

**REALISM UNREALIZED**

**A Critique of Possible World Theory**

**Freya Mathews**



### ABSTRACT

The semantical theories developed for modal logic have brought into focus a certain metaphysical problem, viz the problem of the metaphysical status of the possible individuals and possible worlds which are deployed in the semantical theory. Are these entities mind-independent or mind-dependent? This is the problem of realism vs non-realism with respect to possibility. In this thesis it is claimed that of these two ontological views, it is the realist view which is endorsed by common-sense. It is then argued that this realist view is false. Both epistemological and ontological arguments contribute to this critique, which occupies Chapters 3, 4, 5. Arguments against the realisability, from either a realist or nonrealist viewpoint, of the specific possible world apparatus envisaged by the semantical theory, are also submitted, in Chapter 2. Following the criticism of the realist view, an alternative, nonrealist view of possibility is outlined. According to this view, possibility is a mode, not of objects, but of concepts. The possibility of a concept is analyzed as being equivalent to the intelligibility of that concept, where specific criteria for intelligibility are then advanced. This nonrealist view prescribes the elimination from our discourse of certain forms of modal sentence e.g. counterfactuals. An explanation for the existence and persistence of such eliminable sentence-forms in our language is offered. From the vantage point of the nonrealist view, a survey is undertaken of some of the connections between different theories of possibility and different theories of space and time and identity.

Realist and constructivist theories of existence in general are also compared. Finally a theory of natural laws consistent with the nonrealist theory of modality is proposed. This theory seeks to explicate and justify the necessity of physical laws without appealing to a realist notion of necessity.





TABLE of CONTENTS

|    |   |     |
|----|---|-----|
| 1. | The Concept of Possibility  | 5   |
| 2. | Transworld Identity : Objections to Possible World Theory                 | 35  |
| 3. | Possibilia as Noumena : Epistemological Objections to Basic Modal Realism | 78  |
| 4. | Possibilia : Abstract or Particular ?                                     | 108 |
| 5. | The Problem of Actuality  | 132 |
| 6. | Outline for a Nonrealist Theory of Possibility                            | 161 |
| 7. | The Problem of Natural Laws   | 235 |
|    | Bibliography  | 278 |

The Concept of Possibility

In any treatise on metaphysics, many of the key concepts involved are going to be ones which have seen long and extremely varied service in the history of philosophy. With the key terms thus weighed down with wide and often conflicting connotations accreted over many centuries, little advance can be made in any new investigation into metaphysical problems. I therefore propose to preface this first chapter with a set of terminological guidelines - guidelines for the systematic usage of the key ontological terms that will be encountered in this thesis. These guidelines are not intended to serve as definitions. They are simply meant to provide an outline of the relationships assumed here to hold between the terms. The system thus outlined constitutes a set of ontological theses. No attempt will be made to justify these theses here. Such justification is a long-term affair, which will proceed throughout the thesis. Where I am not actively engaged in defending these theses, I shall retain the terminological usage which embodies, or anticipates, them. This will ensure consistent usage throughout, where such consistency is of course a necessary condition for the verifiability of the arguments.

The key ontological terms I am here concerned with are the following: "actual", "possible", "physical", "concrete", "abstract", "real", "ideal", "platonic".

The term "actual" applies to all and only the contents of our world - physical entities, including both material entities, and non material entities, such as fields, if the latter sort of entity is presumed to exist, and minds and their contents, if these are not already ~~not~~ exhaustively identified with physical structures and

processes. Obviously 'actual' does not apply to merely possible entities. Nor shall we here allow it to be used to apply to mathematical or other abstract entities.

The term 'possible' applies to non-actual physical objects and non-actual minds and their contents. It will not be used here to apply to mathematical or other abstract entities. Unless the contrary is stated, 'possible' will always be understood to mean 'merely possible' i.e. non-actual.

'Physical' applies to entities (or stuffs) which have empirical properties, or which can give rise to empirical properties in other physical entities (e.g. elementary particles may not be themselves observable, but they can have observable effects on bodies or structures which are observable; for example, they leave paths in cloud chambers). Here I am concerned mainly merely to contrast 'physical' with 'mental'. Both actual and possible entities may be physical. So may they be mental. Abstract entities however are clearly not physical.

'Concrete' applies to the physical contents of our world - and hence to brains, though not to (actual) minds and their (actual) contents if any form of mind/brain dualism is assumed. However the main point of introducing the notion of concreteness here is to use it to characterise actual physical entities in contrast to possible ones. Concreteness is exclusively a property of actual things, according to our proposed usage. It will not be considered correct to characterise possible physical objects as possibly concrete. To say of something that it is possibly concrete would be relevantly similar to saying of it that it is possibly actual.

It adds nothing to say of something that is possible that it is possibly actual. Worse, it invites conflation of the very notions the modal terms are being introduced to distinguish. We shall return to this question later.\* For the time being, let me just exclude the expressions 'possibly actual', and, for similar reasons, 'possibly concrete'.

Concrete entities are contrasted not only with possible entities, but also with abstract entities.

'Abstract' applies primarily to set theoretical entities and to all the entities which may be defined over sets e.g. mathematical entities, and, when set theoretical entities are conjoined with empirical concepts, universals. Other entities which may be abstract are propositions, theories. I shall leave it an open question for the time being whether abstract entities are real, and whether possible entities are abstract.

'Real' applies to whatever has mind-independent existence. To have mind-independent existence is to be such that one's existence does not consist in one's being thought of by a conscious being, although it is consistent with having such existence that one is, in addition, thought of by such a being.

The class of real entities will include actual physical objects. On the realist view of possibility - shortly to be presented - it will include possible entities. On a platonistic view of abstract entities, it will also include abstract entities. Minds, however, present a problem case vis a vis the category of the real. Both

---

\* Ch. 5

actual and, assuming realism with respect to possibility, possible, minds can be construed as being real i.e. as having mind-independent existence, in the sense that they do not exist by virtue of being thought of, either by themselves or by other minds. The status of the products of actual and possible minds, e.g. ideas, emotions, etc., would however, on this view of what it means to be real, be unequivocally unreal. Yet this will conflict with the claim that whatever is actual or, given a realist view of possibility, possible, is real, for while ideas, emotions, etc., may be actual or possible, they may not be real. This apparent contradiction is tolerable so long as we remember that it dissolves on explication. For our purpose, here, in introducing the term 'real' is to distinguish what exists independently of us from what exists as a result of our thought. Hence although, on the realist view of possibility, possible minds and hence their contents are real, they are so in the sense that they exist independently of our minds i.e. of any actual minds. But although we can say that the products of possible minds have reality in this sense i.e. relatively to actual minds, they do not have reality relative to the possible minds of which they are the contents, since in their own worlds they do exist only in virtue of being thought of. Similarly our own ideas cannot be said to have reality in our world, despite the reality of our minds and our world. As I have remarked, this paradox generated by our terminology signals no corresponding paradox at the ontological level. At the terminological level, we still have the blanket term 'exists' to cover everything that is either real or a product of an actual or possible mind.

'Ideal' may be used to characterise both abstract and possible entities, in contrast to actual entities - or perhaps, more narrowly, if we assume mind/brain dualism, to concrete entities. But 'ideal' is a highly unsatisfactory term, because it admits both realist and subjective or nonrealist interpretations. For while it connotes a nonconcrete mode of existence which may variously be attributed to ideas, minds, physical objects, abstract entities (e.g. numbers) and possible entities, this nonconcrete mode may be construed as either mind-dependent or mind-independent. In the case of ideas, the ideality attributed to them is usually subjectivist. But in the case of all the other items just cited, the attribution of ideality to them does not in itself determine whether their status is real or mind-dependent. In general I think ideality is associated with subjective idealism, but forms of nonsubjective idealism e.g. classical Platonism have also been developed. I will therefore avoid this term, with its crucial ambivalence.

'Platonic' is the term I shall employ as the unambiguous substitute for 'ideal'. I take 'platonic' to connote a nonconcrete but real mode of existence. It may therefore be applied to possible or abstract entities, on realist interpretations of either, but never to actual physical objects or actual minds and their contents.

