shorter Oxford English Dictionary*.)' And now suppose someone says 'You have just said what the word "tiger" means in English.' And Ziff asks, 'Is that so?' and he says, correctly, 'I think not.' His example is, 'Suppose in a jungle clearing one says "look, a three-legged tiger!": must one be confused? The phrase "a three-legged tiger" is not a *contradictio in adjecto*. But if "tiger" in English meant, among other things, either quadruped or quadrupedal, the phrase "a three-legged tiger" could only be a

⁶¹ Paul Ziff, *Semantic Analysis*, Ithaca, Cornell University Press, 1960, pp. 184-85.

contradictio in adjecto.' So, his example shows that if it is part of the concept of tiger that a tiger has four legs, there couldn't be a three-legged tiger. This is the sort of case which many philosophers tend to explain as a 'cluster concept'. Is it even a contradiction to suppose that we should discover that tigers *never* have four legs? Suppose the explorers who attributed these properties to tigers were deceived by an optical illusion, and that the animals they saw were from a three-legged species, would we then say that there turned out to be no tigers after all? I think we would say that in spite of the optical illusion which had deceived the explorers, tigers in fact have three legs.

Further, is it true that anything satisfying this description in the dictionary is necessarily a tiger? It seems to me that it is not. Suppose we discover an animal which, though having all external appearances of a tiger as described here, has an internal structure completely different from that of the tiger. Actually the word 'feline' was put in here, so it is not entirely fair. Let's suppose it were left out, for this example. That a tiger belongs to any particular biological family, anyway, was something we discovered. If 'feline' means just having the appearance of a cat, let's suppose that it does have the appearance of a big cat. We might find animals in some part of the world which, though they look just like a tiger, on examination were discovered not even to be mammals. Let's say they were in fact very peculiar looking reptiles. Do we then conclude on the basis of this description that some tigers are reptiles? We don't. We would rather conclude that these animals, though they have the external marks by which we originally identified tigers, are not in fact tigers, because they are not of the same species as the species which we called 'the species of tigers'. Now this, I think, is not because, as some people would say, the old concept of tiger has been replaced by a new scientific definition. I think this is true of the concept of tiger *before* the internal structure of tigers has been investigated. Even though we don't

know the internal structure of tigers, we suppose—and let us suppose that we are right—that tigers form a certain species or natural kind. We then can imagine that there should be a creature which, though having all the external appearance of tigers, differs from them internally enough that we should say that it is not the same kind of thing. We can imagine it without knowing anything about this internal structure—what this internal structure is. We can say in advance that we use the term 'tiger' to designate a species, and that anything not of this species, even though it looks like a tiger, is not in fact a tiger.

Just as something may have all the properties by which we originally identified tigers and yet not be a tiger, so we might also find out tigers had *none* of the properties by which we originally identified them. Perhaps *none* are quadrupedal, none tawny yellow, none carnivorous, and so on; all these properties turn out to be based on optical illusions or other errors, as in the case of gold. So the term 'tiger', like the term 'gold', does *not* mark out a 'cluster concept' in which most, but perhaps not all, of the properties used to identify the kind must be satisfied. On the contrary, possession of most of these properties need not be a necessary condition for membership in the kind, nor need it be a sufficient condition.

Since we have found out that tigers do indeed, as we suspected, form a single kind, then something not of this kind is not a tiger. Of course, we may be mistaken in supposing that there is such a kind. In advance, we suppose that they probably do form a kind. Past experience has shown that usually things like this, living together, looking alike, mating together, do form a kind. If there are two kinds of tigers that have something to do with each other but not as much as we thought, then maybe they form a larger biological family. If they have absolutely nothing to do with each other, then there are really two kinds of tigers. This all depends on the history and on what we actually find out.

The philosopher I find most to recognize this sort of consideration (our thoughts on these matters developed independently) is Putnam. In an article called 'It Ain't Necessarily So',⁶² he says of statements about species, that they are 'less necessary' (as he cautiously says) than statements like 'bachelors aren't married'. The example he gives is 'cats are animals'. Cats might turn out to be automata, or strange demons (not his example) planted by a magician. Suppose they turned out to be a species of demons. Then on his view, and I think also my view, the inclination is to say, not that there turned out to be no cats, but that cats have turned out not to be animals as we originally supposed. The original concept of cat is: *that kind of thing*, where the kind can be identified by paradigmatic instances. It is not something picked out by any qualitative dictionary definition. However, Putnam's conclusion is that statements like 'cats are animals' are 'less necessary' than statements like 'bachelors are unmarried'. Certainly I agree that the argument indicates that such statements are not known *a priori*, and hence are not analytic;⁶³ whether a given kind is a

⁶² *Journal of Philosophy*, 59, No. 22 (October 25, 1962), pp. 658-71. In subsequent work on natural kinds and physical properties, which I have not had a chance to see at the time of this writing, Putnam has done further work, which (I gather) has many points of contact with the viewpoint expressed here. As I mentioned in the text, there are some divergencies between Putnam's approach and mine; Putnam does not base his considerations on the apparatus of necessary versus *a priori* truths which I invoke. In his earlier paper, 'The Analytic and the Synthetic', *Minnesota Studies in the Philosophy of Science*, vol. III, pp. 358-97, he seems closer to the 'cluster concept' theory in some respects, suggesting, for example, that it applies to proper names.

I should emphasize again that it was an example of Rogers Albritton which called my attention to this complex of problems, though Albritton probably would not accept the theories I have developed on the basis of the example.

⁶³ I am presupposing that an analytic truth is one which depends on *meanings* in the strict sense and therefore is necessary as well as *a priori*. If statements whose *a priori* truth is known via the fixing of a reference are counted as analytic, then some analytic truths are contingent; this possibility is excluded in the notion of analyticity adopted here. The ambiguity in the notion of

species of animals is a matter for empirical investigation. Perhaps this epistemological sense is what Putnam means by 'necessary'. The question remains whether such statements are necessary in the non-epistemological sense advocated in these lectures. So the next thing to investigate is (using the concept of necessity that I talked about): are such statements as 'cats are animals', or such statements as 'gold is a yellow metal', necessary?

So far I've only been talking about what we could find out. I've been saying we could find out that gold was not in fact yellow, contrary to what we thought. If one went in more detail into the concept of metals, let's say in terms of valency properties, one could certainly find out that though one took gold to be a metal, gold is not in fact a metal. Is it necessary or contingent that gold be a metal? I don't want to go into detail on the concept of a metal—as I said, I don't know enough about it. Gold apparently has the atomic number 79. Is it a necessary or a contingent property of gold that it has the atomic number 79? Certainly we could find out that we were mistaken. The whole theory of protons, of atomic numbers, the whole theory of molecular structure and of atomic structure, on which such views are based, could *all* turn out to be false. Certainly we didn't know it from time immemorial. So in that sense, gold could turn out not to have atomic number 79.

Given that gold *does* have the atomic number 79, could something be gold without having the atomic number 79?

analyticity of course arises from the ambiguity in the usual uses of such terms as 'definition' and 'sense'. I have not attempted to deal with the delicate problems regarding analyticity in these lectures, but I will say that some (though not all) of the cases often adduced to discredit the analytic-synthetic distinction, especially those involving natural phenomena and natural kinds, should be handled in terms of the apparatus of fixing a reference invoked here. Note that Kant's example, 'gold is a yellow metal', is not even *a priori*, and whatever necessity it has is established by scientific investigation; it is thus far from analytic in any sense.

