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ALLAN GIBBARD

CONTINGENT IDENTITY[1]

This brief for contingent identity begins with an example. Under certain conditions, I shall argue, a clay statue is identical with the piece of clay of which it is made – or at least it is plausible to claim so. If indeed the statue and the piece of clay are identical, I shall show, then the identity is contingent: that is to say, where s is the statue and c the piece of clay.

$$s = c \;\&\; \Diamond(s \text{ exists} \;\&\; c \text{ exists} \;\&\; s \neq c). \tag{1}$$

This claim of contingent identity, if true, has important ramifications. Later I shall develop theories of concrete things and proper names which are needed to fit the claim. These theories together form a coherent alternative to theories which hold that all true identities formed with proper names are necessary – a plausible alternative, I shall argue, with many advantages.

Most purported examples of such contingent identity fail: that much, I think, has been shown by Saul Kripke's recent work (1971, 1972). Kripke's work has transformed the subjects of necessity and reference, and the usual examples of contingent identity depend on accounts of those subjects which Kripke's attacks undermine. Take, for instance, one of Frege's examples of *a posteriori* identity, somewhat reworded (1892, p. 57).

$$\text{If Hesperus exists, then Hesperus} = \text{Phosphorus.} \tag{2}$$

On the account of necessity which prevailed before Kripke, a truth is necessary only if it can be known *a priori*. Now as Frege pointed out, (2) is clearly *a posteriori*, since it reports a discovery which could only have been made by observation. On the old account, then, (2), although true, is not a necessary truth. Kripke's attacks undermine this account of necessary truth as *a priori* truth. Whether something is a necessary truth, he argues, is not a matter of how we can know it, but of whether it might have been false if the world had been different: a proposition is a necessary truth if it would have been true in any possible situation. The necessary-contingent distinction and the *a priori* – *a posteriori* distinction, then, are not drawn in the same way, and to prove a truth contingent, it is not enough simply to show that it is *a posteriori* (1971, p. 150; 1972, pp. 260–4).

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Kripke's attacks also undermine accounts of reference which would make (2) a contingent truth. On both Russell's theory (1905) of descriptions and the later "cluster" theory, a name gets its reference in some way from the beliefs of the person who uses it. On Russell's view, the heavenly body Hesperus of which the ancients spoke would be the thing which fitted certain beliefs they had about Hesperus; on the cluster theory, it would be the thing which fitted a preponderance of their beliefs about it. Now the ancients' beliefs about Hesperus and their beliefs about Phosphorus were such that, in some possible worlds, one thing would fit the former and another the latter. On such an account of proper names, then, (2) would be false in some possible worlds, and is therefore contingent.

I shall not repeat Kripke's attacks on the description and cluster theories of proper names (1972, pp. 254–60, 284–308). My purpose here is to argue that even if these attacks are successful, there may well remain some contingent identities consisting of proper names. The identity of Hesperus and Phosphorus is not contingent, on the theories I shall develop, but I shall give an example which is. Kripke's attacks, if I am right, transform the subject of contingent identity, but they do not eliminate it.

I

In what sort of case might a statue *s* be identical with the piece of clay, *c*, of which it is made? Identity here is to be taken in a strict, timeless sense, not as mere identity during some period of time. For two things to be strictly identical, they must have all properties in common. That means, among other things, that they must start to exist at the same time and cease to exist at the same time. If we are to construct a case in which a statue is identical with a piece of clay, then, we shall need persistence criteria for statues and pieces of clay – criteria for when they start to exist and when they cease to exist.

Take first the piece of clay. Here I do not mean the portion of clay of which the piece consists, which may go on existing after the piece has been broken up or merged with other pieces. I shall call this clay of which the piece consists a *portion* of clay; a portion of clay, as I am using the term, can be scattered widely and continue to exist. Here I am asking about a *piece* or *lump* of clay.

A lump sticks together: its parts stick to each other, directly or through other parts, and no part of the lump sticks to any portion of clay which is

not part of the lump. The exact nature of this sticking relation will not matter here; it is a familiar relation which holds between parts of a solid object, but not between parts of a liquid, powder, or heap of solid objects. We know, then, what it is for two portions of clay to be parts of the same lump of clay at a time t, and if they are, I shall say that they are *stuck to* each other *at* t.

For how long, then, does a piece of clay persist? As a first approximation, the criteria might be put as follows. A piece of clay consists of a portion P of clay. It comes into existence when all the parts of P come to be stuck to each other, and cease to be stuck to any clay which is not part of P. It ceases to exist when the parts of P cease to be stuck to each other or come to be stuck to clay which is not in P. Thus a piece of clay can be formed either by sticking smaller pieces of clay together or by breaking it off a larger piece of clay, and it can be destroyed either by breaking it apart or by sticking it to other pieces of clay.

This standard is probably too strict; we ought to allow for such things as wear and the adherence of clay dust to a wet piece of clay. Nothing will change, though, for my purposes, if we allow the portion of clay which composes a piece of clay to change slowly over time. In the actual world, then, a piece of clay might be characterized by a function **P** from instants to portions of clay. In order for it to characterize a piece of clay, the function **P** would have to satisfy the following conditions.

(a) The domain of **P** is an interval of time T.

(b) For any instant t in T, $\mathbf{P}(t)$ is a portion of clay the parts of which, at t, are both stuck to each other and not stuck to any clay particles which are not part of $\mathbf{P}(t)$.

(c) The portions of clay $\mathbf{P}(t)$ change with t only slowly, if at all. (I shall give no exact standard of slowness here, but one might be stipulated if anything hinged on it.)

(d) No function $\mathbf{P}^*$ which satisfies (a), (b), and (c) *extends* **P**, in the sense that the domain of $\mathbf{P}^*$ properly includes the domain of **P** and the function **P** is $\mathbf{P}^*$ with its domain restricted.

Both on this standard, then, and on the earlier, stricter one, a piece of clay comes into existence when parts in it are stuck to each other and unstuck from all other clay, and goes out of existence when its parts cease to be stuck to each other or become stuck to other clay. That is what I shall need for what follows.

What, now, are the persistence criteria for clay statues? By a statue here, I do not mean a shape of which there could be more than one token, but a concrete particular thing: distinct clay statues, as I am using the term, may come out of the same mold. A clay statue consists of a piece of clay in a specific shape. It lasts, then, as long as the piece of clay lasts and keeps that shape. It comes into being when the piece of clay first exists and has that shape, and it goes out of existence as soon as the piece of clay ceases to exist or to have that shape.

These criteria too may be overly strict: again we may want to allow for slow changes of shape from wear, accretion, and slight bending. So let us say, a clay statue persists as long as the piece of clay it is made of persists and changes shape only slowly.

I do not claim that the criteria I have given are precisely set forth that way in our conceptual scheme. I do think that the criteria I have given fit at least roughly what we say about statues and pieces of clay. My argument will depend on no such claim, though, and for all I shall have to say, the criteria I have given might have been purely stipulative. I do need to make one claim for those criteria: I claim that as I have defined them, pieces of clay and clay statues are objects. That is to say, they can be designated with proper names, and the logic we ordinarily use will still apply. That is all, strictly speaking, that I need to claim for the criteria I have given.

Now we are in a better position to ask, are a clay statue and the piece of clay of which it is made identical? The persistence criteria I have given make it clear that often the two are distinct. In a typical case, a piece of clay is brought into existence by breaking it off from a bigger piece of clay. It then gets shaped, say, into the form of an elephant. With the finishing touches, a statue of an elephant comes into being. The statue and the piece of clay therefore have different properties: the times they start to exist are different, and whereas the statue has the property of being elephant-shaped as long as it exists, the piece of clay does not. Since one has properties the other lacks, the two are not identical (cf. Quine, 1950, Sec. 1).

Suppose, though, a clay statue starts to exist at the same time as the piece of clay of which it is made, and ceases to exist at the same time as the piece of clay ceases to exist. Will the statue then be identical with the piece of clay? It is indeed possible for a statue to endure for precisely the same period of time as its piece of clay, as the persistence criteria I have given make clear. Consider the following story.

I make a clay statue of the infant Goliath in two pieces, one the part above the waist and the other the part below the waist. Once I finish the two halves, I stick them together, thereby bringing into existence simultaneously a new piece of clay and a new statue. A day later I smash the statue, thereby bringing to an end both statue and piece of clay. The statue and the piece of clay persisted during exactly the same period of time.

Here, I am tempted to say, the statue and the piece of clay are identical. They began at the same time, and on any usual account, they had the same shape, location, color, and so forth at each instant in their history; everything that happened to one happened to the other; and the act that destroyed the one destroyed the other. If the statue is an entity over and above the piece of clay in that shape, then statues seem to take on a ghostly air. No doubt other explanations of what the statue is can be offered, but the hypothesis that the statue and piece of clay are identical seems well worth exploring.

If indeed the statue and piece of clay are the same thing, then their identity is contingent. It is contingent, that is to say in the sense of (1) at the beginning of this paper. (1) uses proper names, and so let me name the statue and the lump: the statue I shall call '*Goliath*'; the piece of clay, 'Lumpl'. Naming the piece of clay, to be sure, seems strange, but that, presumably, is because it is unusual to name pieces of clay, not because pieces of clay are unnamable. With these names, (1) becomes

$$\textit{Goliath} = \text{Lumpl} \;\&\; \Diamond(\textit{Goliath} \text{ exists} \;\&\; \text{Lumpl exists} \;\&\; \textit{Goliath} \neq \text{Lumpl}). \tag{3}$$

It is in this sense that I want to claim that *Goliath* = Lumpl contingently.