### The Two Realisms

The realism with which this thesis is concerned is, as the title indicates, realism with respect to possibility, or, as we shall sometimes call it, modal realism. This view regards unrealised possibilities as being entities or circumstances which exist mind-independently i.e. irrespective of whether or not we happen to conceive

of them. We can, however, distinguish two such modal realisms - a weaker and a stronger version. The first, which I shall call basic realism, asserts that possible individuals, or possibilia, are real entities. The second, which I shall call possible world realism, asserts that in addition to possibilia there really exist possible worlds. On the latter view, possibilia are the individuals that occupy possible worlds; the organisation of these individuals into possible worlds is taken to be an ontological fact, not a mere technical device of ours employed for the purpose of facilitating the <sup>ic</sup>logical treatment of possibilia. Clearly basic realism does not entail possible world realism, but possible world realism does presuppose basic realism. Of course, if it is believed that worlds are merely a special sort of object, then possible world realism is just a special case of basic realism. But a person who was a basic realist could consistently be a possible world constructivist; he could affirm the real existence of possibilia, but deny that they are really organised into possible worlds. He could simultaneously condone the possible world apparatus of possible world semantics as a convenient piece of <sup>ic</sup>logical equipment, even though lacking substantive ontological import.\*

We can therefore expect a critique of possible world theory, which this thesis purports to be, to proceed on two levels: as a <sup>critique of basic realism on the one hand, and</sup> /critique of possible world realism on the other. A refutation of either basic realism or possible world realism would be a sufficient

---

\* However, denying that possibilia are located in spacetime frameworks, or worlds, creates problems for the differentiation and individuation of possibilia. See Ch. 6.

sufficient refutation of possible world realism. But the label 'possible world theory' can be taken here to suggest a more general theory, embracing both these levels of realism. In this thesis, accordingly, the critique proceeds on the two levels.

I want to draw a sharp distinction between possible world constructivism and basic constructivism. Possible world constructivism is to be understood in the sense just described - as resting on basic realism and merely denying the independent reality of possible worlds. Basic constructivism, however, is the view which denies the reality of possible individuals. It is a subjective idealist view of possibility: possible individuals are purely mental constructs, and their constructability is not evidence of any ontological facts, nor does it entail any ontological consequences.

#### Realism vs. Constructivism

Let us now review the relative intuitive strengths of realism and constructivism. Clearly it is the basic views which are of primary philosophical moment - the concomitant views of possible worlds have a secondary status. It is therefore on the basic views that we shall focus in this <sup>re</sup>view.

The realist notion of possibility - which I shall alternatively call the notion of ontological possibility\* - is, I think, the common sense notion of possibility, and hence commands a very powerful appeal indeed. It is the realist view which underpins such primordial and

---

\* See Note 1



seemingly inevitable metaphysical questions as 'Why is the world as it is and not otherwise?', and 'Why is there something rather than nothing?' It is the realist view moreover which motivates all our counterfactualising at a more mundane level, e.g. 'If I had stepped off the kerb two seconds earlier I would have been killed.' The realist view affirms that it is an ontological fact that things could have been otherwise. The intensity with which we can, on appropriate occasions, deliver statements such as the above, testifies to our everyday faith in the realist view. I would go so far as to say that everybody, in their daily lives, subscribes to this view: we all take care to hesitate on kerbs, we practice birth control, we study for exams. We devote most of our lives to the effort of preventing the wrong possibilities from being realised.

Thus, in its homegrown environment, viz. the arena of ordinary, practical discourse, ontological possibility appears to be a healthy, deeply rooted concept. It is only when we transplant it into the relatively hothouse philosophical environment that it begins to burgeon into what might appear to be a philosophical mutation. For the philosopher, starting with the apparently wholesome statement that other states of affairs than the actual (really) could have been realised, translates this into the statement that these states of affairs are possible. From this statement he infers that there exist possible states of affairs, or possible individuals, and that these <sup>inhabitants of the actual world, are real.</sup> By means of this, though not concrete like the/innocent chain of philosophical reasoning, the philosopher arrives at a metaphysical theory - a theory committed to the reality of certain entities that are inaccessible to perception. From this point it is only one further step to decide whether or not to admit the reality of those at first sight arcane entities, possible worlds.

Such then is the equivocality of the notion of ontological possibility. This notion is by no means unique in respect of this equivocality, for it is one of the major functions of philosophy to expose the unfamiliar face of familiar concepts.

A prime exponent of realism amongst contemporary modal philosophers is David Lewis. His argument for realism is, basically, just that the realist notion of possibility is the commonsense notion. "It is uncontroversially true," he asserts, in 'Counterfactuals', Ch. 4, "that things might have been otherwise than they are. I believe, and so do you, that things could have been different in countless ways. But what does this mean? Ordinary language permits the paraphrase - there are many ways things could have been besides the way they actually are. On the face of it, this sentence is an existential quantification. It says that there exist many entities of a certain description, to wit 'ways things could have been'. I believe that things could have been different in countless ways. I believe permissible paraphrases of what I believe; taking the paraphrase at its face value, I therefore believe in the existence of entities that might be called 'ways things could have been.' I prefer to call them 'possible worlds'." (p. 84)

Notice that Lewis here takes the leap from basic realism to possible world realism without acknowledging that it is a leap. This implies that he assumes worlds to be a special sort of object, and hence possible world realism to be a special case of basic realism. He nowhere articulates this assumption however.

Having affirmed the intuitive strength and entrenchment of the concept I propose to criticise, I should say what the consequences of my criticism will be. If we have to relinquish the realist

analysis of possibility, what analysis, if any, can we substitute for it? There has been no shortage of suggestions. Last century, Mach deplored the invocation of possible worlds in cosmological arguments, and claimed that this form of 'inference' should not be permitted. Quine\* has argued for the outright elimination of certain forms of modal language. Others\*\* have proposed analyses of possibility or necessity which retain the empirical information content of modal sentences, while pruning their metaphysical content. I shall not consider this problem of conceptual restitution until I have completed my critique of the realist interpretation of possibility.\*\*\* Even then, I shall not undertake a review of the various constructivist or nonrealist proposals. I shall merely present my own view as to the legitimate purposes to which modal language may be put. In particular, I shall argue that the objectivity of certain modal claims can be defended without presupposing a realist interpretation of the notions of possible individuals or possible worlds.

---

\* Quine, 'Reference and Modality' in *From a Logical Point of View*

\*\* For example, N. Goodman, in *Fact, Fiction and Forecast*, and J. Mackie in *Truth, Probability and Paradox*.

\*\*\* Ch. 6.

The Role of Modal Logic in the Philosophical Investigation  
of Possibility

It might be thought that an investigation into the concept of possibility would be best conducted through the medium of modal logic. Such a methodology would ensure rigour thereby protecting the philosopher from the principal vocational hazard of metaphysics, which is obscurity.

My reply to this suggestion is the perhaps obvious but nevertheless ignored one that the philosophical foundations of the semantics for modal logic have to be clarified before that logic can constitute a legitimate tool in the investigation of the concept of possibility - or indeed of that of any other specific modal concept. This clarification of the foundations can only be achieved by philosophical analysis initially unmediated by formal apparatus, or at least by any specifically modal formalism.

The proper sequence of steps in an investigation into the notion of possibility would thus, I think, be the following: first the bulk of the philosophical analysis. Second, the formulation of the intuitive semantics, incorporating notions derived from the first step. Third, the application of the logic, in conjunction with the intuitive semantics, to discourse concerning possibility. The value of the third step is that, while philosophical intuition may be sufficient to establish the basic truths, the 'first principles', so to speak, concerning possibility, the development of a logic based on axioms which, through the semantics, express those 'first principles', furnished<sup>s</sup> a tool for determining the truth values of sentences concerning possibility which are too complex to be immediately transparent to

philosophical intuition. For example, native philosophical intuition soon becomes bewildered when confronted with iterated possibility claims. Modal logic provides the machinery for dealing with such claims i.e. determining their truth-value, quickly and easily. It is not that such claims could not be evaluated working merely from intuitive first principles, but that the logic facilitates what would otherwise be a long and probable<sup>y unreliable</sup>/process.