Let us suppose the scientists have investigated the nature of gold and have found that it is part of the very nature of this substance, so to speak, that it have the atomic number 79. Suppose we now find some other yellow metal, or some other yellow thing, with all the properties by which we originally identified gold, and many of the additional ones that we have discovered later. An example of one with many of the initial properties is iron pyrites, 'fool's gold.' As I have said, we wouldn't say that this substance is gold. So far we are speaking of the actual world. Now consider a possible world. Consider a counterfactual situation in which, let us say, fool's gold or iron pyrites was actually found in various mountains in the United States, or in areas of South Africa and the Soviet Union. Suppose that all the areas which actually contain gold now contained pyrites instead, or some other substance which counterfeited the superficial properties of gold but lacked its atomic structure.⁶⁴ Would we say, of this counterfactual situation, that in that situation gold would not even have been an element (because pyrites is not an element)? It seems to me that we would not. We would instead describe this as a situation in which a substance, say iron pyrites, which is not gold, would have been found in the very mountains which actually contain gold and would have had the very properties by which we commonly identify gold. But it would not be gold; it would be something else. One should *not* say that it would still be gold in this possible world, though gold would then lack the atomic number 79. It would be some other stuff, some other substance. (Once again, whether people counterfactually would have *called* it 'gold' is irrelevant. *We* do not describe it as gold.) And so, it seems to me, this would not be a case in which possibly gold might not have been an

⁶⁴ Even better pairs of ringers exist; for example, some pairs of elements of a single column in the periodic table which resemble each other closely but nevertheless are different elements.

element, nor can there be such a case (except in the epistemic sense of 'possible'). Given that gold is this element, any other substance, even though it looks like gold and is found in the very places where we in fact find gold, would not be gold. It would be some other substance which was a counterfeit for gold. In any counterfactual situation where the same geographical areas were filled with such a substance, they would not have been filled with gold. They would have been filled with something else.

So if this consideration is right, it tends to show that such statements representing scientific discoveries about what this stuff *is* are not contingent truths but necessary truths in the strictest possible sense. It's not just that it's a scientific law, but of course we can imagine a world in which it would fail. Any world in which we imagine a substance which does not have these properties is a world in which we imagine a substance which is not gold, provided these properties form the basis of what the substance is. In particular, then, present scientific theory is such that it is part of the nature of gold as we have it to be an element with atomic number 79. It will therefore be necessary and not contingent that gold be an element with atomic number 79. (We may also in the same way, then, investigate further how color and metallic properties follow from what we have found the substance gold to be: to the extent that such properties follow from the atomic structure of gold, they are necessary properties of it, even though they unquestionably are not part of the *meaning* of 'gold' and were not known with *a priori* certainty.)

Putnam's example 'cats are animals' comes under the same sort of heading. We have in fact made a very surprising discovery in this case. We have in fact found nothing to go against our belief. Cats are in fact animals! Then is this truth a necessary truth or a contingent one? It seems to me that it is necessary. Consider the counterfactual situation in which in

place of these creatures—these animals—we have in fact little demons which when they approached us brought bad luck indeed. Should we describe this as a situation in which cats were demons? It seems to me that these demons would not be cats. They would be demons in a cat-like form. We could have discovered that the actual cats that we *have* are demons. Once we have discovered, however, that they are *not*, it is part of their very nature that, when we describe a counterfactual world in which there were such demons around, we must say that the demons would not be cats. It would be a world containing demons masquerading as cats. Although we could say cats *might turn out* to be demons, of a certain species, given that cats are in fact animals, any cat-like being which is not an animal, in the actual world or in a counterfactual one, is not a cat. The same holds even for animals with the appearance of cats but reptilian internal structure. Were such to exist, they would not be cats, but 'fool's cats'.

This has some relation also to the essence of a particular object. The molecular theory has discovered, let's say, that this object here is composed of molecules. This was certainly an important empirical discovery. It was something we didn't know in advance; maybe this might have been composed, for all we knew, of some ethereal entelechy. Now imagine an object occupying this very position in the room which *was* an ethereal entelechy. Would it be this very object here? It might have all the appearance of this object, but it seems to me that it could not ever be *this thing*. The vicissitudes of *this thing* might have been very different from its actual history. It might have been transported to the Kremlin. It might have already been hewn into bits and no longer exist at the present time. Various things might have happened to it. But whatever we imagine counterfactually having happened to it other than what actually did, the one thing we cannot imagine happening to this thing is that *it*, given that it is composed of molecules, should still

have existed and not have been composed of molecules. We can imagine having discovered that it wasn't composed of molecules. But once we know that this is a thing composed of molecules—that this is the very nature of the substance of which it is made—we can't then, at least if the way I see it is correct, imagine that this thing might have failed to have been composed of molecules.

According to the view I advocate, then, terms for natural kinds are much closer to proper names than is ordinarily supposed. The old term 'common name' is thus quite appropriate for predicates marking out species or natural kinds, such as 'cow' or 'tiger'. My considerations apply also, however, to certain mass terms for natural kinds, such as 'gold', 'water', and the like. It is interesting to compare my views to those of Mill. Mill counts both predicates like 'cow', definite descriptions, and proper names as names. He says of 'singular' names that they are connotative if they are definite descriptions but non-connotative if they are proper names. On the other hand, Mill says that *all* 'general' names are connotative; such a predicate as 'human being' is defined as the conjunction of certain properties which give necessary and sufficient conditions for humanity—rationality, animality, and certain physical features.⁶⁵ The modern logical tradition, as represented by Frege and Russell, seems to hold that Mill was wrong about singular names, but right about general names. More recent philosophy has followed suit, except that, in the case of both proper names and natural kind terms, it often replaces the notion of defining properties by that of a cluster of properties, only some of which need to be satisfied in each particular case. My own view, on the other hand, regards Mill as more-or-less right about 'singular' names, but wrong about 'general' names. *Perhaps* some 'general' names ('foolish', 'fat', 'yellow') express

⁶⁵ Mill, op. cit.

properties.⁶⁶ In a significant sense, such general names as 'cow' and 'tiger' do not, unless *being a cow* counts trivially as a property. Certainly 'cow' and 'tiger' are *not* short for the conjunction of properties a dictionary would take to define them, as Mill thought. Whether science can discover empirically that certain properties are *necessary* of cows, or of tigers, is another question, which I answer affirmatively.

Let's consider how this applies to the types of identity statements expressing scientific discoveries that I talked about before—say, that water is H_2O . It certainly represents a discovery that water is H_2O . We identified water originally by its characteristic feel, appearance and perhaps taste, (though the taste may usually be due to the impurities). If there were a substance, even actually, which had a completely different atomic structure from that of water, but resembled water in these respects, would we say that some water wasn't H_2O ? I think not. We would say instead that just as there is a fool's gold there could be a fool's water; a substance which, though having the properties by which we originally identified water, would not in fact be water. And this, I think, applies not only to the actual world but even when we talk about counterfactual situations. If there had been a substance, which was a fool's water, it would then be fool's water and not water. On the other hand if this substance can take another form—such

⁶⁶ I am not going to give any criterion for what I mean by a 'pure property', or Fregean intension. It is hard to find unquestionable examples of what is meant. Yellowness certainly expresses a manifest physical property of an object and, relative to the discussion of gold above, can be regarded as a property in the required sense. Actually, however, it is not without a certain referential element of its own, for on the present view yellowness is picked out and rigidly designated as that external physical property of the object which we sense by means of the *visual impression of yellowness*. It does in this respect resemble the natural kind terms. The phenomenological quality of the sensation itself, on the other hand, can be regarded as a *quale* in some pure sense. Perhaps I am rather vague about these questions, but further precision seems unnecessary here.

as the polywater allegedly discovered in the Soviet Union, with very different identifying marks from that of what we now call water—it is a form of water because it is the same substance, even though it doesn't have the appearances by which we originally identified water.