Suppose, then, that *Goliath* = Lumpl. Then their identity is contingent in the sense of (3). For suppose I had brought Lumpl into existence as *Goliath*, just as I actually did, but before the clay had a chance to dry, I squeezed it into a ball. At that point, according to the persistence criteria I have given, the statue *Goliath* would have ceased to exist, but the piece of clay Lumpl would still exist in a new shape. Hence Lumpl would not be *Goliath*, even though both existed. We would have

$$\text{Lumpl exists} \;\&\; \textit{Goliath} \text{ exists} \;\&\; \textit{Goliath} \neq \text{Lumpl}.$$

If in fact, then, *Goliath* = Lumpl, then here is a case of contingent identity. In fact *Goliath* = Lumpl, but had I destroyed the statue *Goliath* by

squeezing it, then it would have been the case that, although both existed, *Goliath* ≠ Lumpl. The identity is contingent, then, in the sense given in (3).

II

The claim that *Goliath* = Lumpl, then, has important consequences for the logic of identity. How can the claim be evaluated?

Initially, at least, the claim seems plausible. *Goliath* and Lumpl exist during precisely the same period of time, and at each instant during that period, they have, it would seem, the same shape, color, weight, location, and so forth: they share all their obvious properties.

The claim that *Goliath* = Lumpl, moreover, fits a systematic account of statues and pieces of clay. A clay statue ordinarily begins to exist only after its piece of clay does. In such cases, it seems reasonable to say, the statue is a temporal segment of the piece of clay – a segment which extends for the period of time during which the piece of clay keeps a particular, statuesque shape. Here, then, is a systematic account of the relation between a statue and its piece of clay. By that account, however, there will be cases in which a clay statue is identical with its piece of clay. For in some cases the very temporal segment of the piece of clay which constitutes the statue extends for the entire life of the piece of clay. In such a case, the segment is the piece of clay in its entire extent: the statue and the piece of clay are identical.[2]

That leads to my main reason for wanting to say that *Goliath* = Lumpl. Concrete things, like statues and pieces of clay, are a part of the physical world, and we ought, it seems to me, to have a systematic physical account of them. Concrete things, I want to maintain, are made up in some simple, canonical way from fundamental physical entities. Now what I have said of the relation between a statue and its piece of clay fits such a general view of concrete things. Suppose, for example, we take point-instants to be our fundamental physical entities, and let a concrete thing be a set of point-instants. In that case, *Goliath* = Lumpl simply because they are the same set of point-instants, Suppose instead we take particles to be our fundamental physical entities, and let a concrete thing be a changing set of particles – which might mean a function from instants in time to sets of particles. Then again, *Goliath* = Lumpl, because at each instant they consist of the same set of particles. Now particles and point-instants are the sorts of things we might expect to appear in a well-confirmed fundamental physics – in that

part of an eventual physics which gives the fundamental laws of the universe. A system according to which *Goliath* = Lumpl, then, may well allow concrete things to be made up in a simple way from entities that appear in well-confirmed fundamental physics. Concrete things, then, can be given a place in a comprehensive view of the world.

In the rest of this paper, then, I shall work out a theory according to which *Goliath* = Lumpl. Concrete things, for all I shall say, may be either sets of point-instants or changing sets of particles; the Appendix gives an account of concrete things as sets of point-instants. The sections which follow develop a theory of proper names and a theory of modal and dispositional properties for concrete things.

III

If, as I want to claim, *Goliath* = Lumpl, then how do proper names like '*Goliath*' and 'Lumpl' work? Kripke gives an account of proper names from which it follows that *Goliath* cannot be identical with Lumpl; thus if Kripke's were the only plausible account of proper names, then the claim that *Goliath* = Lumpl would have to be abandoned. In fact, though, accepting that *Goliath* = Lumpl leads to an alternative account of proper names, which, I shall argue, is fully coherent and at least as plausible as Kripke's.

Kripke's account of proper names is roughly this. We in the actual world use proper names both to talk about the actual world and to talk about ways the world might have been. According to Kripke, if a proper name denotes a thing in the actual world, then in talk of non-actual situations, the name, if it denotes at all, simply denotes that same thing. A proper name is a *rigid designator:* it refers to the same thing in talk of any possible world in which that thing exists, and in talk of any other possible world, it refers to nothing in that world (1972, pp. 269–70).

Now if all proper names are rigid designators, then *Goliath* cannot be identical with Lumpl as I have claimed. For suppose they are identical. Call the actual world W_0, and the world as it would be if I had squeezed the clay into a ball W'; then

(i) In W_0, *Goliath* = Lumpl,

but as I have shown,

(ii) In W', *Goliath* $\neq$ Lumpl.

Now if the names '*Goliath*' and 'Lumpl' are both rigid designators, then (i) and (ii) cannot both hold. For suppose (i) is true. Then the names '*Goliath*' and 'Lumpl' both denote the same thing in W_0. Hence if they are both rigid designators, they both denote that thing in every possible world in which it exists, and denote nothing otherwise. Since they each denote something in W', they must therefore both denote the same thing in W', and thus (ii) must be false.

The claim that *Goliath* = Lumpl, then, is incompatible with Kripke's account of proper names. Suppose, then, that *Goliath* is indeed identical with Lumpl; what view of proper names emerges? How, on that supposition, could we decide whether the name '*Goliath*' is a rigid designator? Consider the situation. In the actual world, '*Goliath*' refers to a thing which I made and then broke, which is both a statue and a piece of clay. Hence the name '*Goliath*' is a rigid designator if it refers to that same thing in any possible situation in which the thing exists, and refers to nothing otherwise.

What, though, would constitute "that same thing" if the statue and the piece of clay were different? Take the situation in W': suppose instead of breaking the statue, as I actually did, I had squeezed the clay into a ball. Would that single thing which in fact I made and then broke – which in fact was both a piece of clay and a statue – then be the statue *Goliath* which I squeezed out of existence, or the piece of clay Lumpl which went on existing after I squeezed it?

I can find no sense in the question. To ask meaningfully what that thing would be, we must designate it either as a statue or as a piece of clay. It makes sense to ask what the statue *Goliath* would be in that situation: it would be a statue; likewise, it makes sense to ask what the piece of clay Lumpl would be in that situation: it would be a piece of clay. What that thing would be, though, apart from the way it is designated, is a question without meaning.

A rough theory begins to emerge from all this. If *Goliath* and Lumpl are the same thing, asking what that thing would be in W' apart from the way the thing is designated, makes no sense. Meaningful cross-world identities of such things as statues, it begins to seem, must be identities *qua* something: *qua* statue or *qua* lump,[3] *qua Goliath* or *qua* Lumpl. It makes sense to talk of the "same statue" in different possible worlds, but no sense to talk of the "same thing".

Put more fully, what seems to be happening is this. Proper names like

'*Goliath*' or 'Lumpl' refer to a thing as a thing of a certain kind: 'Goliath' refers to something as a statue; 'Lumpl', as a lump. For each such kind of thing, there is a set of persistence criteria, like the ones I gave for statues and for lumps.[4] In rare cases, at least, one thing will be of two different kinds, with different persistence criteria, and whereas one proper name refers to it as a thing of one kind, another proper name will refer to it as a thing of another kind. In such cases, the identity formed with those names is contingently true. It is true because the two names designate the same thing, which ceases to exist at the same time on both sets of criteria. It is contingent because if the world had gone differently after the thing came into existence, the thing might have ceased to exist at different times on the two sets of criteria: it would have been one thing on one set of persistence criteria, and another thing – perhaps a temporal segment of the first – on the second set of criteria.

If all that is so, it makes no sense to call a designator rigid or non-rigid by itself. A designator may be rigid with respect to a sortal: it may be statue-rigid, as '*Goliath*' is, or it may be lump-rigid, as 'Lumpl' is. A designator, for instance, is *statue-rigid* if it designates the same statue in every possible world in which that statue exists and designates nothing in any other possible world. What is special about proper names like '*Goliath*' and 'Lumpl' is not that they are rigid designators. It is rather that each is rigid with respect to the sortal it invokes. '*Goliath*' refers to its bearer as a statue and is statue-rigid; 'Lumpl' refers to its bearer as a lump and is lump-rigid.

In short, then, if we accept that *Goliath* = Lumpl and examine the situation, a rough theory of proper names emerges. A proper name like '*Goliath*' denotes a thing in the actual world, and invokes a sortal with certain persistence criteria. It then denotes the same thing-of-that-sort in every possible world in which it denotes at all. The name '*Goliath*' itself, for instance, denotes a lump of clay and invokes the sortal *statue*; hence it denotes the same statue in every possible world in which that statue exists.

That leaves two questions unanswered. First, how does a name like '*Goliath*' get its reference in the actual world? Second, what makes a thing in another possible world "the same statue" as the one which in fact I made and then broke? I shall tackle this second question first.

Once I made my statue, that statue existed, and nothing that happened from then on could change the fact that it had existed or the way it had come to exist. It would be that same statue whether I subsequently broke it, squeezed it, or sold it. Its origin, then, makes a statue the statue that it is,

and if statues in different possible worlds have the same beginning, then they are the same statue.