The main philosophical bonuses accruing from the development of the possible world semantics however, will be less the clarification of the notions of possibility and necessity that it affords, than the availability of the semantics for the interpretation of nonalethic modal concepts. For the possible world apparatus provides the means for the philosophical clarifications of other modalities e.g. deontic modalities - assuming that it has been shown, via the philosophical critique of the notions of possible individuals and possible worlds, that this apparatus rests on secure foundations.

The task of the philosopher undertaking this critique of possible world semantics thus includes questioning the nature of certain existential presuppositions of the system. This question focuses on the ontological status of possible individuals and possible worlds.

#### Received Conceptual Pluralism

The state of play in the field of modal logic at the present time is that there exists a plurality of formal systems, of which modal logicians fail to agree on any one as the correct system for the concept of possibility and necessity. Rather there is an approximate consensus amongst them that it is misguided to search for such a system

What is advocated instead is a permissive line, advancing a conceptual pluralism - a plurality of distinct notions of possibility, none of which can claim any intuitive privilege over its rivals. It then has to be independently determined in the case of each notion of possibility which set of axioms is true for that notion. One system will be true for one notion, another for a different notion.

The semantics is adapted to this pluralism through the role of the alternativeness relation. For one world to be possible relative to another is for it to constitute an alternative to the other i.e. the relation of relative possibility constitutes the alternativeness relation. The conceptual pluralism espoused by the modal logician thus finds expression within the possible world framework in the following way: each notion of possibility generates its own alternativeness relation i.e. the formal properties of the alternativeness relation vary according to the notion of possibility which generates it. Variation in the properties of the alternativeness relation of course entails variation in the membership of the set of worlds which stand in the relation of alternativeness to any given world. And as the sets of worlds admitted as possible vary, so do the systems which the semantics makes true. A thoroughgoing conceptual pluralism vis a vis possibility thus results in a corresponding pluralism vis a vis the systems of modal logic: no system is singled out as the exclusively correct system; each system may be correct for some concept of possibility.

Let me offer as example of this pluralism some of the notions

of possibility which are standardly recognised.\*

Logical Possibility: A set of propositions,  $\mathcal{S}$ , is logically possible, relative to a given (nonmodal) logical system, if its members violate none of the rules of that system. The notion of logical possibility yields a notion of logical alternativeness. In semantical terms, a formula is true if it may be interpreted on a fixed model set, and logically possible if it may be interpreted on a model system which includes model sets alternative to the fixed model set, where such sets, in order to be logical alternatives to the fixed model set, need only satisfy the conditions governing the logical constants that are satisfied by the fixed model set.

Conceptual Possibility: This is a much less well-defined notion than that of logical possibility, which it presupposes. We can take the first condition on conceptual possibility to be analytic possibility, where analytic possibility is defined as conformity with analytic rules. An example of a pair of propositions which is analytically impossible or inconsistent, is 'Bill is a bachelor', and 'Bill is married to Lucy'. The second condition requires that a conceptually possible sentence does not predicate of an object any predicate which violates the two following rules for the spatio-temporal identity of objects:

---

\* See, for instance, D. Snyder: *Modal Logic and its Applications*. Ch. VI, 2. My explication of these notions differs in some details however from Snyder's.

- A. An individual object cannot occur in two different places at the same time.
- B. Two distinct objects cannot occur in the same place at the same time

Given rule A, a sentence such as 'Adam shook hands with Bill when they were three miles apart' cannot be true i.e. is (conceptually) impossible. For the act of shaking hands requires the propinquity of the participants, yet if Adam is three miles from the point at which Bill is located, at the time the act of handshaking is due to occur, then he cannot, given rule A, also be in close proximity to Bill. Hence the act cannot take place.

Given rule B, it follows that a sentence ascribing, say, round-squareness to an individual object is conceptually impossible. For a round square object, or rather a surface, is understood, in the present context, to be a surface which is not merely partly circular and partly square, but entirely circular and also entirely square. However, an individual surface has just one shape. The reason for this is connected with the identity conditions for surfaces i.e. shape is a criterion for individuating surfaces. Circularity is one shape, squareness is another, different shape. If a surface is (entirely) circular, and a surface is (entirely) square, they must be two distinct surfaces, since a single surface has a single shape. But given that they are two distinct surfaces, we cannot, without violating rule B, locate them in the same region of spacetime, thereby qualifying them for treatment as one individual, viz a round square.



These remarks concerning rules A and B may justly be regarded with suspicion, however. They are intended only to illustrate the notion of conceptual possibility, not to critically analyse it. A great deal remains to be said concerning them. Their importance resides in their intimate connection with the identity conditions for empirical objects.\*

Theoretical Possibility: A set of propositions,  $\mathcal{S}$ , may be said to be theoretically possible if the conjunction of all its members is consistent with the set,  $\mathcal{L}$ , of propositions expressing the principles or laws of physical theory. Unless otherwise stated,  $\mathcal{L}$  is taken to be the set of laws applying to the actual world. We may here leave open whether the body of knowledge expressed in  $\mathcal{L}$  is that which is known by a given individual, or by a given community, or is understood in an ideal sense, as being the knowledge which could be inferred from the knowledge which is at present available to the most knowledgeable community.

Theoretical possibility presupposes both logical and conceptual possibility, and is hence the strongest of the three notions.

### Reduction of the Conceptual Pluralism

This picture of the received view amongst modal logicians on the question of the truth, for possibility, of the various modal systems, does not, it will be noticed, square with my earlier claim that there is a single ordinary or commonsense notion of possibility, viz. the realist notion. I wish now to reaffirm that claim - without however

---

\* In Ch. 6. <sup>this</sup> This notion of possibility is developed in much greater depth, and adapted to a nonrealist theory of possibility.

rehearsing the considerations offered earlier in support of it.

I propose that it is this notion of possibility which underlies the possible world semantics. Possible individuals and possible worlds are thus to be understood according to the realist conception. In other words, I would maintain that insofar as modal logic is interpreted as the logic of possibility and necessity, it is the logic of ontological possibility and necessity. As we shall soon see, it follows from this that the correct system of modal logic can after all be established.

What becomes of the alleged conceptual pluralism - the plurality of notions of possibility, each yielding a different modal system - given this view?

Considering the commitment of David Lewis to realism, and the similarity of his argument for possible world realism to my argument for basic realism, it is worth looking at what he says about these disparate notions of possibility. He introduces them, in his paper <sup>'Counterpart Theory'</sup> ~~'counterfactuals'~~ as 'relative modalities'. 'Just as a sentence  $\phi$  is necessary if it holds in all worlds, so  $\phi$  is causally necessary if it holds in all worlds compatible with the laws of nature; obligatory for you if it holds in all worlds in which you act rightly; implicitly known, believed, hoped, asserted or perceived by you if it holds in all worlds compatible with the content of your knowledge, beliefs, hopes, assertions or perceptions. These, and many more, are relative modalities, expressible by quantification over restricted ranges of worlds.'

---

\* J.P. Vol. LXV No. 5 '68 p. 124

I think D Lewis here overlooks an important distinction between causal necessity, on the one hand, and the deontic and epistemic modalities that he subsequently lists. I have no quarrel with his advice for the formal treatment of these latter modalities, provided it is understood that such treatment has a prior commitment to ontological possibility. Nor indeed have I any quarrel with his proposed formal treatment of causal necessity. What I want to ask is what is the role of causal possibility and necessity once ontological possibility and necessity have been accepted? What is the justification for postulating causal possibility in addition to ontological possibility, thereby making alethic modality a generic modality, under which various species are subsumed?

#### The Status of the 'Relative' Concepts of Possibility

I think the situation which engenders the proliferation of supposedly equally legitimate different notions of possibility is as follows. Our ordinary notion of possibility is the one that I have already described, viz ontological possibility. But we are, understandably, uncertain as to the necessary and sufficient 'conditions' that a thing must satisfy in order to qualify as ontologically possible. According to one view, a thing is ontologically possible if it can be described consistently with physical theory; according to another it is so merely if it may be described with logical self-consistency, and so on for other views.