Let's consider the statement 'Light is a stream of photons' or 'Heat is the motion of molecules'. By referring to light, of course, I mean something which we have some of in this room. When I refer to heat, I refer not to an internal sensation that someone may have, but to an external phenomenon which we perceive through the sense of feeling; it produces a characteristic sensation which we call the sensation of heat. Heat is the motion of molecules. We have also discovered that increasing heat corresponds to increasing motion of molecules, or, strictly speaking, increasing average kinetic energy of molecules. So temperature is identified with mean molecular kinetic energy. However I won't talk about temperature because there is the question of how the actual scale is to be set. It might just be set in terms of the mean molecular kinetic energy.⁶⁷ But what represents an interesting phenomenological discovery is that when it's hotter the molecules are moving faster. We have also discovered about light that light is a stream of photons; alternatively it is a form of electromagnetic radiation. Originally we identified light by the characteristic internal visual impressions it can produce in us, that make us able to see. Heat, on the other hand, we originally identified by the characteristic effect on one aspect of our nerve endings or our sense of touch.

Imagine a situation in which human beings were blind or their eyes didn't work. They were unaffected by light. Would that have been a situation in which light did not exist? It seems

⁶⁷ Of course, there is the question of the relation of the statistical mechanical notion of temperature to, for example, the thermodynamic notion. I wish to leave such questions aside in this discussion.

to me that it would not. It would have been a situation in which our eyes were not sensitive to light. Some creatures may have eyes not sensitive to light. Among such creatures are unfortunately some people, of course; they are called 'blind'. Even if all people had had awful vestigial growths and just couldn't see a thing, the light might have been around; but it would not have been able to affect people's eyes in the proper way. So it seems to me that such a situation would be a situation in which there was light, but people could not see it. So, though we may identify light by the characteristic visual impressions it produces in us, this seems to be a good example of fixing a reference. We fix what light is by the fact that it is whatever, out in the world, affects our eyes in a certain way. But now, talking about counterfactual situations in which let's say, people were blind, we would not then say that since, in such situations, nothing could affect their eyes, light would not exist; rather we would say that that would be a situation in which light—the thing we have identified as that which in fact enables us to see—existed but did not manage to help us see due to some defect in us.

Perhaps we can imagine that, by some miracle, sound waves somehow enabled some creature to see. I mean, they gave him visual impressions just as we have, maybe exactly the same color sense. We can also imagine the same creature to be completely *insensitive* to light (photons). Who knows what subtle undreamt of possibilities there may be? Would we say that in such a possible world, it was sound which was light, that these wave motions in the air were light? It seems to me that, given our concept of light, we should describe the situation differently. It would be a situation in which certain creatures, maybe even those who were called 'people' and inhabited this planet, were sensitive not to light but to sound waves, sensitive to them in exactly the same way that we are sensitive to light. If this is so, once we have found out what

light is, when we talk about other possible worlds we are talking about *this* phenomenon in the world, and not using 'light' as a phrase *synonymous* with 'whatever gives us the visual impression—whatever helps us to see'; for there might have been light and it not helped us to see; and even something else might have helped us to see. The way we identified light *fixed a reference*.

And similarly for other such phrases, such as 'heat'. Here heat is something which we have identified (and fixed the reference of its name) by its giving a certain sensation, which we call 'the sensation of heat'. We don't have a special name for this sensation other than as a sensation of heat. It's interesting that the language is this way. Whereas you might suppose it, from what I am saying, to have been the other way. At any rate, we identify heat and are able to sense it by the fact that it produces in us a sensation of heat. It might here be so important to the concept that its reference is fixed in this way, that if someone else detects heat by some sort of instrument, but is unable to feel it, we might want to say, if we like, that the concept of heat is not the same even though the referent is the same.

Nevertheless, the term 'heat' doesn't *mean* 'whatever gives people these sensations'. For first, people might not have been sensitive to heat, and yet the heat still have existed in the external world. Secondly, let us suppose that somehow light rays, because of some difference in their nerve endings, *did* give them these sensations. It would not then be heat but light which gave people the sensation which we call the sensation of heat.

Can we then imagine a possible world in which heat was not molecular motion? We can imagine, of course, having discovered that it was not. It seems to me that any case which someone will think of, which he thinks at first is a case in which heat—contrary to what is actually the case—would have been something other than molecular motion, would actually be a case in which some creatures with different nerve endings from

ours inhabit this planet (maybe even we, if it's a contingent fact about us that we have this particular neural structure), and in which these creatures were sensitive to that something else, say light, in such a way that they felt the same thing that we feel when we feel heat. But this is not a situation in which, say, light would have been heat, or even in which a stream of photons would have been heat, but a situation in which a stream of photons would have produced the characteristic sensations which *we* call 'sensations of heat'.

Similarly for many other such identifications, say, that lightning is electricity. Flashes of lightning are flashes of electricity. Lightning is an electrical discharge. We can imagine, of course, I suppose, other ways in which the sky might be illuminated at night with the same sort of flash without any electrical discharge being present. Here too, I am inclined to say, when we imagine this, we imagine something with all the visual appearances of lightning but which is not, in fact, lightning. One could be told: this appeared to be lightning but it was not. I suppose this might even happen now. Someone might, by a clever sort of apparatus, produce some phenomenon in the sky which would fool people into thinking that there was lightning even though in fact no lightning was present. And you wouldn't say that that phenomenon, because it looks like lightning, was in fact lightning. It was a different phenomenon from lightning, which is the phenomenon of an electrical discharge; and this is not lightning but just something that deceives us into thinking that there is lightning.

What characteristically goes on in these cases of, let's say, 'heat is molecular motion'? There is a certain referent which we have fixed, for the real world and for all possible worlds, by a contingent property of it, namely the property that it's able to produce such and such sensations in us. Let's say it's a contingent property of heat that it produces such and such sensations in people. It's after all contingent that there should

ever have been people on this planet at all. So one doesn't know *a priori* what physical phenomenon, described in other terms—in basic terms of physical theory—is the phenomenon which produces these sensations. We don't know this, and we've discovered eventually that this phenomenon is in fact molecular motion. When we have discovered this, we've discovered an identification which gives us an essential property of this phenomenon. We have discovered a phenomenon which in all possible worlds will be molecular motion—which could not have failed to be molecular motion, because that's what the phenomenon *is*.⁶⁸ On the other hand, the property by which we identify it originally, that of producing such and such a sensation in us, is not a necessary property but a contingent one. This very phenomenon could have existed, but due to differences in our neural structures and so on, have failed to be felt as heat. Actually, when I say *our* neural structures, as those of human beings, I'm really hedging a point which I made earlier; because of course, it might be part of the very nature of human beings that they have a neural structure which is sensitive to heat. Therefore this too could turn out to be necessary if enough investigation showed it. This I'm just ignoring, for the purpose of simplifying the discussion. At any rate it's not necessary, I suppose, that this

⁶⁸ Some people have been inclined to argue that although certainly we cannot say that sound waves 'would have been heat' if they had been felt by the sensation which we feel when we feel heat, the situation is different with respect to a possible phenomenon, not present in the actual world, and distinct from molecular motion. Perhaps, it is suggested, there might be another form of heat other than 'our heat', which was not molecular motion; though no actual phenomenon other than molecular motion, such as sound, would qualify. Similar claims have been made for gold and for light. Although I am disinclined to accept these views, they would make relatively little difference to the substance of the present lectures. Someone who is inclined to hold these views can simply replace the terms 'light', 'heat', 'pain', etc., in the examples by 'our light', 'our heat', 'our pain' and the like. I therefore will not take the space to discuss this issue here.

planet should have been inhabited by creatures sensitive to heat in this way.