The name '*Goliath*' picks out in W' the one statue which begins in W' like *Goliath* in W_0. Consider the case more fully. The world W' bears an important relation to W_0 and the statue *Goliath* in W_0: W' *branches* from W_0 after *Goliath* begins to exist; that is, until some time after *Goliath* begins to exist in W_0, the histories of W_0 and W' are exactly the same. In the branching world W', then, *Goliath* is the statue which has exactly the same history before the branching as *Goliath* in W_0. The name 'Lumpl' too picks out a thing in W' which begins exactly like the statue *Goliath* in W_0. 'Lumpl', though, picks out, not the unique statue in W' which begins that way, but the unique piece of clay in W' which begins that way. Since that piece of clay in W' is distinct from that statue in W', the two names pick out different things in W' – different things which both start out in the same way.

Here, then, is a theory of reference for the special case of branching possible worlds. Let proper name α denote a thing X in the actual world W_0; the theory will apply to any possible world W which branches from W_0 after X begins to exist in W_0. According to the theory, α not only denotes X in W_0, but also invokes a set C of persistence criteria which X satisfies in W_0. The reference of α in W, then, is the thing in W which has the same history before the branching as X has in W_0 and which satisfies the persistence criteria in set C.

According to the theory, then, the reference of a name in branching world W depends on two things: its reference in the actual world, and the persistence criteria it invokes. The reference of the name in the actual world determines how the thing it denotes in W begins; the persistence criteria it invokes determine which of the various things that begin that way in W the name denotes.

That leaves the problem of possible worlds which do not branch from the actual world, or which branch too early. How to handle reference to things in such obdurate worlds I do not know. Perhaps the best course is to deny that any such reference is possible. The clearest cases of reference by a speaker in one possible world to a thing in another are ones like the clay statue case, where a world branches from the actual one after the thing to which reference is made starts to exist. I am inclined, then, for the sake of clarity, to rule out any other sort of reference to concrete entities in other possible worlds. If, though, a clear criterion which allowed such reference

were devised, that criterion could probably be adopted without much changing the system I am proposing.

There remains the question of how a name gets its reference in the actual world. Its reference in branching worlds, I have said, depends partly on its reference in the actual world. Until we say how a name gets its reference in the actual world, then, even the theory of reference for branching worlds is incomplete. Nothing I have said about the names '*Goliath*' and 'Lumpl' has any direct bearing on the question of reference in the actual world. The account Kripke gives (1972, pp. 298–9) seems plausible to me, and everything I have said in this paper is compatible with it.

On that account, a name gets its reference from a causal chain that connects the person who uses the name with the thing denoted. In my mouth and in the mouth of anyone else who uses the names '*Goliath*' and 'Lumpl', those names denote the actual thing they do because I applied those names to it directly and others got the names from me. Other people, then, are connected to that clay statue by a tradition through which the name was handed down; I am connected more directly, by having perceived the thing and named it.

Persistence criteria play a role in starting the tradition. I named the thing I did by pointing to it and invoking persistence criteria: "I name this statue '*Goliath*'," I said, "and this piece of clay 'Lumpl'." The name '*Goliath*', then, denoted the unique thing at which I was pointing which satisfied the persistence criteria for statues – that is, the unique statue at which I was pointing. Since the same thing satisfied both the criteria for statues and the criteria for pieces of clay, both names denoted the same thing, but if I had invoked different persistence criteria, I might have named a different thing. When I pointed at the statue, I pointed at a number of things of various durations. I pointed, for instance, at the portion of clay which made up the statue. I might have said, "I name the portion of clay which makes up this statue 'Portia'." If I had done so, I would have named a portion of clay which survived the breaking of the statue. Thus when the tradition is started which gives a name a concrete reference in the actual world, the persistence criteria invoked help determine what entity bears that name.

I have given a theory of proper names, and on that theory, it is clear why the identity '*Goliath* = Lumpl' is contingent. It is equally clear, on that theory, why the identity 'Hesperus = Phosphorus' is necessary, in the sense that it holds in any possible world in which Hesperus exists. At least it is

clear if identity of concrete things across possible worlds is confined to branching cases in the way I have described. Both names, 'Hesperus' and 'Phosphorus', invoke the persistence criteria for heavenly bodies. Both refer to Venus. Hence in any possible world W which branches from the actual world after Venus begins to exist, they both refer to the heavenly body in W which starts out in W like Venus in W_0. Both, then, refer to the same thing in W. On the theory here, then, as on Kripke's theory, the identity 'Hesperus = Phosphorus', even though *a posteriori*, is a necessary truth: it would hold in any situation in which Hesperus or Phosphorus existed.

In short, then, if we accept that *Goliath* = Lumpl, the following theory of proper names for concrete objects emerges. The reference of a name in the actual world is fixed partly by invoking a set of persistence criteria which determine what thing it names. The name may then be passed on through a tradition, and the reference is fixed by the origin of that tradition. The name can also be used to refer to a thing in a possible world which branches from the actual world after the thing named in the actual world begins to exist. In that case the name refers to the unique thing in that possible world which both satisfies the persistence criteria the name invokes and starts out exactly like the bearer of the name in the actual world.

IV

Kripke's theory of proper names is incompatible with the theory I have developed, and Kripke gives a number of forceful arguments for his theory. Do any of those arguments tell against the theory here? Let me try to pick out arguments Kripke gives which are germane.

According to the theory here, it makes no sense to call a designator rigid and leave it at that, because it makes no strict sense to call things in different possible worlds identical and leave it at that: identity across possible worlds makes sense only with respect to a sortal. According to Kripke, qualms about identity across possible worlds are unfounded, and plain talk of rigid designators makes perfectly good sense. What Kripke says most directly on this point, however, shows no more than what I have already accepted: that it makes sense to call a designator rigid with respect to a sortal, like *statue, number,* or *man*. "... we can perfectly well talk about rigid and non-rigid designators. Moreover, we have a simple, intuitive test for them. We can say, for example, that the number of planets might have been a different number

from the number it in fact is." The designator 'the number of planets', then, is non-rigid. "If we apply this intuitive test to proper names, such as for example 'Richard Nixon', they would seem intuitively to come out as rigid designators. ... It seems that we cannot say 'Nixon might have been a different man from the man he in fact was,' unless, of course, we mean it metaphorically." (1971, pp. 148–9).

Does it make sense, then, to call a designator "rigid" independently of a sortal it invokes? Kripke's examples here prove no such thing. Nixon indeed could not have been a different *man* from the man he in fact is. That, however, shows only that the designator 'Nixon' is rigid with respect to the sortal *man*, not that it is rigid independntly of any sortal. To show it rigid independently of any sortal, one would have to go beyond what Kripke says in the passage I have quoted, and show that Nixon could not have been a different *entity* from the one he in fact is.

For that purpose, the "simple, intuitive test" Kripke offers will not help. We speak and think of "the same person" but not of "the same entity". The point at issue is how everyday talk of "the same person" best fits into systematic talk of "entities". To this issue, everyday intuitions about entities, if we had them, would be irrelevant: the matter has to be settled by working out rival systems and comparing their implications.

Kripke attacks qualms about cross-world identity in another way: those qualms, he says, may just grow out of a confusion about what possible worlds are. Talk of "possible worlds" suggests that they are like distant planets to be explored. If that were what they were like, I might explore a possible world and discover someone who looked like Benjamin Franklin; I would then have to determine whether it actually was Franklin I had discovered, or just someone who looked like him (1972, p. 268).

Instead, according to Kripke, possible worlds are situations which we stipulate – 'counterfactual situations' may be the best term. What thing is what in a counterfactual situation is not something I find out; it is part of what I stipulate: it is "given in the very description" of the stipulated situation. "And there seems to be no less objection to *stipulating* that we are speaking of certain *people* than there can be to stipulating that we are speaking of certain *qualities*" (1971, p. 148).

Is that so? The statue example seems to provide an objection – an objection, at least, to stipulating that we are speaking of certain *entities*. In that example, a possible situation was stipulated, just as Kripke demands. "For

suppose I had brought Lumpl into existence as *Goliath*, just as I actually did, but before the clay had a chance to dry, I squeezed it into a ball." In this stipulated situation, I showed, there are two distinct things, a statue and a piece of clay. It might be tempting to ask which of the two is the one thing which, in the actual world, I made and then broke. To that question, though, there is no plain answer – or so I argued. Now the problem is not one of understipulation. It is not as if the thing I actually made could appear in two different possible situations in which I squeezed it: in one as a statue that ceased to exist when squeezed, and in another as a piece of clay which persisted after it was squeezed. After I made that thing, I held it in my hands and I could have squeezed it; if I suppose that I did squeeze it, I have stipulated as much about the identities of the things in that supposed situation as can be stipulated. A situation, then, can be fully stipulated even though questions of identity across possible worlds remain unsettled.