Each of these views is construed as yielding a distinct notion of possibility e.g. causal (or theoretical) possibility, logical

possibility. But each of these notions is also a notion of ontological possibility, specifically a notion of ontological possibility as determined according to a particular set of necessary and sufficient conditions.

Given the reality of possibilia and possible worlds, the necessary and sufficient conditions for their existence are objectively determined i.e. there will in reality be just one correct set of such conditions. The notion of possibility which corresponds with the view that this is the set of necessary and sufficient conditions for ontological possibility would then coincide with the notion of ontological possibility simpliciter. If we could discover which notion of possibility this was, the other notions would become gratuitous. For what would be the point of asserting of something that it was, say, logically possible, if this did not <sup>imply</sup> ~~comply~~ that it were possible, but implied only the purely formal fact that its description was self-consistent? And if, on the other hand, the necessary and sufficient conditions for <sup>the</sup> ~~of a thing~~ ontological possibility <sup>was the</sup> ~~were~~ <sup>of its description</sup> logical consistency, then what would be the point of asserting of something that it was, say, theoretically possible? Certainly the thing in question would in this case be possible, but it would not be possible in virtue of any of its theoretical characteristics, but merely in virtue of its logical <sup>ly</sup> ~~consistent~~ <sup>b</sup> ~~descripability~~. The assumption normally underlying an assertion that something is theoretically possible is that physical theory consists of a set of necessary principles or rules, which prescribe how the world has to be. Theoretical alternatives to the actual world, will thus, on this understanding of physical theory, be the only real alternatives

to the actual world, ~~will thus, on this understanding of physical theory, be the only real alternatives to the actual world.~~ If we did not subscribe to this view of physical theory, but instead understood such theory as a set of merely contingent statements, then it would simply be idle, though not in any way vicious, to calculate the alternatives permitted by the theory. In other words, the notion of theoretical possibility would have no positive role in our conceptual framework. It has a positive role only when it is assumed that theoretical possibility is <sup>the</sup> necessary and sufficient condition for ontological possibility.

I conclude therefore that the ostensible plurality of notions of possibility represents a disagreement merely as to the correct interpretation of a basic concept of possibility on which everyone is agreed. That is to say, everyone agrees on what it is to be possible, but there is disagreement on what constitutes the necessary and sufficient conditions for possibility.

Even if we cannot close this margin of disagreement or ignorance, we can understand the notion of ontological possibility independently of knowing the necessary and sufficient conditions for ontological possibility. To be ontologically possible is just to be capable of really being actual. It seems to me therefore that the alleged pluralism of concepts of possibility is largely an illusion. There is just one, ordinary concept of possibility, and various views about what are the necessary and sufficient conditions for a thing to be possible.

### The Correct System of Modal Logic

Given that there is thus a single, common concept of possibility, it should follow that just one modal system is true for this concept.

This system is  $S_5$ . The argument is as follows. The notion of possible worlds involved in possible world semantics is, we have claimed, a realist notion i.e. possible worlds are understood as existing mind-independently.

↳ The existence of an entity is categorically the one fact about it that cannot be construed as obtaining merely relative to some particular frame of reference: if an entity exists, then however its properties may (systematically) transform from one reference frame to another, the one constant throughout these transformations is the entity's existence. If it exists in any reference frame, then it exists in all of them. Hence if we regard a given possible world as a reference frame for the 'observation' of other possible worlds, we could say <sup>that</sup> if a given world exists from the viewpoint of one world, then it exists from the viewpoint of every world. But this is equivalent to saying that the fact of the existence of an entity does not obtain relatively at all; it obtains, if at all, absolutely. Alternativeness - the relation of relative possibility - thus turns out, on our view of possibility, to be nonrelative after all. This circumstance confers on the alternativeness relation the properties of an equivalence relation, and this in turn yields  $S_5$  as the correct modal system.

Given the status that we have here attributed to the notions of logical, conceptual and theoretical possibility, it follows that these notions are only of any use so long as they are considered as extensionally coinciding with the notion of ontological possibility i.e. as generating a set of possible worlds coextensive with the set of ontologically possible worlds. We have already remarked that we tolerate a plurality of such notions only because we are ignorant of the true conditions for ontological possibility. But we are to construe these notions not as each generating a subset of the set of (ontologically) possible worlds, for which a modal system other than  $S_5^*$  will be true, but as each generating the entire set of (ontologically) possible worlds. Hence  $S_5$  will be true for all of them.

#### Necessary and Sufficient Conditions

Let me add now a word about necessary and sufficient conditions. I have been discussing the question of the necessary and sufficient conditions for ontological possibility i.e. for the existence of possibilia, or possible worlds. But this is loose talk as long as the role of the notion of necessary and sufficient conditions remains unclarified in the present context.

Indeed it is precisely a confusion concerning this role which has contributed to the proliferation of concepts of possibility which supposedly stand on an equal footing with one another. Let me therefore briefly clarify my view of the status of these conditions.

In the first place, we need to distinguish two kinds of conditions : causal and noncausal. I do not want to consider the question of causal conditions for its own sake here. So let me turn at once to the noncausal case. An entity does not come into (real) existence, I claim, as a result of satisfying certain non-causal conditions. Such satisfaction implies an element of process, of temporality, which would be appropriate only if the conditions in question were causal. Noncausal conditions are not like hurdles over which an entity must jump in order to come into existence. Rather, in existing, the entity satisfies the conditions; it does not exist as a result of satisfying them.

What I am proposing here is a view of necessary and sufficient conditions which makes it possible to speak of the necessary or sufficient conditions for ontological possibility without begging the question. For if necessary and sufficient conditions are understood as rules for ontology, then they tell us how things have to be, and how they may be, respectively. But this is precisely to tell us what is ontologically necessary, and ontologically possible, respectively. Thus to state the necessary and sufficient conditions for ontological possibility is to state that it is ontologically necessary that possibilia be such and such, and ontologically possible that they be so and so. If the necessary and sufficient conditions are being invoked in explication of ontological possibility, then the latter paraphrase of the statement of those necessary and sufficient conditions shows the explication to be circular.



On my view of necessary and sufficient conditions however, there is no assumption that we can prescribe the constraints on ontology, or even that there are any such constraints. Rather, we assume that we have a basic knowledge of the way things are. For instance, we assume that we have some form of acquaintance with certain possibilia. The nature of these possibilia is such that they are always consistently describable. We then devise a rule for the identification of possibilia: an entity only qualifies as a possible entity if it may be described without logical inconsistency. By this process, logical consistency has become a necessary condition for ontological possibility. But this condition is merely a condition for the identification, by us, of an entity as a certain kind of entity. It is not a condition for the existence of that thing.

These remarks merely constitute an extrapolation to modalities of the familiar interaction between the analytic and the synthetic in nonmodal discourse. I would describe this interaction as follows. In the first place we may assume that what actually exists, is as it chooses to be i.e. it is not constrained by any 'conditions'. But in order to sort actual entities into kinds i.e. in order to order them, and make the world conceptually tractable, we have to introduce a notion of definitive characteristics. A definitive characteristic is a characteristic which an object must, or may, have, if it is ~~to~~ quality as belonging to a certain kind. In this sense, and this sense only, an object has to satisfy certain necessary and sufficient conditions. It has to satisfy these conditions not in order to exist - for we are assuming that the

object in question is already given - but in order to be identified as belonging to a particular kind. I call this view of necessary and sufficient conditions analytic essentialism. Analytic essentialism is the incontrovertible but trivial doctrine that if a given object, A, (ostensively<sup>v</sup> identified), is to qualify as a  $\phi$ , where  $\phi$  is a sortal term, then it must have the properties which define  $\phi$ -hood.

To return to the modal case, I am suggesting that when we state the necessary and sufficient conditions for ontological possibility, we are not stating conditions which possibilia have to satisfy in order to exist, but epistemological conditions for the mental reconstruction or representation of possibilia.

We might, alternatively, construe these conditions as conditions for the discovery of possibilia. In this case, by finding a state of affairs to be, say, consistently describable, or descriptably consistently with physical theory, we discover that it is ontologically possible. We could thus construe logical consistency, or consistency with theory, as evidence that the description is a description of an ontologically possible state of affairs.