I will conclude with some remarks about the application of the foregoing considerations to the debate over the mind-body identity thesis. Before I do so, however, I wish to recapitulate the views I have developed, and perhaps add a point or two.

First, my argument implicitly concludes that certain general terms, those for natural kinds, have a greater kinship with proper names than is generally realized. This conclusion holds for certain for various species names, whether they are count nouns, such as 'cat', 'tiger', 'chunk of gold', or mass terms such as 'gold', 'water', 'iron pyrites'. It also applies to certain terms for natural phenomena, such as 'heat', 'light', 'sound', 'lightning', and, presumably, suitably elaborated, to corresponding adjectives—'hot', 'loud', 'red'.

Mill, as I have recalled, held that although some 'singular names', the definite descriptions, have both denotation and connotation, others, the genuine proper names, had denotation but not connotation. Mill further maintained that 'general names', or general terms, had connotation. Such terms as 'cow' or 'human' are defined by the conjunction of certain properties which pick out their extension—a human being, for example, is a rational animal with certain physical characteristics. The hoary tradition of definition by *genus* and *differentia* is of a piece with such a conception. If Kant did, indeed, suppose that 'gold' could be *defined* as 'yellow metal', it may well be this tradition which led him to the definition. ('Metal' would be the genus, 'yellow' the differentia. The differentia could hardly include 'being gold' without circularity.)

The modern logical tradition, as represented by Frege and Russell, disputed Mill on the issue of singular names, but endorsed him on that of general names. Thus *all* terms, both singular and general, have a 'connotation' or Fregean sense. More recent theorists have followed Frege and Russell, modi-

fying their views only by replacing the notion of a sense as given by a particular conjunction of properties with that of a sense as given by a 'cluster' of properties, only *enough* of which need apply. The present view, directly reversing Frege and Russell, (more or less) *endorses* Mill's view of *singular* terms, but *disputes* his view of *general* terms.

Second, the present view asserts, in the case of species terms as in that of proper names, that one should bear in mind the contrast between the *a priori* but perhaps contingent properties carried with a term, given by the way its reference was fixed, and the analytic (and hence necessary) properties a term may carry, given by its meaning. For species, as for proper names, the way the reference of a term is fixed should not be regarded as a synonym for the term. In the case of proper names, the reference can be fixed in various ways. In an initial baptism it is typically fixed by an ostension or a description. Otherwise, the reference is usually determined by a chain, passing the name from link to link. The same observations hold for such a general term as 'gold'. If we imagine a hypothetical (admittedly somewhat artificial) baptism of the substance, we must imagine it picked out as by some such 'definition' as, 'Gold is the substance instantiated by the items over there, or at any rate, by almost all of them'. Several features of this baptism are worthy of note. First, the identity in the 'definition' does not express a (completely) necessary truth: though each of these items is, indeed, essentially (necessarily) gold,⁶⁹ gold might have existed even if the items did not. The definition does, however, express an *a priori* truth, in the same sense as (and with the same qualifications applied as) '1 meter = length of S': it *fixes a reference*. I believe that, in general,

⁶⁹ Assuming, of course, that they are all gold; as I say below, some may be fool's gold. We know in advance, *a priori*, that it is not the case that the items are *typically* fool's gold; and all those items which are actually gold are, of course, essentially gold.

terms for natural kinds (e.g., animal, vegetable, and chemical kinds) get their reference fixed in this way; the substance is defined as the kind instantiated by (almost all of) a given sample. The 'almost all' qualification allows that some fools' gold may be present in the sample. If the original sample has a small number of deviant items, they will be rejected as not really gold. If, on the other hand, the supposition that there is one uniform substance or kind in the initial sample proves more radically in error, reactions can vary: sometimes we may declare that there are two kinds of gold, sometimes we may drop the term 'gold'. (These possibilities are not supposed to be exhaustive.) And the alleged new kind may prove illusory for other reasons. For example, suppose some items (let the set of them be *I*) are discovered and are believed to belong to a new kind *K*. Suppose that later it is discovered that the items in *I* are indeed of a single kind; however, they belong to a previously known kind, *L*. Observational error led to the false initial belief that the items in *I* possessed some characteristic *C* excluding them from *L*. In this case we would surely say that the kind *K* does not exist, in spite of the fact that it was defined by reference to a uniform initial sample. (Note that if *L* had not previously been identified, we might well have said that the kind *K* did exist, but that we were in error in supposing it to be associated with the characteristic *C*!) To the extent that the notion 'same kind' is vague, so is the original notion of gold. Ordinarily, the vagueness doesn't matter in practice.

In the case of a natural phenomenon perceptible to the senses, the way the reference is picked out is simple: 'Heat = that which is sensed by sensation *S*'. Once again, the identity fixes a reference: it therefore is *a priori*, but not necessary, since heat might have existed, though we did not. 'Heat', like 'gold', is a rigid designator, whose reference is fixed by its 'definition'. Other natural phenomena, such as electricity, are

originally identified as the causes of certain concrete experimental effects. I do not attempt to give exhaustive characterizations here, only examples.

Third, in the case of natural kinds, certain properties, believed to be at least roughly characteristic of the kind and believed to apply to the original sample, are used to place new items, outside the original sample, in the kind. ('Properties' is used here in a broad sense, and may include larger kinds: for example animality and felinity, for tigers.) These properties need not hold *a priori* of the kind; later empirical investigation may establish that some of the properties did not belong to the original sample, or that they were peculiarities of the original sample, not to be generalized to the kind as a whole. (Thus the yellowness of gold may be an optical illusion; or, more plausibly, though the gold originally observed was indeed yellow, it could turn out that some gold is white.) On the other hand, an item may possess all the characteristics originally used and fail to belong to the kind. Thus an animal may look just like a tiger, and fail to be a tiger, as mentioned above; distinct elements in the same column of the periodic table may resemble each other rather closely. Such failures are the exception; but, as in the periodic table, they *do* arise. (Sometimes a failure of the initial sample to have the characteristics associated with it may lead us to repudiate the species, as in the *I-K-L* case above. But this phenomenon is not typical, let alone universal; see the remarks on the yellowness of gold, or whether cats are animals.) *A priori*, all we can say is that it is an empirical matter whether the characteristics originally associated with the kind apply to its members universally, or even ever, and whether they are in fact jointly sufficient for membership in the kind. (The joint sufficiency is extremely unlikely to be *necessary*, but it may be *true*. In fact, any animal looking just like a tiger is a tiger—as far as I know—though it is (metaphysically) *possible* that there should have been animals

that resembled tigers but were not tigers. The universal applicability, on the other hand, may well be necessary, if true: 'Cats are animals' *has* turned out to be a necessary truth. Indeed of many such statements, especially those subsuming one species under another, we know *a priori* that, if they are true at all, they are necessarily true.)