Kripke agrees to something like this. "Given certain counterfactual vicissitudes in the history of the molecules of a table, *T*, one may ask whether *T* would exist, in that situation, or whether a certain bunch of molecules, which in that situation would constitute a table, constitute the very same table *T*." Such a conception of 'transworld identification', he says, "differs considerably from the usual one"; for one thing, "the attempted notion deals with criteria of identity of particulars in terms of other particulars, not qualities" – in terms of particular molecules, that is to say (1972, pp. 271–2). This qualification, though, has no bearing on the point in question here. Take a possible world in which I squeeze Lumpl into a ball, and suppose all the molecules involved are clearly identified. There are still two distinct things in that world, the statue *Goliath* which I destroy by squeezing, and the piece of clay Lumpl which survives the squeezing. The question remains, then, which of those two distinct things in that possible world is the single thing which in fact I made and then broke. There is, in short, a genuine problem with cross-world identification – Kripke's arguments notwithstanding.

V

The most prominent objection to contingent identity remains to be tackled: the objection that it violates Leibniz' Law. If *Goliath* is contingently identical with Lumpl, then although

$$\Box(\text{Lumpl exists} \rightarrow \text{Lumpl} = \text{Lumpl}) \quad (4)$$

is true

$$\Box(\text{Lumpl exists} \rightarrow \textit{Goliath} = \text{Lumpl}) \quad (5)$$

is false. Yet (5) is derived from (4) and

$$\textit{Goliath} = \text{Lumpl} \quad (6)$$

by substitutivity of identicals. Thus, the objection goes, Goliath cannot be contingently identical with Lumpl.

The usual answer will serve my purpose here. Leibniz' Law settles very little by itself: put as a general law of substitutivity of identicals, it is just false; in its correct version, it is a law about properties and relations: *If $x = y$, then for any property, if x has it then y has it, and for any relation and any given things, if x stands in that relation to those things, then y stands in that relation to those things.* The law so stated yields substitutivity of identicals only for contexts that attribute properties and relations. (5) follows from (4) and (6) by Leibniz' Law, then, only if the context

$$\Box(\text{Lumpl exists} \rightarrow ____ = \text{Lumpl}) \quad (7)$$

attributes a property. We can block the inference to (5), then, simply by denying that the context (7) attributes a property.

It may seem arbitrary to deny that (7) attributes a property, but whether it does is the very point in question here. A property, if it is to be a property, must apply or not apply to a thing independently of the way the thing is designated. (7) gives a property, then, only if it gives something that is true of Lumpl or false of Lumpl independently of the way Lumpl is designated, and whether it does is the point in question.

The proponent of contingent identity, then, has a reasonable, consistent position open to him – a position that is familiar in the literature on the subject (cf. Quine, 1961, Sec. II). Expressions constructed with modal operators, he can say, simply do not give properties of *concrete things*, such as statues and pieces of clay. Modal expressions do not apply to concrete things independently of the way they are designated. Lumpl, for instance, is the same thing as *Goliath*: it is a clay statue of the infant *Goliath* which I put together and then broke. Necessary identity to Lumpl, though, is not a property which that thing has or lacks, for it makes no sense to ask whether

that thing, as such, is necessarily identical with Lumpl. Modal contexts, then, do not attribute properties or relations to concrete things – so the proponent of contingent identity can respond to Leibniz' Law.

Now this response comes at a stiff price. Quantificational contexts must attribute properties or relations; they must be true or false of things independently of the way those things are designated. If modal contexts do not attribute properties or relations to concrete things, it follows that such contexts are not open to quantification with variables whose values are concrete things. A large number of formulas, then, must be ruled out as ill-formed.

Although, for instance, the sentence

$$\Diamond(\text{Lumpl exists } \& \textit{ Goliath} \neq \text{Lumpl})$$

is well formed, the expression

$$\Diamond(\text{Lumpl exists } \& x \neq \text{Lumpl}) \qquad (8)$$

turns out to be ill-formed – at least, that is, if the variable x can take *Goliath* as a value. Now on the basis of what I have said, that seems reasonable. Take the expression (8), and consider the thing I made and then broke, which is both a statue and a lump. There is no apparent way of saying that (8) is true or false of that thing; it is true of it *qua* statue but not *qua* piece of clay. By that test, the free variable x does not belong in its context in (8) if it takes concrete things like statues and lumps among its values.

Here, then, may be a telling objection to contingent identity: if in order to maintain contingent identity we must restrict quantification so drastically, the objector can argue, we shall be unable to say many of the things we need to say, both in scientific talk and in daily life. Concrete things will have no modal properties: there will, that is, be no such thing as *de re* modality for concrete things. Indeed on some accounts, there will also be problems with dispositions – as I shall later show. Perhaps we can maintain contingent identity only at the cost of tying our tongues, and that, if it is true, might be a strong reason for rejecting contingent identity.

The remainder of my argument for the plausibility of the system I am advocating will concern this issue. I shall give devices which I think will enable us to say anything that we ought seriously to regard as meaningful, and say it in the system I am advocating. What I have to say will center around the system Carnap proposed in *Meaning and Necessity* for quantifying into modal contexts.[5] Carnap's system, I think, is the best one for handling

quantified modal talk of concrete things. In what follows, I shall draw loosely both on Carnap's system and on Aldo Bressan's extension of it (1972) to give ways of saying what we need to say.

Carnap's system has many advantages. It fits my claim that *Goliath* = Lumpl, and it allows variables in any context in which a proper name can appear. Indeed on Carnap's account, variables in modal contexts act almost exactly as proper names do on the account on Section III of this paper. Carnap, in short, gives a clear, consistent theory which fits what I have been saying.

There is, to be sure, a price for all this: Carnap gives a non-standard account of the way predicates and variables behave in modal contexts. The account he gives, though, makes sense, and it departs from the standard account of quantifiers in much the same way as I departed in Section III from the standard account of proper names. It is non-standard, then, in ways that fit nicely the theory in this paper.

Carnap's treatment of variables is suggested by part of Frege's treatment of proper names. According to Frege (1892, p. 59), a proper name in a modal context refers *obliquely*: its reference there is its usual sense. Hence in

$$\Diamond(\text{Lumpl exists} \;\&\; \textit{Goliath} \neq \text{Lumpl}), \tag{9}$$

the name '*Goliath*' refers, not to a statue, but to a statue-concept which is the normal sense of the name. Any other name with that same normal sense could be substituted for '*Goliath*' in (9) without changing its truth-value. This part of Frege's account fits what I have said of proper names, as I shall later illustrate.

Now just as, on Frege's account, proper names shift their reference in modal contexts, on Carnap's account, variables in modal contexts shift their range of values: they range over senses. In the formula

$$\Diamond(\text{Lumpl exists} \;\&\; x \neq \text{Lumpl}),$$

then, x ranges not over concrete things, like statues and pieces of clay, but over what Carnap calls "individual concepts" – including statue-concepts and lump-concepts. Call things of the kind the variables take as values in non-modal contexts *individuals*: an *individual concept* is a function whose domain is a set of possible worlds, and which assigns to each world W in its domain an individual that exists in W.

I spell out what is roughly Carnap's proposal in the appendix; here I give

it by example. Let the individuals in the system be concrete things, like statues and lumps. Let '*E*' in non-modal contexts be the predicate *exists*, and let '*H*' in such contexts be the predicate *is humanoid*, by which I shall mean *is human-shaped throughout its early history*. Then in the formula

$$\Box(Ex \rightarrow Hx), \tag{10}$$

on Carnap's proposal, both the variable and the predicates make a shift. The variable x in (10) now ranges over individual concepts, and the predicates in (10) make compensating shifts as follows: '*E*' now means not *exists*, but rather *is a concept of an individual that exists*. '*H*' now means not *is humanoid*, but rather *is a concept of an individual that is humanoid*. For any possible world W and individual concept f, that is to say, '*H*' in modal contexts is true of f in W if and only if the individual f assigns to W is humanoid in W.[6]

That gives (10) a clear interpretation: the open sentence (10) is true of any individual concept f such that for every world W, if f assigns an individual to W, then f assigns to W an individual that is humanoid in W. In particular, then, (10) is true of the *Goliath*-concept – the individual concept that assigns the statue *Goliath* to each possible world in which that statue exists, and assigns nothing to any other possible world. For *Goliath* in any possible world, according to the theory I have given, is humanoid: in any world in which it exists, it starts out in the shape of the actual *Goliath*, and changes shape only slowly. (10) is false of the Lumpl-concept correspondingly defined, since in possible worlds in which I squeeze Lumpl into a ball, Lumpl loses its human shape during its early history, and thus is not humanoid in the stipulated sense. To such a possible world, then, the Lumpl-concept does not assign an individual which is humanoid.

Variables on this proposal work very much like proper names on my account of them in Section III. Just as on that earlier account,

$$\Box(E\ Goliath \rightarrow H\ Goliath) \tag{11}$$

is true and

$$\Box(E\ \text{Lumpl} \rightarrow H\ \text{Lumpl}) \tag{12}$$

is false, so on the Carnapian account I am now giving, the open sentence $\Box(Ex \rightarrow Hx)$ is true of the *Goliath*-concept and false of the Lumpl-concept.

Indeed just as, on Carnap's account, variables in modal contexts range over individual concepts, so on the account in III, proper names in modal

contexts can be construed as denoting individual concepts. Proper names work, in other words, roughly as Frege claims. Let the name '*Goliath*' in (11), for instance, denote the *Goliath*-concept, and suppose predicates shift in modal contexts as Carnap suggests. Then (11) attributes to the *Goliath*-concept the property

$$\Box(E____ \rightarrow H____),$$

that in every possible world W, if it assigns to W an existing individual, then it assigns to W an individual that is humanoid. The *Goliath*-concept has that property, and so (11) on this construal is true. The Lumpl-concept does not have that property, and so (12) on this construal is false. That is as it should be on the account in Section III. Modal properties can be construed as attributing properties and relations to individual concepts, much as Frege claims.