No important philosophical difference distinguishes these two interpretations of the notion of conditions, for both concern the properties that possibilia have which enable us to recognise them and identify them as possibilia, rather than the ontological circumstances which must prevail in order for possibilia to come into existence.

### Mixed Modalities

We should notice that on the present view of the so-called relative notions of possibility, and of the status of the notion of necessary and sufficient conditions for possibility, there will be no place for mixed modalities, or more specifically, mixed alethic modalities. Both modal operators represent the same concept of possibility and necessity respectively in every occurrence.

### Epistemic Possibility

It is now time to redress a certain imbalance. I have in this chapter stressed the dominant position of the realist conception of possibility. There is, however, another concept of possibility, which is not *prima facie* reducible to ontological possibility, and which has a wide currency in ordinary discourse. I shall call this concept that of epistemic possibility. Epistemic possibility can best be characterised by contrasting it with ontological possibility. The occurrence of a particular state of affairs,  $\phi$ , is epistemically possible if it is not known that  $\phi$  has not actually occurred. Once  $\phi$  is known not to have occurred, it is no longer epistemically possible - it is epistemically impossible. The fact that  $\phi$  is known not to have occurred would not of course preclude it from being judged to have been ontologically possible. Thus the fact, if it is a fact, that  $\phi$  is known to occur only in another possible world, makes  $\phi$  ontologically possible but epistemically impossible. While the fact, if it is a fact, that  $\phi$  does not occur in any world, makes  $\phi$  ontologically impossible, but

~~epistemically impossible. While the fact, if it is a fact, that~~  
~~does not occur in any world, makes ontologically impossible,~~  
 but does not make  $\phi$  epistemically impossible so long as it is not  
known that  $\phi$  does not occur in this world.

In short, ontological possibility is the right sense of  
 possibility for counterfactual claims, but epistemic possibility is  
 the right sense for all those claims which may be paraphrased.

'For all I know, such and such may actually be the case.'

One suspects, nevertheless, that these two notions of possibility  
 must be related. They are. For implicit in any judgment of the  
 form, 'for all I know, such and such may actually be the case', is  
 an assumption that there are certain ways the actual world can be,  
 and certain ways that it cannot be. No sane person would ever  
 claim that, for all he knew, the earth might be a round square (or  
 spherical cube). But plenty of sane people have claimed that they  
 do not know i.e. it has not been demonstrated, that the earth is not  
 flat. The reason people refrain from the first judgment of  
 epistemic possibility but not from the second is that it is assumed  
 that nothing can be a round square, but not that nothing can be flat.  
 In other words, it is assumed that round squares are ontologically  
 impossible, while flat objects are ontologically possible.

Even though the notions of ontological and epistemic possibility  
 are in an important sense distinct, it nonetheless appears that the  
 notion of epistemic possibility presupposes that of ontological  
 possibility.

I shall however return to epistemic possibility in a later chapter.\*

---

\* See Ch. 6.

For while I think ontological possibility is ultimately dispensable, I do not think we can get along without a notion of epistemic possibility.

To salvage epistemic possibility will require a re-examination of the concept in much greater depth than we have attempted here.

NOTES:

1. I wish to add a few remarks concerning the notion of ontological possibility. The adjective 'ontological' as used in this expression has two distinct connotations.

- (1) It connotes the essential reference involved in this notion to actual existence, or entities (as opposed to merely mental entities). An object is said to be ontologically possible if it is really capable of being actual. The capacity of an object to be actual is a fact about the actual world, and is hence an objective i.e. a mind-independent matter. This objectivity is connoted by the term 'ontological' (since 'ontological' (objective) is contrasted with 'epistemic' (subjective).)
- (2) The adjective 'ontological' also evokes the metaphysical aspect of the notion of ontological possibility. i.e. it draws attention to the fact that possibilia have ontological status - they exist, though since they do not figure among the concrete objects of the actual world their existence must be metaphysical in character. The term 'metaphysical possibility' is sometimes used interchangeably with 'ontological possibility', but I find this term unacceptably misleading, since it could be understood as implying a distinction between the actual and the possible, the realised and the unrealised, in relation to metaphysical entities. Entities described as 'metaphysically possible' would then be understood to be potential but unrealised metaphysical entities - entities which are capable of having metaphysical existence, but in fact do not. This seems to me an unfortunate

interpretation: metaphysical entities (possibilia) were invoked by the realist in order to explain the distinction between the actual and the merely possible; clearly they will fail to do so if they themselves are subject to this distinction. Moreover, the assumption that there are realised and unrealised metaphysical entities will inevitably lead to an ontological regress, of possible entities, and possibly possible entities, and so on, all realistically interpreted. And nowhere in this regress will any light be shed on the actuality/possibility distinction.

I therefore advocate the term 'ontologically possible', with its above two legitimate and valuable connotations.

## Appendix to Chapter 1

The three most common systems of modal logic and their semantics are as follows\*.

### The Formal Systems

The System T : ( first propounded by R. Feys\*\* in 1937 )

Primitive symbols:

|              |                             |
|--------------|-----------------------------|
| $p, q, r$    | ( propositional variables ) |
| $\sim, \Box$ | ( monadic operators )       |
| $\vee$       | ( dyadic operator )         |
| $(, )$       | ( brackets )                |

Formation rules:

- FR1      A variable standing alone is a wff.  
 FR2      If  $\alpha$  is a wff, so are  $\sim\alpha$  and  $\Box\alpha$   
 FR3      If  $\alpha$  and  $\beta$  are wffs, so is  $(\alpha \vee \beta)$ .

Definitions:

Def  $\rightarrow$ , Def  $\supset$ , Def  $\equiv$ , as in the Propositional Calculus, and

$$\begin{aligned} \text{[Def } \Diamond] \quad & \Diamond\alpha =_{df} \sim\Box\sim\alpha \\ \text{[Def } \supset] \quad & (\alpha \supset \beta) =_{df} \Box(\alpha \rightarrow \beta) \\ \text{[Def } =] \quad & (\alpha = \beta) =_{df} ((\alpha \supset \beta) \cdot (\beta \supset \alpha)) \end{aligned}$$

Every wff of the Propositional Calculus is a wff of T.

Axioms:

A1 - A4 as for the axioms of the axiomatization of PC given by Whitehead and Russell in Principia Mathematica, viz

$$\begin{aligned} \text{A1} \quad & (p \vee p) \supset p \\ \text{A2} \quad & q \supset (p \vee q) \\ \text{A3} \quad & (p \vee q) \supset (q \vee p) \\ \text{A4} \quad & (q \supset r) \supset ((p \vee q) \supset (p \vee r)) \\ \text{then} \quad & \end{aligned}$$

$$\begin{aligned} \text{A5} \quad & \Box p \supset p \\ \text{A6} \quad & \Box(p \supset q) \supset (\Box p \supset \Box q) \end{aligned}$$

\* I am here following G.E. Hughes & N.J. Cresswell, An Introduction to Modal Logic, pp. 30-31, 46-47, 141, 146.

\*\* R. Feys, 'Les logiques nouvelles des modalités', Revue Neoscholastique de Philosophie, vol. 40(1937) p. 517-53, vol. 41(1938) p. 217-252.



The System  $S_4$ : The basis of  $S_4$  is that of T, together with

$$A7 \quad \Box p \supset \Box \Box p$$

The System  $S_5$ : the basis of  $S_5$  is that of  $S_4$ , together with

$$A8 \quad \Diamond p \supset \Box \Diamond p$$

(2)  
(B) Modal Predicate Calculi (LPC)

The System LPC + T: has the basis of non-modal LPC, plus

1. The primitive operator,  $\Box$ , with appropriate formation rule: if  $\alpha$  is a wff, so is  $\Box \alpha$ .
2. Definitions of  $\Diamond$ ,  $\supset$  and  $=$  as in T.
3. Axiom schemata corresponding to the modal axioms of T, A5, A6.