Fourth, scientific investigation generally discovers characteristics of gold which are far better than the original set. For example, it turns out that a material object is (pure) gold if and only if the only element contained therein is that with atomic number 79. Here, the 'if and only if' can be taken to be *strict* (necessary). In general, science attempts, by investigating basic structural traits, to find the nature, and thus the essence (in the philosophical sense) of the kind. The case of natural phenomena is similar; such theoretical identifications as 'heat is molecular motion' are *necessary*, though not *a priori*. The type of property identity used in science seems to be associated with *necessity*, not with a *prioricity*, or analyticity: For all bodies x and y , x is hotter than y if and only if x has higher mean molecular kinetic energy than y . Here the coextensiveness of the predicates is *necessary*, but not *a priori*. The philosophical notion of attribute, on the other hand, seems to demand *a priori* (and analytic) coextensiveness as well as necessary coextensiveness.

Note that on the present view, scientific discoveries of species essence do not constitute a 'change of meaning'; the possibility of such discoveries was part of the original enterprise. We need not even assume that the biologist's denial that whales are fish shows his 'concept of fishhood' to be different from that of the layman; he simply corrects the layman, discovering that 'whales are mammals, not fish' is a necessary truth. Neither 'whales are mammals' *nor* 'whales are fish' was supposed to be *a priori* or analytic in any case.

Fifth, and independently of the scientific investigations just mentioned, the 'original sample' gets augmented by the dis-

covery of new items.⁷⁰ (In the case of gold, men applied tremendous effort to the task. Those who doubt the natural scientific curiosity of Man should consider this case. Only such anti-scientific fundamentalists as Bryan cast aspersions on the effort.) More important, the species-name may be passed from link to link, exactly as in the case of proper names, so that many who have seen little or no gold can still use the term. Their reference is determined by a causal (historical) chain, not by use of any items. I will make even less effort here to spell out an exact theory than in the case of proper names.

Usually, when a proper name is passed from link to link, the way the reference of the name is fixed is of little importance to us. It matters not at all that different speakers may fix the reference of the name in different ways, provided that they give it the same referent. The situation is probably not very different for species names, though the temptation to think that the metallurgist has a different concept of gold from the man who has never seen any may be somewhat greater. The interesting fact is that the way the reference is fixed seems overwhelmingly important to us in the case of sensed phenomena: a blind man who uses the term 'light', even though he uses it as a rigid designator for the very same phenomenon as we, seems to us to have lost a great deal, perhaps enough for us to declare that he has a different concept. ('Concept' here is used non-technically!) The fact that we identify light in a certain way seems to us to be *crucial*, even though it is not necessary; the intimate connection may create an *illusion* of necessity. I think that this observation, together with the remarks on property-identity above, may well be essential to an under-

⁷⁰ Obviously, there are also artificialities in this whole account. For example, it may be hard to say which items constitute the original sample. Gold may have been discovered independently by various people at various times. I do not feel that any such complications will radically alter the picture.

standing of the traditional disputes over primary and secondary qualities.⁷¹

Let us return to the question of theoretical identification. Theoretical identities, according to the conception I advocate, are generally identities involving two rigid designators and therefore are examples of the necessary *a posteriori*. Now in spite of the arguments I gave before for the distinction between necessary and *a priori* truth, the notion of a *posteriori* necessary truth may still be somewhat puzzling. Someone may well be inclined to argue as follows: 'You have admitted that heat might have turned out not to have been molecular motion, and that gold might have turned out not to have been the element with the atomic number 79. For that matter, you also

⁷¹ To understand this dispute, it is especially important to realize that yellowness is not a dispositional property, although it is related to a disposition. Many philosophers for want of any other theory of the meaning of the term 'yellow', have been inclined to regard it as expressing a dispositional property. At the same time, I suspect many have been bothered by the 'gut feeling' that yellowness is a manifest property, just as much 'right out there' as hardness or spherical shape. The proper account, on the present conception is, of course, that the reference of 'yellowness' is fixed by the description 'that (manifest) property of objects which causes them, under normal circumstances, to be seen as yellow (i.e., to be sensed by certain visual impressions)'; 'yellow', of course, does not *mean* 'tends to produce such and such a sensation'; if we had had different neural structures, if atmospheric conditions had been different, if we had been blind, and so on, then yellow objects would have done no such thing. If one tries to revise the definition of 'yellow' to be, 'tends to produce such and such visual impressions under circumstances C', then one will find that the specification of the circumstances C either circularly involves yellowness or plainly makes the alleged definition into a scientific discovery rather than a synonymy. If we take the 'fixes a reference' view, then it is up to the physical scientist to identify the property so marked out in any more fundamental physical terms that he wishes.

Some philosophers have argued that such terms as 'sensation of yellow', 'sensation of heat', 'sensation of pain', and the like, could not be in the language unless they were identifiable in terms of external observable phenomena, such as heat, yellowness, and associated human behavior. I think that this question is independent of any view argued in the text.

have acknowledged that Elizabeth II might have turned out not to be the daughter of George VI, or even to originate in the particular sperm and egg we had thought, and this table might have turned out to be made from ice made from water from the Thames. I gather that Hesperus might have turned out not to be Phosphorus. What then can you mean when you say that such eventualities are impossible? If Hesperus might have turned out not to be Phosphorus, then Hesperus might not have been Phosphorus. And similarly for the other cases: if the world could have turned out otherwise, it could have been otherwise. To deny this fact is to deny the self-evident modal principle that what is entailed by a possibility must itself be possible. Nor can you evade the difficulty by declaring the "might have" of "might have turned out otherwise" to be merely epistemic, in the way that "Fermat's Last Theorem might turn out to be true and might turn out to be false" merely expresses our present ignorance, and "Arithmetic might have turned out to be complete" signals our former ignorance. In these mathematical cases, we may have been ignorant, but it was in fact mathematically impossible for the answer to turn out other than it did. Not so in your favorite cases of essence and of identity between two rigid designators: it really is logically possible that gold should have turned out to be a compound, and this table might really have turned out not to be made of wood, let alone of a given particular block of wood. The contrast with the mathematical case could not be greater and would not be alleviated even if, as you suggest, there may be mathematical truths which it is impossible to know *a priori*.'

Perhaps anyone who has caught the spirit of my previous remarks can give my answer himself, but there is a clarification of my previous discussion which is relevant here. The objector is correct when he argues that if I hold that this table could not have been made of ice, then I must also hold that it could not have turned out to be made of ice; *it could have turned out that P*

entails that *P* could have been the case. What, then, does the intuition that the table might have turned out to have been made of ice or of anything else, that it might even have turned out not to be made of molecules, amount to? I think that it means simply that there might have been a *table* looking and feeling just like this one and placed in this very position in the room, which was in fact made of ice. In other words, I (or some conscious being) could have been *qualitatively in the same epistemic situation* that in fact obtains, I could have the same sensory evidence that I in fact have, about a *table* which was made of ice. The situation is thus akin to the one which inspired the counterpart theorists; when I speak of the possibility of the table turning out to be made of various things, I am speaking loosely. *This* table itself could not have had an origin different from the one it in fact had, but in a situation qualitatively identical to this one with respect to all the evidence I had in advance, the room could have contained a *table made of ice* in place of this one. Something like counterpart theory is thus applicable to the situation, but it applies only because we are *not* interested in what might have been true of *this particular* table, but in what might or might not be true of a *table* given certain evidence. It is precisely because it is *not* true that this table might have been made of ice from the Thames that we must turn here to qualitative descriptions and counterparts. To apply these notions to genuine *de re* modalities is, from the present standpoint, perverse.