VI

What happens to identity on this account? Identity of individual concepts x and y is not now expressed as '$x = y$'; that, in modal contexts, means just that x and y are concepts of the same individual. The way to say that x and y are the same individual concept is

$$\Box[(Ex \vee Ey) \rightarrow x = y].$$

I shall abbreviate this '$x \equiv y$'.

It could now be objected that the thesis of contingent identity has collapsed. Identity in the system here, it seems, is given not by '=', but by '$\equiv$', and the relation '$\equiv$' is never contingent: if it holds between two individual concepts, then it holds between them in every possible world. No genuine relation of identity, then, is contingent; the illusion that there are contingent identities came from using the identity sign '=' to mean something other than true identity.

To this objection the following answer can be given. '=' indeed is the identity-sign for individuals in the system, and if I am right that a piece of clay is an individual in the Carnapian sense, then '=' is the identity sign for pieces of clay. For consider: in non-modal contexts, I stipulated, the variables range over individuals. Now '=' in such contexts holds only for identical individuals; it is the relation a piece of clay, for instance, bears to itself and only to itself. Moreover, applied to individuals, '=' satisfies Leibniz' Law:

individuals related by it have the same properties in the strict sense, and stand in the same relations in the strict sense. The contexts where '=' is not an identity-sign are modal contexts, but there the variables range not over individuals, but over individual concepts. '=' in the system, then, is the identity sign for individuals, and according to the system, '=' can hold contingently for individuals: A sentence of the form '$a = b$', then, asserts the identity of two individuals, and it may be contingent.

Quine would object to this answer. It depends on a "curious double interpretation of variables": outside modal contexts they are interpreted as ranging over individuals; inside modal contexts, over individual concepts. "This complicating device," Quine says, "has no essential bearing, and is better put aside" (1961, p. 153). "Since the duality in question is a peculiarity of a special metalinguistic idiom and not of the object-language itself, there is nothing to prevent our examining the object language from the old point of view and asking what the values of its variables are in the old-fashioned non-dual sense of the term" (letter in Carnap, 1947, p. 196). The values in the old-fashioned sense, Quine says, are individual concepts, for '$(\forall x)\, x \equiv x$' is a logical truth, and on "the old point of view", that means that entities between which the relation $\equiv$ fails are distinct entities. In all contexts, then, the values of the variables are individual concepts, and identity is given by '$\equiv$'.

All this can be accepted, however, and the point I have made stands: '=' in the system expresses identity of individuals. '$a = b$', on Quine's interpretation, says that a and b are concepts of the same individual. That amounts to saying that the individual of which a is the concept is identical with the individual of which b is the concept. Even on Quine's interpretation, then, '$a = b$' in effect asserts the identity of individuals, and does so in the most direct way the system allows.

On either Quine's interpretation or Carnap's, then, to assert

$$\textit{Goliath} = \text{Lumpl} \tag{13}$$

is in effect to assert the identity of an individual. For all Carnap's system says, (13) may be ture, though *Goliath* might not have been identical with Lumpl. If (13) is true but contingent, then it seems reasonable to call it a contingent identity. The claim that there are contingent identities in a natural sense, then, is consistent with Carnap's modal system on either Carnap's or Quine's interpretation of values of variables.

VII

One further Quinean objection needs to be answered. I am embracing "essentialism" for individual concepts. Essentialism, if I understand Quine, is the view that necessity properly applies "to the fulfillment of conditions by objects ... apart from special ways of specifying them" (1961, p. 151). Now what I have said, as I shall explain, requires me to reject essentialism for concrete things but accept it for individual concepts. That discriminatory treatment needs to be justified.

First, a more precise definition of essentialism: *Essentialism for* a class of entities U, I shall say, is the claim that for any entity e in U and any condition ϕ which e fulfills, the question of whether e necessarily fulfills ϕ has a definite answer apart from the way e is specified.[7]

Now according to what I have said, essentialism for the class of concrete things is false. In the clay statue example, I said, the same concrete thing fulfills the condition

$$E____ \rightarrow H____$$

necessarily under the specification '*Goliath*' and only contingently under the specification 'Lumpl'; whether that thing, apart from any special designation, necessarily fulfills that condition is a meaningless question.

Essentialism for the class of individual concepts, on the other hand, must be true if Carnap's system is to work. That is so because Carnap's system allows quantification into modal contexts without restriction. For let ϕ be a condition and e an individual concept which fulfills ϕ. Then $\Box\phi x$ is well formed and the variable 'x' ranges over individual concepts, so that e is in the range of 'x'. Thus e either definitely satisfies the formula $\Box\phi x$ or definitely fails to satisfy it. The question of whether e necessarily fulfills ϕ must have a definite answer even apart from the way e is specified. Thus essentialism holds for individual concepts.

Why this discriminatory treatment? Why accept essentialism for individual concepts and reject it for individuals? The point of doing so is this: my arguments against essentialism for concrete things rested not on general logical considerations, but on considerations that apply specifically to concrete things. I argued that it makes no sense to talk of a concrete thing as fulfilling a condition ϕ in every possible world – as fulfilling ϕ necessarily, in other words – apart from its designation. Essentialism, then, is false for

concrete things because apart from a special designation, it is meaningless to talk of the same concrete thing in different possible worlds.

For this last, I had two arguments, both of which apply specifically to concrete things. First I considered the clay statue example, gave reasons for saying that *Goliath* is identical to Lumpl, and showed that the same statue in a different situation would not be the same piece of clay. Second, in Section III, I gave a theory of identity of concrete things across certain possible worlds, according to which such identity made sense only with respect to a kind. These arguments applied only to concrete things.[8]

It makes good sense, on the other hand, to speak of the same individual concept in different possible worlds. An individual concept is just a function which assigns to each possible world in a set an individual in that world. There is no problem of what that function would be in a possible world different from the actual one. Whereas, then, there is no good reason for rejecting essentialism indiscriminately, there are strong grounds for rejecting essentialism for concrete things.

VIII

An objection broached in Section V remains to be tackled. There is, according to the system here, no such thing as *de re* modality for concrete things: in a formula of the form $\Box Fx$, the variable ranges over individual concepts rather than concrete things. Now without *de re* modality for concrete things, the objection goes, our tongues will be tied: we will be left unable to say things that need to be said, both for scientific and for daily purposes.

In fact, though, the system here ties our tongues very little. It allows concrete things to have modal properties of a kind, and those permissible modal properties will do any job that *de re* modalities could reasonably be asked to do. To see how such legitimate modal properties can be constructed, return to the statue example.

According to the theory given here, the concrete thing *Goliath* or Lumpl has neither the property of being essentially humanoid nor the property of being possibly non-humanoid. There is a modal property, though, which it does have: it is essentially humanoid *qua* statue. That can be expressed in the Carnapian system I have given. Let $\mathfrak{S}$ be the predicate "is a statue-rigid individual concept". $\mathfrak{S}$ is intensional, then, in the sense that it applies to individual concepts, so that variables in its scope take individual concepts as

values, just as they do in the scope of a modal operator. The sentence

x is essentially humanoid *qua* statue,

then, means this:

$$(\exists y)[y = x \ \& \ \delta y \ \& \ \Box(Ey \rightarrow Hy)]. \text{[9]} \qquad (14)$$

Here the variable y is free within the scope of a modal operator, and hence ranges over individual concepts; but x occurs only outside the scope of modal operators, and hence ranges over individuals. In '$y = x$', then, the predicate '=' makes a compensating shift of the kind shown in Section V, but only in its left argument. Thus '$y = x$' here means that y is a concept of an individual identical to x – in other words, y is a concept of x. (14), then, says the following: "There is an individual concept y which is a statue-concept, and is a concept of something humanoid in any possible world in which it is a concept of anything." That gives a property which applies to concrete things: only the variable x is free in (14), and since it occurs only outside the scope of modal operators, it ranges over individuals. (14), then, gives a property of the concrete thing Lumpl, a property which we might call 'being essentially humanoid *qua* statue'.

Concrete things, then, in the system given here, have no *de re* modal properties – no properties of the form $\Box F$. They do, however, have modal properties of a more devious kind: modal properties *qua* a sortal. Such properties should serve any purpose for which concrete things really need modal properties.

IX

Dispositional properties raise problems of much the same kind as do modal properties. At least one promising account of dispositions is incompatible with the system given here.

Here is the account. A disposition like solubility is a property which applies to concrete things, and it can be expressed as a counterfactual conditional: 'x is soluble' means "If x were placed in water, then x would dissolve." This counterfactual conditional in turn means something like this: "In the possible world which is, of all those worlds in which x is in water, most like the actual world, x dissolves." [10]

Now this account is incompatible with the system I have given, because it requires identity of concrete things across possible worlds. For without

such cross-world identity, it makes no sense to talk of "the possible world which is, of all those worlds in which x is in water, most like the actual world." For such talk makes sense only if there is a definite set of worlds in which x is in water, and there is such a definite set only if for each possible world, either x is some definite entity in that world – so that it makes definite sense to say that x is in water in that world – or x definitely does not exist in that world. The account of dispositions I have sketched, then, requires identity of concrete things across possible worlds, which on the theory in this paper is meaningless.