The System LPC +  $S_4$ : is ~~LPC~~ LPC + T together with the axiom schema

$$A7 \quad \Box \alpha \supset \Box \Box \alpha$$

The System LPC +  $S_5$ : is LPC +  $S_4$  together with the axiom schema

$$A8 \quad \Diamond \alpha \supset \Box \Diamond \alpha$$

(B) The Semantics for Modal LPC

T-model (with the Barcan Formula \*) : an ordered quadruple, ~~is~~  $\langle W, R, D, V \rangle$ , where  $W$  is a set of 'worlds',  $R$  is a reflexive relation over the members of  $W$ ,  $D$  is a set (or domain) of individuals, and  $V$  is a value assignment satisfying the standard conditions of non-modal LPC, ( $[V\sim]$ ,  $[V\vee]$ ,  $[V\wedge]$ ), plus

$[V\Box]$  For any wff  $\alpha$  and any  $w_i \in \mathcal{W}$ ,  $V(\Box \alpha, w_i) = 1$ , if for every  $w_j \in \mathcal{W}$  such that  $w_i R w_j$ ,  $V(\alpha, w_j) = 1$ .  
Otherwise  $V(\Box \alpha, w_i) = 0$ .

A wff,  $\alpha$ , is T+BF-valid iff for every T+BF-model,  $\langle W, R, D, V \rangle$ ,  $V(\alpha, w_i) = 1$  for every  $w_i \in \mathcal{W}$ .

\* BF  $(A) \Box \alpha \supset \Box (A) \alpha$

$S_4 + \text{BF-model}$  : same as for  $T + \text{BF-model}$ , plus  $R$  is transitive.

$S_5 + \text{BF-model}$  : same as for  $S_4 + \text{BF}$ , plus  $R$  is symmetric.

The intuitive interpretation of these semantics is that a wff,  $\alpha$ , is possibly true in a world  $w_i$  if it is true in some possible world,  $w_j$ , accessible from  $w_i$ .

Transworld Identity:  
Objections to Possible World Theory

In this chapter I want to point out flaws in the possible world apparatus of possible world semantics, by means of a critique of the transworld identity relation. If the argument is considered successful, it will be equally damning of possible world realism and possible world constructivism alike, and will therefore threaten the effectiveness of possible world semantics on any interpretation of possible worlds.

The attack, as I have said, focuses on a relation which is central to the possible world apparatus as employed in the semantical analysis of modal logic, viz the relation of transworld identity between individuals existing in different possible worlds. Both possible world realism and possible world constructivism are dependent on this relation\* if possible worlds are to serve any semantical purpose. For the modal expressions of our language, which the possible world semantics is intended to analyse, are largely concerned with how a given actual individual could have been or possibly or potentially is. I shall call the theory of transworld identity subsumed under possible world realism. Transworld-identity<sub>1</sub>, and the theory of transworld identity subsumed under possible world constructivism Transworld-Identity<sub>2</sub>. In the case of Transworld-Identity<sub>1</sub> it is metaphysically determinate which individuals are identical with one another across worlds. In the case of

---

\* In the last part of this chapter we shall be considering an alternative to the Transworld identity relation, proposed by David Lewis, viz the counterpart relation. Transworld identity, being the identity relation, is an equivalent<sup>cc</sup> relation. The counterpart relation, in contrast, need not be either transitive or symmetric. This is of the utmost importance.

Transworld-Identity<sub>2</sub>, we decide the criteria for transworld identity i.e. it is established not by ontology but by convention which individuals are which across possible worlds.

Making such a distinction between identity as a feature of ontology and as a feature of a conceptual framework of course begs the fundamental question about the nature of the identity relation. This is a question I shall be pursuing in a later chapter;<sup>1</sup> for the moment I shall just introduce the distinction in this undefended manner. No harmful consequences will follow from this in the present chapter because, as I have said, the arguments will be equally against Transworld-Identity<sub>1</sub> and Transworld-Identity<sub>2</sub>.

Before proceeding however, we need to note that the indispensability of the transworld identity relation to the analysis of modal expressions has been challenged. S. Kripke,<sup>2</sup> for one, argues that the problem of the transworld identification of individuals i.e. the problem of providing qualitative criteria for the transworld identification of individuals, arises from an overly literalistic interpretation of what he calls the possible world 'metaphor'.<sup>3</sup> His own view is that there is no need to give a qualitative description of an individual in a given possible world in order to refer to it in that world. We can refer to it by the name it bears in the actual world. We can stipulate that we are referring

---

1. See Ch. 6

2. Kripke: 'Naming and Necessity' in Semantics of Natural Languages. ed. D. Davidson.

3. To describe the notion of possible worlds as metaphorical is of course to deny that possible worlds are real entities. But on the other hand Kripke espouses a notion of metaphysical necessity. I conclude that he is a basic realist, but a possible world constructivist.

to, say, Nixon, in a given possible world. No set of qualitative criteria is required to pick out Nixon in that world. We do not view possible worlds through a telescope, and wonder which of the individuals thus manifested to us is Nixon. Rather we can conceive possible worlds around given actual individuals. In short, what are given to us are the antecedently identified individuals, not the worlds.

However, despite this constructivist line, I think that eventually Kripke has to, and does, provide a set of qualitative criteria which play a roughly equivalent role to the criteria for transworld identity which he criticises. For while he avoids the need to provide a set of criteria for the transworld identity of individuals, he still has the problem of determining in which worlds his antecedently identified individuals may plausibly occur. These two problems may be seen eventually as boiling down to the same one. For while Kripke can simply stipulate that it is Nixon he is referring to in a given counterfactual situation, he still has to justify the ascriptions he makes to Nixon in that situation. Some ascriptions will be plausible e.g. that Nixon might not have been the president of the U.S.A.; others will be implausible e.g. that Nixon might ~~not~~ have been a mosquito. In deciding ~~what~~ which ascriptions are plausible and which are not, one is deciding what Nixon might and might not have been like, while still remaining Nixon. In deciding this, one is deciding, more or less loosely, on a set of qualitative criteria for the transworld identity of Nixon.

What then should we take these criteria for the transworld identity of individuals to be? Intuitively one would say that, in order to be transworld identical, two instantiations in different worlds of a given individual should be, to some specified degree, similar to one another. Intuitively we would find a claim that Nixon, the man, might have been a mosquito, implausible. The minimal condition which it seems plausible to impose is that of sortal strictness: an individual of a given sort may not be identified across worlds with an individual of a different sort.

This condition of sortal strictness is one which it would seem reasonable for the possible world constructivist to impose. Since the possible world realist lacks a modal telescope and cannot inspect the contents of possible worlds directly, he will be compelled to become a Rationalist with respect to possible worlds. That is, in order to make any assertions about the characteristics of possible worlds, as opposed to making merely a bald assertion of their existence, the possible world realist has to assume that reason prescribes for ontology, and hence that he can discover, by reason alone, what possible worlds are like. For the realist then too it will be reasonable to assume that this minimal similarity requirement is satisfied by individuals which according to his view, are as a matter of ontological fact transworld identical.

Kripke's own tacit recommendations for such criteria for transworld identity - or, as we would say in his case, for counterfactual ascriptions - are that the real essence of the individual should be preserved across worlds, or counterfactual frameworks. I do not want to go into the question of the real and nominal essences

of kinds here, except to state that Kripke proposes as the real essence of a natural kind the internal structure of the paradigm instances of that kind in the actual world, or, in the case of substances, such as gold, the molecular structure of <sup>the</sup> paradigm instances of that kind in the actual world, or, in the case of substances, such as gold, the molecular structure of paradigm samples of the substance. The real essence of an individual, however, on Kripke's view, relates to that individual's origin: it is of Nixon's essence that he was born of his particular parents i.e. it is necessarily false that Nixon could have been born of different parents. The role of the spatio-temporal location of the origin is not altogether clear: we are not told that Nixon could not have been conceived, by his actual parents, somewhat earlier or later than he actually was or in a different room of the parental house, or even in a different country. It would thus appear that it is less the precise spatiotemporal co-ordinates of the origin that are essence - determining, than the qualitative circumstances that prevailed at the origin - the circumstances which determined the kind of structure, or constitution, that was conferred on the individual in question.