The general answer to the objector can be stated, then, as follows: Any necessary truth, whether *a priori* or *a posteriori*, could not have turned out otherwise. In the case of some necessary *a posteriori* truths, however, we can say that under appropriate qualitatively identical evidential situations, an appropriate corresponding qualitative statement might have been false. The loose and inaccurate statement that gold might have turned out to be a compound should be replaced (roughly)

by the statement that it is logically possible that there should have been a compound with all the properties originally known to hold of gold. The inaccurate statement that Hesperus might have turned out not to be Phosphorus should be replaced by the true contingency mentioned earlier in these lectures: two distinct bodies might have occupied, in the morning and the evening, respectively, the very positions actually occupied by Hesperus-Phosphorus-Venus.⁷² The reason the example of Fermat's Last Theorem gives a different impression is that here no analogue suggests itself, except for the extremely general statement that, in the absence of proof or disproof, it is possible for a *mathematical conjecture* to be either true or false.

I have not given any general paradigm for the appropriate corresponding qualitative contingent statement. Since we are concerned with how things might have turned out otherwise, our general paradigm is to redescribe both the prior evidence and the statement qualitatively and claim that they are only contingently related. In the case of identities, using two rigid designators, such as the Hesperus-Phosphorus case above, there is a simpler paradigm which is often usable to at least approximately the same effect. Let ' R_1 ' and ' R_2 ' be the two rigid designators which flank the identity sign. Then ' $R_1 = R_2$ ' is necessary if true. The references of ' R_1 ' and ' R_2 ', respectively, may well be fixed by nonrigid designators ' D_1 ' and ' D_2 ', in the Hesperus and Phosphorus cases these have the form 'the heavenly body in such-and-such position in the sky in the evening (morning)'. Then although ' $R_1 = R_2$ ' is necessary,

⁷² Some of the statements I myself make above may be loose and inaccurate in this sense. If I say, 'Gold *might* turn out not to be an element,' I speak correctly; 'might' here is *epistemic* and expresses the fact that the evidence does not justify *a priori* (Cartesian) certainty that gold is an element. I am also strictly correct when I say that the elementhood of gold was discovered *a posteriori*. If I say, 'Gold *might have* turned out not to be an element,' I seem to mean this metaphysically and my statement is subject to the correction noted in the text.

' $D_1 = D_2$ ' may well be contingent, and this is often what leads to the erroneous view that ' $R_1 = R_2$ ' might have turned out otherwise.

I finally turn to an all too cursory discussion of the application of the foregoing considerations to the identity thesis. Identity theorists have been concerned with several distinct types of identifications: of a person with his body, of a particular sensation (or event or state of having the sensation) with a particular brain state (Jones's pain at 06:00 was his C-fiber stimulation at that time), and of *types* of mental states with the corresponding *types* of physical states (pain is the stimulation of C-fibers). Each of these, and other types of identifications in the literature, present analytical problems, rightly raised by Cartesian critics, which cannot be avoided by a simple appeal to an alleged confusion of synonymy with identity. I should mention that there is of course no obvious bar, at least (I say cautiously) none which should occur to any intelligent thinker on a first reflection just before bedtime, to advocacy of some identity theses while doubting or denying others. For example, some philosophers have accepted the identity of particular sensations with particular brain states while denying the possibility of identities between mental and physical *types*.⁷⁸ I will concern myself primarily with the type-type identities, and the philosophers in question will thus be immune to much of the discussion; but I will mention the other kinds of identities briefly.

Descartes, and others following him, argued that a person or mind is distinct from his body, since the mind could exist without the body. He might equally well have argued the same

⁷⁸ Thomas Nagel and Donald Davidson are notable examples. Their views are very interesting, and I wish I could discuss them in further detail. It is doubtful that such philosophers wish to call themselves 'materialists'. Davidson, in particular, bases his case for his version of the identity theory on the supposed *impossibility* of correlating psychological properties with physical ones.

The argument against token-token identification in the text *does* apply to these views.

conclusion from the premise that the body could have existed without the mind.⁷⁴ Now the one response which I regard as plainly inadmissible is the response which cheerfully accepts the Cartesian premise while denying the Cartesian conclusion. Let 'Descartes' be a name, or rigid designator, of a certain person, and let 'B' be a rigid designator of his body. Then if Descartes were indeed identical to B, the supposed identity, being an identity between two rigid designators, would be necessary, and Descartes could not exist without B and B could not exist without Descartes. The case is not at all comparable to the alleged analogue, the identity of the first Postmaster General with the inventor of bifocals. True, this identity obtains despite the fact that there could have been a first Postmaster General even though bifocals had never been invented. The reason is that 'the inventor of bifocals' is not a rigid designator; a world in which no one invented bifocals is not *ipso facto* a world in which Franklin did not exist. The alleged analogy therefore collapses; a philosopher who wishes

⁷⁴ Of course, the body *does* exist without the mind and presumably without the person, when the body is a corpse. This consideration, if accepted, would already show that a person and his body are distinct. (See David Wiggins, 'On Being at the Same Place at the Same Time', *Philosophical Review*, Vol. 77 (1968), pp. 90-5.) Similarly, it can be argued that a statue is not the hunk of matter of which it is composed. In the latter case, however, one might say instead that the former is 'nothing over and above' the latter; and the same device might be tried for the relation of the person and the body. The difficulties in the text would not then arise in the same form, but analogous difficulties would appear. A theory that a person is nothing over and above his body in the way that a statue is nothing over and above the matter of which it is composed, would have to hold that (necessarily) a person exists if and only if his body exists and has a certain additional physical organization. Such a thesis would be subject to modal difficulties similar to those besetting the ordinary identity thesis, and the same would apply to suggested analogues replacing the identification of mental states with physical states. A further discussion of this matter must be left for another place. Another view which I will not discuss, although I have little tendency to accept it and am not even certain that it has been set out with genuine clarity, is the so-called functional state view of psychological concepts.

to refute the Cartesian conclusion must refute the Cartesian premise, and the latter task is not trivial.

Let 'A' name a particular pain sensation, and let 'B' name the corresponding brain state, or the brain state some identity theorist wishes to identify with A. *Prima facie*, it would seem that it is at least logically possible that B should have existed (Jones's brain could have been in exactly that state at the time in question) without Jones feeling any pain at all, and thus without the presence of A. Once again, the identity theorist cannot admit the possibility cheerfully and proceed from there; consistency, and the principle of the necessity of identities using rigid designators, disallows any such course. If A and B were identical, the identity would have to be necessary. The difficulty can hardly be evaded by arguing that although B could not exist without A, *being a pain* is merely a contingent property of A, and that therefore the presence of B without pain does not imply the presence of B without A. Can any case of essence be more obvious than the fact that *being a pain* is a necessary property of each pain? The identity theorist who wishes to adopt the strategy in question must even argue that *being a sensation* is a contingent property of A, for *prima facie* it would seem logically possible that B could exist without any sensation with which it might plausibly be identified. Consider a particular pain, or other sensation, that you once had. Do you find it at all plausible that *that very sensation* could have existed without being a sensation, the way a certain inventor (Franklin) could have existed without being an inventor?