The point is perhaps most clear in the statue example. It makes no sense to say of the concrete thing *Goliath,* or Lumpl, that if I squeezed it, it would cease to exist. If I squeezed the statue *Goliath, Goliath* would cease to exist, but if I squeezed the piece of clay Lumpl, Lumpl would go on existing in a different shape. Take, then, the property "If I squeezed x, then x would cease to exist," which I shall write

$$\text{I squeeze } x \mathrel{\Box\!\!\rightarrow} x \text{ ceases to exist.} \tag{15}$$

That is not a property which the single concrete thing, *Goliath* or Lumpl, either has or straightforwardly lacks.

Counterfactual properties, then, have much the same status as modal properties. A concrete thing – a piece of salt, for instance – cannot have the counterfactual property

$$x \text{ is in water} \mathrel{\Box\!\!\rightarrow} x \text{ dissolves,}$$

or as I shall write it,

$$Wx \mathrel{\Box\!\!\rightarrow} Dx. \tag{16}$$

Put more precisely, the point is this: a concrete thing can have no such property if, first, the account of counterfactuals which I have given is correct and, second, identity of concrete things across possible worlds makes no sense. Call a property of the form given in (15) and (16) a *straightforward counterfactual property*; then on the theories I have given, concrete things can have no straightforward counterfactual properties.

Individual concepts, in contrast, can perfectly well have straightforward counterfactual properties, since they raise no problems of identity across possible worlds. Indeed we can treat the connective '$\Box\!\!\rightarrow$' as inducing the same shifts as do modal operators: making the variables in its scope range over individual concepts, and shifting the predicates appropriately. On that

interpretation, (15) is true of the *Goliath*-concept but false of the Lumpl-concept; (15) says, "In the possible world which, of all those worlds in which I squeeze the thing picked out by concept x, is most like the actual world, the thing picked out by x ceases to exist." That holds of the *Goliath*-concept but not of the Lumpl-concept. Likewise on this interpretation, (16) is true not of a piece of salt, but of a piece-of-salt individual concept. (16) now says the following: "In the possible world which is, of all those worlds in which the thing picked out by x is in water, most like the actual world, the thing picked out by x dissolves."

So far the situation is grave. The moral seems to be this: concrete things have no dispositional properties, but individual concepts do. Water-solubility, or something like it, may be a property of a piece-of-salt individual concept, but it cannot be a property of the concrete thing, that piece of salt. That is a sad way to leave the matter. On close examination, many seeming properties look covertly dispositional – mass and electric charge are prime examples. Strip concrete things of their dispositional properties and they may have few properties left.

Fortunately, though, individuals do turn out to have dispositional properties of a kind. The device used for modal properties in the last section works here too. A concrete thing like a piece of salt cannot, it is true, have the straightforward counterfactual property $Wx \boxrightarrow Dx$. Only an individual concept could have that property. A piece of salt does, though, have the more devious counterfactual property given by "*Qua* piece of salt, if x were in water then x would dissolve," which I shall write

$$(x \textit{ qua } \text{piece})[Wx \boxrightarrow Dx]. \tag{17}$$

This expands as follows: let $\mathcal{P}$ mean "is a piece-rigid individual concept"; then (17) means

$$(\exists y)[y = x \,\&\, \mathcal{P}y \,\&\, (Wy \boxrightarrow Dy)]. \tag{18}$$

As in the corresponding formula (14) for modal properties, 'x' here is free of modal entanglements, and so it ranges over concrete things. (18) seems a good way to interpret water solubility as a property of pieces of salt.

Concrete things, then, can have dispositional properties. The dispositional property *is water-soluble* is not the straightforward counterfactual property given by (16), but the more devious counterfactual property given by (18). A system with contingent identity can still allow dispositions to be genuine properties of concrete things.

X

From the claim that *Goliath* = Lumpl, I think I have shown, there emerges a coherent system which stands up to objections. Why accept this system? In Section II, I gave one main reason: the system lets concrete things be made up in a simple way from entities that appear in fundamental physics. It thus gives us machinery for putting into one coherent system both our beliefs about the fundamental constitution of the world and our everyday picture of concrete things.

Another important reason for accepting the system is one of economy. I think I have shown how to get along without *de re* modality for concrete things and still say what needs to be said about them. That may be especially helpful when we deal with causal necessity; indeed the advantages of doing without *de re* causal necessity go far beyond mere economy. What I have said in this paper about plain necessity applies equally well to causal necessity, and the notion of causal necessity seems especially unobjectionable – even Quine thinks it may be legitimate. (See Quine, 1961, pp. 158–9.) Causally necessary truths are what scientists are looking for when they look for fundamental scientific laws, and it surely makes sense to look for fundamental scientific laws. Now we might expect fundamental scientific laws to take the form $\Box_c\phi$, "It is causally necessary that ϕ," where ϕ is extensional – contains no modal operators. If so, then scientific laws contain *de dicto* causal necessity, but no *de re* necessity. To get significant *de re* causal necessities, we would need to make metaphysical assumptions with no grounding in scientific law. If we can get along without *de re* physical necessity, that will keep puzzling metaphysical questions about essential properties out of physics. The system here shows how to do that.

None of the reasons I have given in favor of the system here are conclusive. The system has to be judged as a whole: it is coherent and withstands objections; the remaining question is whether it is superior to its rivals. What, then, are the alternatives?

Kripke gives an alternative formal semantics (1963), but no systematic directions for applying it. To use Kripke's semantics, one needs extensive intuitions that certain properties are essential and others accidental. Kripke makes no attempt to say how concrete things might appear in a theory of fundamental physics; whether such an account can be given in Kripke's system remains to be seen.

One other alternative to the theory in this paper is systematic: statues

and pieces of clay can be taken, not to be "individuals" in the Carnapian sense of the term which I have been using, but to be Carnapian "individual concepts". They may be regarded, that is, as functions from possible worlds, whose values are Carnapian individuals. (See Thomason and Stalnaker, 1968). On such a view, a Carnapian individual would be regarded as a sort of "proto-individual" from which concrete things are constructed.

Such a view has its advantages: it allows standard quantification theory, with no Carnapian shift of the range of variables in modal contexts. Indeed as Quine points out, a Carnapian semantics can be interpreted so that variables always range over individual concepts. (Letter in Carnap, 1947, p. 196.)

One reason for preferring the Carnapian system is this. I expect that the variables used in expressing fundamental laws can most simply be interpreted as ranging over Carnapian individuals. If so, then I would be reluctant to regard those Carnapian individuals as mere proto-individuals, with genuine individuals as functions which take these proto-individuals as values at possible worlds. Fundamental physics, I would like to say, deals with genuine individuals.

If the system I have given is accepted, the ramifications are wide. Take just one example: the question of whether a person is identical with his body. If there is no consciousness after death, then, it would seem, a person ceases to exist when he dies. A person's body normally goes on existing after he dies. Ordinarily, then, a person is not identical with his body. In some cases, however, a person's body is destroyed when he dies. In such cases, according to the system in this paper, there is no purely logical reason against saying the following: the person in this case is identical with his body, but had he died a normal death, he would have been distinct from his body. If there are reasons against such a view, they must be non-logical reasons.

Whether or not the system I have advocated is the best one, I have at least done the following. First, I have shown that there is a problem with identity across possible worlds, even in the simple case of possible worlds which branch after the entity in question begins to exist. In such cases, I have shown, certain assumptions, not easily refuted, lead to contingent identity. Second, I have given a theory of proper names which fits much of what Kripke says about proper names when he considers examples, and which, in rare cases, allows contingent identity. Finally, I have shown how, while accepting contingent identity and rejecting *de re* modality for concrete

things, we can still allow concrete things to have modal and dispositional properties.

The system I advocate is worked out in more detail in the Appendix. In that system, I think, concrete things and possible worlds lose some of their mystery: they arise naturally from a systematic picture of the physical world.

APPENDIX

The goal of this appendix is to construct a semantics which will explain such expressions as "x in world W is necessarily humanoid *qua* statue" as used in this paper. The rough motivations for the semantics are these. A fundamental physical theory can be interpreted as giving a metaphysics, which says what sorts of fundamental entities, or "elements", there are, and what fundamental relations may hold among them. (I use 'relation' here in a broad sense that includes properties.) The elements, for example, might be point-instants or particle-instants, and the fundamental relations might include distance, time-order (or causal accessibility), mass density, electromagnetic field, and the like. I suppose the following. (a) A concrete thing, or "entity", is a set of elements. (b) All relations depend on fundamental relations: for any relation, whether it holds among given entities is fixed by which fundamental relations hold among which elements in the universe. (c) A relation *internal* to an entity is a relation whose holding depends on which fundamental relations hold among the various elements in that entity.