Kripke argues that in order to be a tiger in any world, an individual must have a particular internal structure, similar in key respects to that of the individuals correctly identified as tigers in the actual world. But he does not say explicitly whether an individual which is a tiger in the actual world must be a tiger in every world in which it exists. That is, he does not say explicitly whether individuals have to preserve in other worlds the real essence of the species they instantiate in the actual world. However, from

his remarks concerning the real essence of individuals, it is possible to infer that an individual which originated as a tiger in the actual world would likewise originate as a tiger in every world in which it exists. This follows from his requirement that the circumstances attendant at an individuals genesis be preserved from one world to another. Whether an individual which originates as an instance of a certain kind can - in either the actual or in a possible world - through time change its properties until it becomes an instance of a different kind, is a further question. It is plausible, though not uncontestable, to suppose that an individual cannot thus change its sortal stripes while remaining the same individual. If we assume this for Kripke, then it will turn out that, on his view, not only must two transworld identical individuals originally belong to the same sortal category, they must, as long as they are to remain transworld identical, continue to do so.

Thus we find that Kripke's view roughly coincides with the view which we earlier claimed to be intuitively plausible, viz that the minimal conditions for the transworld identity of individuals is that they should belong to the same sortal category. In Kripke's case there is the extra requirement that they should share the same origin, but this, as we remarked, is not spelled out in sufficient detail to determine its precise implications.

I am not suggesting that Kripke himself construes transworld identity as supervening on similarity - as, for instance, David Lewis\*

---

\* David Lewis: Counterfactuals Ch. 4.



does - but that we can take what he says to imply that such identity entails a certain degree of similarity, the degree of similarity entailed by essence-preservation. ~~We have seen that subject to one assumption this degree of similarity, the degree of similarity entailed by essence-preservation.~~ We have seen that subject to one assumption this degree of similarity amounts at least to that entailed by belonging to the same sortal category.

### The 'Identical Twins'

I now want to examine a particular instance of the transworld identity relation. Consider a pair of (monozygotic) twins,  $A_0$ ,  $B_0$ , extant in the actual world  $w_0 \in \mathcal{W}$ , where  $\mathcal{W}$  is the set of all possible worlds. Suppose the <sup>lives</sup> ~~lives~~ of these twins to have been extremely similar: they have shared a closely similar origin, have had social relations with the same persons in the same circumstances. They furnish for each other the experience of having a twin, and because they are so alike their respective experiences of having a twin are correspondingly alike. For our purposes, let us conceive them to be qualitatively indiscernible save for the fact that twin  $A_0$  has property  $H$  where twin  $B_0$  has  $P$ , where  $H$  and  $P$  are such that they are not coinstantiable in a single individual. (An example of two such properties would be 'red-haired at  $t$ ,' and 'black-haired at  $t$ ,' ) For naturalism,  $H$  and  $P$  can be treated as compound properties, if we like - compounded out of all such qualitative differences  $A_0$  and  $B_0$  display relative to each other.

According to Transworld Identity Theory,  $A_0$  will be transworld identical with various individuals who inhabit, respectively, other worlds which are possible relative to  $\omega_0$ . Suppose there is a world,  $\omega_1$ , which is inhabited by an individual  $A_1$  who is similar to  $A_0$  to the extent that he shares all his properties with  $A_0$  save that he has property P where  $A_0$  has H. There is also in  $\omega_1$  an individual  $B_1$  who is qualitatively indiscernible from  $B_0$  save for the fact that he has property H where  $B_0$  has P. Suppose that  $\omega_1$  is possible relative to  $\omega_0$ .

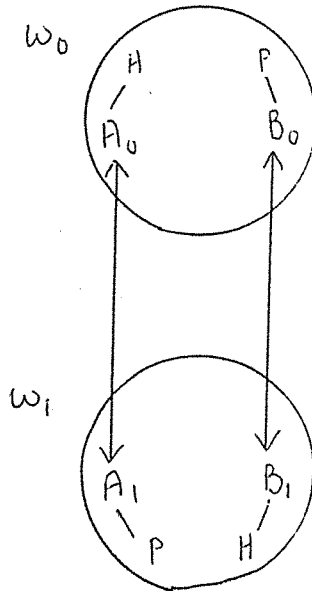
There is no reason, from the viewpoint of Transworld Identity Theory, why  $A_1$  should not be allowed to be transworld identical with  $A_0$ , and  $B_1$  with  $B_0$ .  $A_1$  and  $A_0$  satisfy the minimal similarity requirement, as do  $B_1$  and  $B_0$ .<sup>\*</sup> Hence Transworld Identity Theory gives no grounds for denying that  $A_1$  and  $B_1$  are the trans-substantiations, as we shall call them, of  $A_0$  and  $B_0$  respectively.<sup>\*\*</sup> Let

---

\* Two points need to be observed. Firstly, the argument does not, at this stage, require the close degree of similarity provided here, though this will lend it greater conviction in the later stages. Secondly, we did not need to establish the minimal similarity condition in order to get this argument started. For if there were no minimal requirement, it would follow that there would be no reason why anything should not be transworld identical with anything. Hence there would, again, be no reason why  $A_1$  should not be transworld identical with  $A_0$ , and  $B_1$  with  $B_0$ . I argued for that requirement simply because I think it is independently plausible.

\*\* I would prefer the less cumbersome term 'counterpart' for an individual which is transworld identical with a given individual, but D. Lewis has appropriated this term for his Counterpart Theory, through which it has acquired connotative accretions which must be avoided here.

us further suppose that the differences between  $A_0$  and  $A_1$ , on the one hand, and  $B_0$  and  $B_1$  on the other, constitute the only qualitative aspects in which  $\omega_1$  differs from  $\omega_0$ .



I am now going to outline a simple argument suggested by this example. I shall then show the flaws in the arguments as formulated, and try to refine it until the required results emerge.

Since  $A_1$  is qualitatively indiscernible from  $B_0$ , (where by 'qualitatively indiscernible' I mean that  $A_1$  would manifest no empirical difference to  $B_0$  to an ideal observer of them both), and since  $B_1$  is qualitatively indiscernible from  $A_0$ , and  $\omega_1$  is otherwise indiscernible from  $\omega_0$ , it is reasonable to say that  $\omega_1$  is qualitatively indiscernible from  $\omega_0$ .

$\omega_0$ . If the Identity of Indiscernibles is endorsed by Transworld Identity Theory, it follows that  $\omega_0 = \omega_1$ . Furthermore it follows from the Identity of Indiscernibles that  $A_0 = B_1$ , and  $B_0 = B_1$ , <sup>it has been given that  $A_0 = A_1$  and  $B_0 = B_1$</sup>   $\wedge$  But since it has now been shown that  $\omega_0 = \omega_1$ ,  $A_0$  is not merely transworld identical with  $A_1$  and  $B_1$ , nor is  $B_0$  merely transworld identical with  $B_1$  and  $A_1$ ; they are now all intra-world identical with one another i.e.  $A_0 = B_1 = B_0 = A_1$ .  $A_0$  and  $B_0$  are therefore the same individual.

The fact that this conclusion is radically counterintuitive, being in outright violation of the basic assumption of identity theory, viz the nonidentity of discernibles, compels us to conclude that Transworld Identity Theory is incompatible with the Identity of Indiscernibles, at any rate unless or until further conditions are imposed on the relation of transworld identity. For until such conditions are introduced, there is nothing to prevent the Transworld Identity theorist constructing or discovering such worlds as  $\omega_0$  and  $\omega_1$ .

If the Transworld Identity theorist jettisons the Identity of Indiscernibles, as he so far seems constrained to do, in order to avoid affirming some revolutionary principle of identity of discernibles, then he has to contemplate with equanimity the construction, or existence, of perhaps infinitely many qualitatively indistinguishable worlds for every member of the set of qualitatively distinguishable worlds.

This then is the simple argument announced earlier. In its present form it is suggestive, but nonrigorous. So let us now see how it weathers formalisation.