I mention this strategy because it seems to me to be adopted by a large number of identity theorists. These theorists, believing as they do that the supposed identity of a brain state with the corresponding mental state is to be analyzed on the paradigm of the contingent identity of Benjamin Franklin with the inventor of bifocals, realize that just as his contingent activity made Benjamin Franklin into the inventor of bifocals,

so some contingent property of the brain state must make it into a pain. Generally they wish this property to be one storable in physical or at least 'topic-neutral' language, so that the materialist cannot be accused of positing irreducible non-physical properties. A typical view is that *being a pain*, as a property of a physical state, is to be analyzed in terms of the 'causal role' of the state,⁷⁵ in terms of the characteristic stimuli (e.g., pinpricks) which cause it and the characteristic behavior it causes. I will not go into the details of such analyses, even though I usually find them faulty on specific grounds in addition to the general modal considerations I argue here. All I need to observe here is that the 'causal role' of the physical state is regarded by the theorists in question as a contingent property of the state, and thus it is supposed to be a contingent property of the state that it is a mental state at all, let alone that it is something as specific as a pain. To repeat, this notion seems to me self-evidently absurd. It amounts to the view that the *very pain I now have* could have existed without being a mental state at all.

I have not discussed the converse problem, which is closer to the original Cartesian consideration—namely, that just as it seems that the brain state could have existed without any pain, so it seems that the pain could have existed without the corresponding brain state. Note that *being a brain state* is evidently an essential property of B (the brain state). Indeed, even more is true: not only being a brain state, but even being a brain state of a specific type is an essential property of B. The configuration of brain cells whose presence at a given time constitutes the presence of B at that time is essential to B, and in its absence B would not have existed. Thus someone who

⁷⁵ For example, David Armstrong, *A Materialist Theory of the Mind*, London and New York, 1968, see the discussion review by Thomas Nagel, *Philosophical Review* 79 (1970), pp. 394-403; and David Lewis, 'An Argument for the Identity Theory', *The Journal of Philosophy*, pp. 17-25.

wishes to claim that the brain state and the pain are identical must argue that the pain *A* could not have existed without a quite specific type of configuration of molecules. If $A = B$, then the identity of *A* with *B* is necessary, and any essential property of one must be an essential property of the other. Someone who wishes to maintain an identity thesis cannot simply *accept* the Cartesian intuitions that *A* can exist without *B*, that *B* can exist without *A*, that the correlative presence of anything with mental properties is merely contingent to *B*, and that the correlative presence of any specific physical properties is merely contingent to *A*. He must explain these intuitions away, showing how they are illusory. This task may not be impossible; we have seen above how some things which appear to be contingent turn out, on closer examination, to be necessary. The task, however, is obviously not child's play, and we shall see below how difficult it is.

The final kind of identity, the one which I said would get the closest attention, is the type-type sort of identity exemplified by the identification of pain with the stimulation of C-fibers. These identifications are supposed to be analogous with such scientific type-type identifications as the identity of heat with molecular motion, of water with hydrogen hydroxide, and the like. Let us consider, as an example, the analogy supposed to hold between the materialist identification and that of heat with molecular motion; both identifications identify two types of phenomena. The usual view holds that the identification of heat with molecular motion and of pain with the stimulation of C-fibers are both contingent. We have seen above that since 'heat' and 'molecular motion' are both rigid designators, the identification of the phenomena they name is necessary. What about 'pain' and 'C-fiber stimulation'? It should be clear from the previous discussion that 'pain' is a rigid designator of the type, or phenomenon, it designates: if something is a pain it is essentially so, and it seems absurd to suppose that pain

could have been some phenomenon other than the one it is. The same holds for the term 'C-fiber stimulation', provided that 'C-fibers' is a rigid designator, as I will suppose here. (The supposition is somewhat risky, since I know virtually nothing about C-fibers, except that the stimulation of them is said to be correlated with pain.⁷⁶ The point is unimportant; if 'C-fibers' is not a rigid designator, simply replace it by one which is, or suppose it used as a rigid designator in the present context.) Thus the identity of pain with the stimulation of C-fibers, if true, must be *necessary*.

So far the analogy between the identification of heat with molecular motion and pain with the stimulation of C-fibers has not failed; it has merely turned out to be the opposite of what is usually thought—both, if true, must be necessary. This means that the identity theorist is committed to the view that there could not be a C-fiber stimulation which was not a pain nor a pain which was not a C-fiber stimulation. These consequences are certainly surprising and counterintuitive, but let us not dismiss the identity theorist too quickly. Can he perhaps show that the apparent possibility of pain not having turned out to be C-fiber stimulation, or of there being an instance of one of

⁷⁶ I have been surprised to find that at least one able listener took my use of such terms as 'correlated with', 'corresponding to', and the like as already begging the question against the identity thesis. The identity thesis, so he said, is not the thesis that pains and brain states are correlated, but rather that they are identical. Thus my entire discussion presupposes the anti-materialist position that I set out to prove. Although I was surprised to hear an objection which concedes so little intelligence to the argument, I have tried especially to avoid the term 'correlated' which seems to give rise to the objection. Nevertheless, to obviate misunderstanding, I shall explain my usage. Assuming, at least *arguendo*, that scientific discoveries have turned out so as not to refute materialism from the beginning, both the dualist and the identity theorist agree that there is a correlation or correspondence between mental states and physical states. The dualist holds that the 'correlation' relation in question is irreflexive; the identity theorist holds that it is simply a special case of the identity relation. Such terms as 'correlation' and 'correspondence' can be used neutrally without prejudging which side is correct.

the phenomena which is not an instance of the other, is an illusion of the same sort as the illusion that water might not have been hydrogen hydroxide, or that heat might not have been molecular motion? If so, he will have rebutted the Cartesian, not, as in the conventional analysis, by accepting his premise while exposing the fallacy of his argument, but rather by the reverse—while the Cartesian argument, given its premise of the contingency of the identification, is granted to yield its conclusion, the premise is to be exposed as superficially plausible but false.

Now I do not think it likely that the identity theorist will succeed in such an endeavor. I want to argue that, at least, the case cannot be interpreted as analogous to that of scientific identification of the usual sort, as exemplified by the identity of heat and molecular motion. What was the strategy used above to handle the apparent contingency of certain cases of the necessary *a posteriori*? The strategy was to argue that although the statement itself is necessary, someone could, *qualitatively* speaking, be in the same epistemic situation as the original, and in such a situation a *qualitatively* analogous statement could be false. In the case of identities between two rigid designators, the strategy can be approximated by a simpler one: Consider how the references of the designators are determined; if these coincide only contingently, it is this fact which gives the original statement its illusion of contingency. In the case of heat and molecular motion, the way these two paradigms work out is simple. When someone says, inaccurately, that heat might have turned out not to be molecular motion, what is true in what he says is that someone could have sensed a phenomenon in the same way we sense heat, that is, feels it by means of its production of the sensation we call 'the sensation of heat' (call it 'S'), even though that phenomenon was not molecular motion. He means, additionally, that the planet might have been inhabited by creatures who did not get S

when they were in the presence of molecular motion, though perhaps getting it in the presence of something else. Such creatures would be, in some qualitative sense, in the same epistemic situation as we are, they could use a rigid designator for the phenomenon that causes sensation S in them (the rigid designator could even be 'heat'), yet it would not be molecular motion (and therefore not heat!), which was causing the sensation.