A model structure for the system will consist of the following. (1) A non-empty set D, called the domain of *elements*. A subset of D is called an *entity*; an entity, then, is a set of elements. I shall identify each element x with the entity $\{x\}$; an element, then, is an entity of a special kind (cf. Quine, 1963, p. 31). (2) A transitive reflexive relation $\leqslant$ on D. It should be thought of as a time relation, "is before or simultaneous with", or in special relativity, as a relation of causal accessibility. Besides transitivity and reflexivity, we might, in order to model a specific physical theory, want to impose additional restrictions on the relation $\leqslant$. (3) A non-empty set $\mathfrak{W}$, to be read eventually as the set of all possible worlds. (4) A sequence $\mathsf{R} = \mathfrak{R}_1, \mathfrak{R}_2, \ldots$ characterized as follows. An *n-place relation* is a function F whose domain is $\mathfrak{W}$ and whose values are sets of n-tuples of entities. A one-place relation is called a property, where a 1-tuple is defined simply as the individual x. For each n, $\mathfrak{R}_n$ is a set of n-place relations among elements, and a member of $\mathfrak{R}_n$ is

called a *fundamental relation*. We postulate that $\leqslant$ is a fundamental relation; that is, that one fundamental relation assigns the extension of $\leqslant$ to every possible world.

A *qualitative temporal-modal model structure,* or *QTM structure,* will be defined by first defining a "*proto-QTM structure*". A *proto-QTM structure* is an ordered 4-tuple $\langle D, \leqslant, \mathfrak{W}, \mathfrak{R} \rangle$ which satisfies the above conditions.

Next, some matters of notation. Variables x, y, and z will be used for elements; X, Y, and Z for entities. Variables j and k will be used for members of $\mathfrak{W}$. When used as superscripts, they will indicate ordered pairs on the pattern $X^k = \langle X, k \rangle$; when used as subscripts, they will indicate the value of a function, on the pattern $F_k = F(k)$.

Given a proto-QTM structure, a relation of exact internal similarity is defined as follows. An isomorphism under R between X^j and Y^k is a relation $::$ between elements which maps the set X one-to-one onto the set Y and meets this condition: For any n-place fundamental relation F, and for any n-tuple $\langle x_1, \ldots, x_n \rangle$ of elements of X and n-tuple $\langle y_1, \ldots, y_n \rangle$ of elements of Y such that $x_1 :: y_1, \ldots, x_n :: y_n$, we have

$$\langle X_1, \ldots, X_n \rangle \in F_j \text{ iff } \langle Y_1, \ldots, Y_n \rangle \in F_k.$$

We shall write $X^j \approx Y^k$ iff there is an isomorphism under R between X^j and Y^k. This should be read as saying that X in j is *internally exactly similar* to Y in $k-$ or *exactly like.*

As things stand, members of $\mathfrak{W}$ cannot be treated as possible worlds, but only as specifications of possible worlds: j and k might be distinct and yet be just different specifications of the same possible world. That would be the case if the entire domain D were exactly alike in j and k – if $D^j \approx D^k$. One way out of this problem would be to define a possible world as a maximal subset $\mathfrak{W}'$ of $\mathfrak{W}$ such that whenever $j \in \mathfrak{W}'$ and $k \in \mathfrak{W}'$, then $D^j \approx D^k$. Later definitions will be more simple, however, if we merely represent each possible world by a single specification: if we allow in $\mathfrak{W}$ just one specification of each possible world. That will be accomplished if the following condition is satisfied.

Condition of Unique Specification: For all j and k in $\mathfrak{W}$, $D^j \approx D^k$ iff $j = k$.

A *QTM structure* is a proto-QTM structure which satisfies the Condition of Unique Specification.

We are now in a position to construct a notion that approximates identity across possible worlds with respect to a property. The *past* $\mathcal{P}x$ of an element

x is the entity $\{y : y \leqslant x\}$. A "past" of an entity will be defined to include the combined past of the elements at the beginning of its existence.

DEFINITION. Z is *a past of* X iff

(i) Z is hereditary under $\leqslant$; that is,

$$\forall z\, \forall y (z \in Z \,\&\, y \leqslant z \rightarrow y \in Z).$$

(ii) For every element $x \in X$, $\mathcal{P}x \cap X \cap Z$ is non-empty.

This will be written $Z \lessdot X$.

Entities in two possible worlds will be "F-counterparts" if they have property F in their respective worlds and pasts which are exactly alike.

DEFINITION. X in j is an *F-counterpart of Y in k* iff $X \in F_j$, $Y \in F_k$, and there are pasts X_0 of X and Y_0 of Y such that there is an isomorphism under $\mathfrak{R}$ between X_0 and Y_0 which is also an isomorphism between $X \cap X_0$ and $Y \cap Y_0$. This will be written $X^j = {}_F Y^k$.

An *individual concept* c is a function whose domain is a subset of $\mathfrak{C}$ and whose values are entities.

DEFINITION. Individual concept c is *rigid with respect to* property F iff for any k in the domain of c and for any i,

(1) $c_k \in F_k$,

(2) If j is in the domain of c, then $c_j^j = {}_F c_k^k$,

(3) If j is not in the domain of c, then there is no Y such that $Y^j = {}_F c_k^k$.

Given a QTM structure, we now construct a Carnapian modal language with an additional special feature. Let ϕ be a wff with free variable α, so that ϕ can be said to ascribe a property F to α. Then $(\alpha * \phi)$ will be a one-place predicate which is true of those individual concepts which are rigid with respect to F. It can be read informally, then, as "is rigid with respect to the property which ϕ ascribes to α." For example, let S be "is a statue"; H, "is humanoid"; and let l be Lumpl. Then '$(y*Sy)$' means "is statue-rigid", and

$$\forall x [x = l \,\&\, (y*Sy)x \rightarrow \Box(Ex \rightarrow Hx)]$$

means that any statue-rigid concept of Lumpl is necessarily, if a concept of anyting at all, a concept of something humanoid. Indeed that, as I shall explain, is how I shall gloss "Lumpl is essentially humanoid *qua* statue." The construction of this language $\mathfrak{L}$ goes as follows.

The syntax of $\mathfrak{L}$ is that of a predicate calculus with two additions, '$\Box$' and '*'. 'E' is a one-place predicate (for *exists*), and '=' and '$\subseteq$' are two-place predicates. If ϕ is a wff, then $\Box\phi$ is a wff. The use of '*' is peculiar to the system. Let α be a variable and ψ a wff. α is *extensional* in ψ iff α does not occur free in ψ within the scope of '$\Box$', within a predicate containing '*', or within the scope of a predicate containing '*'. Then where α is extensional in ψ, $(\alpha^*\psi)$ is a one-place predicate in which α is bound. All other variables free in ψ are free in $(\alpha^*\psi)$. Where π is a predicate, $(\alpha^*\pi\alpha)$ will be abbreviated π^*.

A *value-assignment* $\mathfrak{V}$ is a function which assigns (i) an n-place relation to each *ordinary predicate* -- predicate other than 'E', '=', and '$\subseteq$' and the *-constructions, (ii) an individual concept to each individual constant in $\mathfrak{L}$, and to each member of a set $\mathfrak{X}$ of variables in $\mathfrak{L}$. If the set $\mathfrak{X}$ is empty, then $\mathfrak{V}$ is called an *interpretation*. Where α is a variable, the *α/c variant* of $\mathfrak{V}$ is a value assignment $\mathfrak{V}'$ such that $\mathfrak{V}'\alpha = c$ and for every term or predicate $\gamma \neq \alpha$, if $\mathfrak{V}\gamma$ is defined, then $\mathfrak{V}'\gamma = \mathfrak{V}\gamma$, and otherwise, $\mathfrak{V}'\gamma$ is undefined. The α/c variant of $\mathfrak{V}$ will be written $\mathfrak{V}\alpha/c$.

The truth-conditions for locutions without the sign '*' are the natural ones.

1. An atomic wff $\pi\alpha_1 \ldots \alpha_n$ is not true in k for $\mathfrak{V}$ if for any term α_i in the wff, α_i is not in the domain of $\mathfrak{V}$ or k is not in the domain of $\mathfrak{V}\alpha_i$. Otherwise:
   (a) $E\alpha$ is true in k for $\mathfrak{V}$.
   (b) $\alpha = \beta$ is true in k for $\mathfrak{V}$ iff $(\mathfrak{V}\alpha)k = (\mathfrak{V}\beta)k$.
   (c) $\alpha \subseteq \beta$ is true in k for $\mathfrak{V}$ iff $(\mathfrak{V}\alpha)k \subseteq (\mathfrak{V}\beta)k$.
   (d) Where π is any other atomic n-place predicate, $\pi\alpha_1 \ldots \alpha_n$ is true in k for $\mathfrak{V}$ iff
   $\langle(\mathfrak{V}\alpha_1)k, \ldots, (\mathfrak{V}\alpha_n)k\rangle \in (\mathfrak{V}\pi)k$.
2. $\sim\phi$ is true in k for $\mathfrak{V}$ iff ϕ is not true in k for $\mathfrak{V}$, and $\phi_1 \vee \phi_2$ is true in k for $\mathfrak{V}$ iff ϕ_1 is true in k for $\mathfrak{V}$ or ϕ_2 is true in k for $\mathfrak{V}$.
3. $(\forall x)\phi$ is true in k for $\mathfrak{V}$ iff for every individual concept c, ϕ is true in k for $\mathfrak{V}\alpha/c$.
4. $\Box\phi$ is true in k for $\mathfrak{V}$ iff ϕ is true in every j for $\mathfrak{V}$.

The truth conditions for expressions with '*' are specified as follows. Where α is extensional in ψ, the *property ascribed by ψ to α for* $\mathfrak{V}$ is the function which assigns to each possible world k the set of all entities X for which the following holds: for some individual concept c, $X = c_k$ and ψ is

true in k for $\mathcal{O}\,\alpha/c$. This will be written $\mathfrak{Prop}\ \mathcal{O} : \psi/\alpha$. Then $(\alpha*\psi)\beta$ is true in k for $\mathcal{O}$ iff the individual concept $\mathcal{O}\beta$ is rigid with respect to $\mathfrak{Prop}\ \mathcal{O} : \psi/\alpha$.

The logic of $\mathfrak{L}$, it would seem, will be S5 with the Barcan formula and its converse, plus certain axioms concerning $=$, $\subseteq$, E, and $*$. What follows is not a report of results obtained, but what I expect to be true of the system. Consider first the symbol '$*$'. Closures of wffs on the following schemas will be valid. First, an individual concept which is rigid with respect to a property is always a concept of an entity with that property, if of anything at all.

$$(\alpha*\psi)\alpha \rightarrow \Box(E\alpha \rightarrow \psi), \qquad \text{(Ax.S.1)}$$

where α is extensional in ψ. Where ψ is $\pi\alpha$, this becomes

$$\pi*\alpha \rightarrow \Box(E\alpha \rightarrow \pi\alpha).$$

Second, if an entity has a given property, then it falls under an individual concept which is rigid with respect to that property.

$$\psi \rightarrow \exists\,\beta[\beta = \alpha\ \&\ (\alpha*\psi)\beta], \qquad \text{(Ax.S.2)}$$

where α and β are distinct variables, α is extensional in ψ, and β is not free in ψ. Where ψ is $\pi\alpha$, this becomes

$$\pi\alpha \rightarrow \exists\,\beta[\beta = \alpha\ \&\ \pi*\beta].$$

Identity of individual concepts α and β will be given by

$$\Box(E\alpha \vee E\beta \rightarrow \alpha = \beta),$$

and this will be written $x \equiv y$. The closures of wffs on the pattern of Leibniz' Law will be valid for extensional contexts. We will have, that is, the closure of

$$\alpha = \beta \rightarrow (\psi \rightarrow \phi),$$

where ϕ is obtained from ψ by substituting free occurrences of β for free occurrences of α in positions where α is extensional in ψ. The closures of wffs on the pattern of Leibniz' Law for $\equiv$ will be valid. That is,

$$\alpha \equiv \beta \rightarrow (\psi \leftrightarrow \phi)$$

wherever ϕ is obtained from ψ by substitution of free occurrences of β for free occurrences of α.

Now to explain such terms as '*qua*', 'essentially', and 'sortal'. Take first sortal properties: there is no guarantee as matters stand that a thing which has property F falls under exactly one individual concept that is rigid with

respect to F; that will be so, indeed, for very few properties F. A strict sortal will be a predicate for which there is such a guarantee: predicate π is a *strict sortal* under interpretation $\mathcal{O}$ iff

$$\Box\forall x\forall y\,(\pi{*}x \,\&\, \pi{*}y \rightarrow x \equiv y \vee \Box x \neq y)$$

is true under $\mathcal{O}$ for some k (or equivalently, for all k). In roughly Bressan's language (1972, p. 94), π is a strict sortal iff $\pi*$ is a quasi-absolute concept.

Probably most everday sortals like 'statue' and 'lump' are not strict sortals in this sense. Consider a possible world k which is radially symmetrical until a time t. In k, distinct statues may well have exactly like pasts. Take a statue X in k, away from the axis of symmetry, which comes into existence before t; X has a twin X' in k across the axis of symmetry, with an exactly like past. Now let j branch from k at or after t; then two statues in j will each equally well be statue-counterparts in j of X in k. 'Statue', then, is not a strict sortal.

'Statue', though, is well behaved in another respect: it divides its reference, in the sense that necessarily, no two things which fall under it overlap. That is enough to guarantee that there will be multiple statue-counterparts only in strange cases of symmetry. π is a predicate of divided reference under interpretation $\mathcal{O}$ iff

$$\Box\forall x\forall y\,[\pi x \,\&\, \pi y \rightarrow x \text{ disjoint from } y]$$

is true under $\mathcal{O}$, where 'x disjoint from y' abbreviates

$$\forall z_1\forall z_2\,[z_1 \subseteq x \,\&\, z_2 \subseteq x \,\&\, z_1 \subseteq y \,\&\, z_2 \subseteq y \rightarrow z_1 = z_2].$$

(That is, only the empty set is a subset of both). The predicate $\pi*$, I suspect, will be useful when and only when π is a predicate of divided reference.

Now for the use of '*qua*'. It is an abbreviation of a device for giving extensional modal properties. Tag a wff with $[\alpha\ qua\ \pi]$ where π is a one-place predicate, and the expansion will be as follows.

$$\ldots x \ldots\ [x\ qua\ \pi]$$

abbreviates

$$\pi x \,\&\, \forall y\,[y = x \,\&\, \pi{*}y \rightarrow \ldots y \ldots].$$

For example,

$$\Box(Ex \rightarrow Hx)\,[x\ qua\ S]$$

abbreviates

$$Sx \,\&\, \forall y\,[y = x \,\&\, S{*}y \rightarrow \Box(Ey \rightarrow Hy)];$$

that is, x is a statue, and any statue-rigid concept of x is necessarily, if a concept of anything, a concept of something humanoid. This ascribes an extensional property to x, which I shall call the property of being *essentially* humanoid *qua* statue.

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NOTES

[1] I am grateful for the comments and criticisms of many people. I was helped in the early stages of revision by discussion at the University of Pittsburgh philosophy colloquium, by the written comments of Richard Gale and Paul Teller, and by discussion with Allen Hazen, Robert Kraut, and Storrs McCall. I am especially grateful to Anil Gupta for his extensive help, both in the early and the late stages of revision.

[2] This fits the view put forth in Quine, 1950, Sec. 1.

[3] David Lewis (1971) gives a theory very much like this. There are, according to Lewis, a diversity of counterpart relations which hold between entities in different possible worlds – the "personal" counterpart relation and the "bodily" counterpart relation are two (p. 208). The counterpart relation appropriate to a given modal context may be selected by a term, such as 'I' or 'my body', or it may be selected by a phrase, "regarded as a ___", which works like one of my "qua" phrases. In these respects, then, my theory fits Lewis's. In other respects, it differs. My relation of being an F-counterpart (see the Appendix) is an equivalence relation, and it holds between any two entities in different worlds which are both F's and which share a common past. Lewis's counterpart relations "are a matter of overall resemblance in a variety of respects" (p. 208), and are not equivalence relations (p. 209).

[4] Geach (1962, Sec. 34) contends that a proper name conveys a "nominal essence" – "requirements as to identity" that can be expressed by a common noun. The name 'Thames', for instance, conveys the nominal essence expressed by the common noun 'river'. In this respect, my theory follows Geach's. Geach, however, (Sec. 31) thinks that even in the actual world, identity makes no sense except with respect to a general term. According to the theory in this paper, non-relative identity makes sense in talk of any one possible world; it is only cross-world identity that must be made relative to a sortal.

[5] See especially Carnap, 1947, Sec. 41. I shall not follow Carnap in detail, nor, for the most part, shall I try to say in what precise ways I follow him and in what ways I deviate from what he says.

[6] The talk of "shifts" here is not Carnap's; it is part of my own informal reading of Carnap's semantics. Carnap does think "that individual variables in modal sentences . . . must be interpreted as referring, not to individuals, but to individual concepts" (1947, p. 180). He does not, however, allow variables to shift their ranges of values within a single language. Rather, he constructs two languages, a non-modal language S_1 in which variables range over individuals, and a modal language S_2 in which variables range over individual concepts. Any sentence of S_1 is a sentence of S_2, and is its own translation into S_2. (See pp. 200–202.) The semantics I give in the Appendix is roughly that of Carnap's S_2. (See Carnap, 1947, pp. 183–4). Variables in the Appendix always range over individual concepts; hence they never explicitly shift *to* a range of individual concepts from a range of individuals. In informal discussion in the body of this paper, though, I take a variable to range over individuals whenever such an interpretation is possible. That means I take the values of a variable to be individuals whenever the variable occurs in a formula *extensionally*, in the sense defined in the Appendix.

Carnap does not talk of predicates' shifting in the way I describe, but once variables are taken to range over individual concepts, such a reinterpretation of predicates allows a straightforward reading of Carnap's semantics. Quine discusses this point in his letter to Carnap (Carnap, 1947, p. 197).

[7] For other characterizations of essentialism, see Parsons, 1969, Sec. II.

[8] Quine objects to essentialism even for abstract entities. "Essentialism," he writes, "is abruptly at variance with the idea, favored by Carnap, Lewis, and others, of explaining necessity by analyticity" (1961, p. 155). That, however, cannot be true: Carnap does explain his system in terms of analyticity, and his system involves essentialism, as I have explained. Carnap's system is thus a counterexample to Quine's claim; it shows that one can consistently both accept essentialism for individual concepts and explain necessity by analyticity.

[9] Anil Gupta has shown me a formula similar to this one, which he attributes to Nuel Belnap.

[10] See Stalnaker (1968) and Stalnaker and Thomason (1970). For a somewhat different theory which raises similar problems, see Lewis (1973).

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