Now can something be said analogously to explain away the feeling that the identity of pain and the stimulation of C-fibers, if it is a scientific discovery, could have turned out otherwise? I do not see that such an analogy is possible. In the case of the apparent possibility that molecular motion might have existed in the absence of heat, what seemed really possible is that molecular motion should have existed without being *felt as heat*, that is, it might have existed without producing the sensation S, the sensation of heat. In the appropriate sentient beings is it analogously possible that a stimulation of C-fibers should have existed without being felt as pain? If this is possible, then the stimulation of C-fibers can itself exist without pain, since for it to exist without being *felt as pain* is for it to exist without there *being any* pain. Such a situation would be in flat out contradiction with the supposed necessary identity of pain and the corresponding physical state, and the analogue holds for any physical state which might be identified with a corresponding mental state. The trouble is that the identity theorist does not hold that the physical state merely *produces* the mental state, rather he wishes the two to be identical and thus *a fortiori* necessarily co-occurrent. In the case of molecular motion and heat there is something, namely, the sensation of heat, which is an intermediary between the external phenomenon and the observer. In the mental-physical case no such intermediary is possible, since here the physical phenomenon is supposed to be identical with the

internal phenomenon itself. Someone can be in the same epistemic situation as he would be if there were heat, even in the absence of heat, simply by feeling the sensation of heat; and even in the presence of heat, he can have the same evidence as he would have in the absence of heat simply by lacking the sensation *S*. No such possibility exists in the case of pain and other mental phenomena. To be in the same epistemic situation that would obtain if one had a pain *is* to have a pain; to be in the same epistemic situation that would obtain in the absence of a pain *is* not to have a pain. The apparent contingency of the connection between the mental state and the corresponding brain state thus cannot be explained by some sort of qualitative analogue as in the case of heat.

We have just analyzed the situation in terms of the notion of a qualitatively identical epistemic situation. The trouble is that the notion of an epistemic situation qualitatively identical to one in which the observer had a sensation *S* simply *is* one in which the observer had that sensation. The same point can be made in terms of the notion of what picks out the reference of a rigid designator. In the case of the identity of heat with molecular motion the important consideration was that although 'heat' is a rigid designator, the reference of that designator was determined by an accidental property of the referent, namely the property of producing in us the sensation *S*. It is thus possible that a phenomenon should have been rigidly designated in the same way as a phenomenon of heat, with its reference also picked out by means of the sensation *S*, without that phenomenon being heat and therefore without its being molecular motion. Pain, on the other hand, is not picked out by one of its accidental properties; rather it is picked out by the property of being pain itself, by its immediate phenomenological quality. Thus pain, unlike heat, is not only rigidly designated by 'pain' but the reference of the designator is determined by an essential property of the

referent. Thus it is not possible to say that although pain is necessarily identical with a certain physical state, a certain phenomenon can be picked out in the same way we pick out pain without being correlated with that physical state. If any phenomenon is picked out in exactly the same way that we pick out pain, then that phenomenon *is* pain.

Perhaps the same point can be made more vivid without such specific reference to the technical apparatus in these lectures. Suppose we imagine God creating the world; what does He need to do to make the identity of heat and molecular motion obtain? Here it would seem that all He needs to do is to create the heat, that is, the molecular motion itself. If the air molecules on this earth are sufficiently agitated, if there is a burning fire, then the earth will be hot even if there are no observers to see it. God created light (and thus created streams of photons, according to present scientific doctrine) before He created human and animal observers; and the same presumably holds for heat. How then does it appear to us that the identity of molecular motion with heat is a substantive scientific fact, that the mere creation of molecular motion still leaves God with the additional task of making molecular motion into heat? This feeling is indeed illusory, but what *is* a substantive task for the Deity is the task of making molecular motion felt as heat. To do this He must create some sentient beings to insure that the molecular motion produces the sensation *S* in them. Only after he has done this will there be beings who can learn that the sentence 'Heat is the motion of molecules' expresses an *a posteriori* truth in precisely the same way that we do.

What about the case of the stimulation of C-fibers? To create this phenomenon, it would seem that God need only create beings with C-fibers capable of the appropriate type of physical stimulation; whether the beings are conscious or not is irrelevant here. It would seem, though, that to make the C-fiber stimulation correspond to pain, or be felt as pain, God must

do something in addition to the mere creation of the C-fiber stimulation; He must let the creatures feel the C-fiber stimulation as *pain*, and not as a tickle, or as warmth, or as nothing, as apparently would also have been within His powers. If these things in fact are within His powers, the relation between the pain God creates and the stimulation of C-fibers cannot be identity. For if so, the stimulation could exist without the pain; and since 'pain' and 'C-fiber stimulation' are rigid, this fact implies that the relation between the two phenomena is not that of identity. God had to do some work, in addition to making the man himself, to make a certain man be the inventor of bifocals; the man could well exist without inventing any such thing. The same cannot be said for pain; if the phenomenon exists at all, no further work should be required to make it into pain.

In sum, the correspondence between a brain state and a mental state seems to have a certain obvious element of contingency. We have seen that identity is not a relation which can hold contingently between objects. Therefore, if the identity thesis were correct, the element of contingency would not lie in the relation between the mental and physical states. It cannot lie, as in the case of heat and molecular motion, in the relation between the phenomenon (= heat = molecular motion) and the way it is felt or appears (sensation *S*), since in the case of mental phenomena there is no 'appearance' beyond the mental phenomenon itself.

Here I have been emphasizing the possibility, or apparent possibility, of a physical state without the corresponding mental state. The reverse possibility, the mental state (pain) without the physical state (C-fiber stimulation) also presents problems for the identity theorists which cannot be resolved by appeal to the analogy of heat and molecular motion.

I have discussed similar problems more briefly for views equating the self with the body, and particular mental events

with particular physical events, without discussing possible countermoves in the same detail as in the type-type case. Suffice it to say that I suspect that the considerations given indicate that the theorist who wishes to identify various particular mental and physical events will have to face problems fairly similar to those of the type-type theorist; he too will be unable to appeal to the standard alleged analogues.

That the usual moves and analogies are not available to solve the problems of the identity theorist is, of course, no proof that no moves are available. I certainly cannot discuss all the possibilities here. I suspect, however, that the present considerations tell heavily against the usual forms of materialism. Materialism, I think, must hold that a physical description of the world is a *complete* description of it, that any mental facts are 'ontologically dependent' on physical facts in the straightforward sense of following from them by necessity. No identity theorist seems to me to have made a convincing argument against the intuitive view that this is not the case.⁷⁷

⁷⁷ Having expressed these doubts about the identity theory in the text, I should emphasize two things: first, identity theorists have presented positive arguments for their view, which I certainly have not answered here. Some of these arguments seem to me to be weak or based on ideological prejudices, but others strike me as highly compelling arguments which I am at present unable to answer convincingly. Second, rejection of the identity thesis does not imply acceptance of Cartesian dualism. In fact, my view above that a person could not have come from a different sperm and egg from the ones from which he actually originated implicitly suggests a rejection of the Cartesian picture. If we had a clear idea of the soul or the mind as an independent, subsistent, spiritual entity, why should it have to have any necessary connection with particular material objects such as a particular sperm or a particular egg? A convinced dualist may think that my views on sperms and eggs beg the question against Descartes. I would tend to argue the other way; the fact that it is hard to imagine me coming from a sperm and egg different from my actual origins seems to me to indicate that we have no such clear conception of a soul or self. In any event, Descartes' notion seems to have been rendered dubious ever since Hume's critique of the notion of a Cartesian self. I regard the mind-body problem as wide open and extremely confusing.