The Implications of Transworld Identity Theory  
for the Identity of Indiscernibles

We have already posited  $\mathcal{W}$ , a nonempty set of possible worlds. For each  $w \in \mathcal{W}$ , let  $I(w)$  be the set of individuals in  $w$ . Let  $I$  be the set of all individuals.

We assume that  $I = \bigcup_{w \in \mathcal{W}} I(w)$ . We represent the set of all properties which are instantiated in any world by

$$\mathcal{P} = \{P : (\exists w)(\exists i \in I(w)(P(i)))\}$$

Our first step is to distinguish four versions of the principle of the Identity of Indiscernibles.

(a) Intraworld, but not transworld, ~~the~~ Identity of Indiscernibles, expressed by

$$(\forall w \in \mathcal{W})(\forall i, j \in I(w)) [ (\forall P \in \mathcal{P})(P(i) \equiv P(j)) \Rightarrow i = j ] \quad (1)$$

The Identity of Indiscernibles was originally formulated as a principle of intraworld identity, indifferent to the question of transworld identity. It is expressed by (1) specifically for the case when  $w = w_0$ , where  $w_0$  is the actual world.

(b) Intraworld, and transworld, ~~the~~ Identity of Indiscernibles, expressed respectively by (1) above, and by

$$(\forall i, j \in I) [ (\forall P \in \mathcal{P})(P(i) \equiv P(j)) \Rightarrow i = j ] \quad (2)$$

(c) Not intraworld, but transworld, ~~the~~ Identity of Indiscernibles, expressed by the negation of (1) and by (2).

(d) Not intraworld, and not transworld, ~~the~~ Identity of Indiscernibles, expressed by the negations of both (1) and (2).

Now let us introduce some helpful notational innovations: we distinguish intraworld identity from transworld identity by attaching the appropriate subscripts: ' $=_{t.w.}$ ' to be read 'is transworld identical with' and ' $=_{i.w.}$ ' to be read 'is intraworld identical with'. The Identity of Indiscernibles can be qualified in a similar fashion: ' $II_{t.w.}$ ' reads 'the principle of Transworld Identity of Indiscernibles', and ' $II_{i.w.}$ ' reads 'the principle of Intraworld Identity of Indiscernibles'. We also introduce the sign ' $\equiv$ ' to be read 'is (qualitatively) indiscernible from'; this can in turn be qualified, thus: ' $\equiv_{t.w.}$ ' for transworld indiscernibility, and ' $\equiv_{i.w.}$ ' for intraworld indiscernibility.

Now we have adequate resources to formalise the 'identical twins' argument:

- 1)  $A_0 =_{t.w.} A_1$  premise
- 2)  $B_0 =_{t.w.} B_1$  premise
- 3)  $A_0 \equiv_{t.w.} B_1$  premise
- 4)  $B_0 \equiv_{t.w.} A_1$  premise
- 5)  $w_0 \equiv w_1$  premise
- 6)  $w_0 = w_1$  by application of the Identity of Indiscernibles to (5)
- 7)  $A_0 \equiv_{i.w.} B_1$  (3), (6).
- 8)  $B_0 \equiv_{i.w.} A_1$  (4) (6)
- 9)  $A_0 =_{i.w.} B_1$  (7) x  $II_{i.w.}$
- 10)  $B_0 =_{i.w.} A_1$  (8) x  $II_{i.w.}$
- 11)  $A_0 =_{i.w.} A_1$  (1), (6)
- 12)  $B_0 =_{i.w.} B_1$  (2), (6)
- 13)  $A_0 =_{i.w.} B_1 =_{i.w.} B_0 =_{i.w.} A_1$  (9),(10),(11),(12)

where steps 7, 8, 11, 12 assume that where a transworld identity is given, and then the worlds in question become identical, the transworld identity is transformed into an intraworld identity. (13) is an instance of a principle of intraworld identity of (certain) discernibles ( $ID_{i.w.}$ )

This formal presentation brings out the assumptions made in the unformalised argument. For the Identity of Indiscernibles, as applied to (5), is neither  $II_{t.w.}$  nor  $II_{i.w.}$ ; it is a special version of the Identity of Indiscernibles applicable to worlds; call it  $II_w$ . The question is, what are the conditions for  $II_w$  in terms of  $II_{t.w.}$  and  $II_{i.w.}$ ? Transworld identity of individuals does not eliminate distinctness in the same unequivocal way that intraworld identity of individuals does. How do we explain this distinction between these two senses of identity, and even more difficult, which sense of identity do we intend when it is worlds which are flanking the identity sign? This calls for some discussion.

We have found that attaching the subscripts 't.w.' and 'i.w.' to the relevant notation in the above manner begs the very questions which are here at issue. Therefore let us drop these subscripts until we have clarified the presuppositions they embody.

The question we have to address is, what are the conditions for indiscernibility? Which is another way of asking, what qualifies as a property, or quality?

The Transworld Identity theorist might argue that if two distinct individuals, either within a world or across worlds, each have a property F, this is sufficient for us to be able to distinguish

two properties,  $F_1$  and  $F_2$ ,  $F_1$  being the property had by one of these individuals,  $F_2$  the property had by the other. In that case, to return to our example,  $A_0$  would have property  $H_{A_0}$  where  $B_1$  had property  $H_{B_1}$ , and  $B_0$  would have property  $P_{B_0}$  where  $A_1$  had property  $P_{A_1}$ . If indiscernibility is defined in terms of the sameness of the properties attributable to a pair of individuals, then clearly the individuals belonging to this pair are, on this interpretation of the discernibility of properties, discernible. This is because on this interpretation we have dropped the requirement that any difference in properties should be a difference which is empirically manifested, or a difference between such empirically manifest properties. I shall retain the term 'qualitative indiscernibility' for indiscernibility in the latter sense - indiscernibility between empirically manifest properties.

When we consider this argument specifically in relation to  $II_{i.w.}$ , we can see that it rests on a trivialisation of the principle. For in order for nonidentical indices to be assigned to the properties attributed to the individuals whose identity or nonidentity is in question, the nonidentity of those very individuals has to have been pre-established. In other words, the Identity of Indiscernibles now has to be formulated like this:

$$[(\forall F_x)(\forall F_y)((F_x x \equiv F_y y) \& x = y) \supset x = y] \quad (3)$$

where the identity given in the consequent follows trivially from the fact that the same identity is given in the antecedent.

But, the Transworld Identity theorist would argue, what looks like a trivialisation of the Identity of Indiscernibles in the intraworld context, is not a trivialisation in the transworld context.



Or rather, while the transworld indiscernibility (in some sense) of two individuals may give their transworld identity, it will not give their 'absolute' (see below) identity. Transworld identity will not eliminate their transworld distinctness. Let me explain this apparent paradox: it is the function of the qualifier 'transworld' to indicate the presence of the individuals whose names flank the identity sign in distinct worlds. The ontological or conceptual\* distinctness of those worlds entails the ontological or conceptual distinctness of the individuals. The Transworld Identity theorist argues that while the qualitative indiscernibility of two individuals existing in different worlds might ensure their transworld identity, their transworld identity in itself implies a distinctness which<sub>4</sub> is incompatible with their absolute (see below) identity, and from this distinctness it follows that although their empirically manifest properties are exactly similar, the distinctness of the two individuals entails that their properties can be indexed relative to each of them respectively, and are hence discernible. In short, from the transworld identity of two <sup>qualitatively</sup> ~~quantitatively~~ indiscernible individuals, neither their absolute indiscernibility nor hence their absolute identity follows, where by absolute identity I mean identity as defined independently of a framework of possible worlds. Intraworld identity is a species of absolute identity. Our question is, is the notion of identity which is applicable to worlds absolute identity, or a notion of identity which still admits of a certain ontological or conceptual distinctness in the individuals identified, as does the notion of transworld identity.

---

\* 'ontological' for the possible world realist, 'conceptual' for the possible world constructivist.

In order to begin to answer this, let us consider two situations (where we are reintroducing our 't.w.' and 'i.w.' subscripts)

$$(\exists w \in \mathcal{W})(\exists w' \in \mathcal{W}) [ [(\forall i \in I(w))(\exists j \in I(w'))(i =_{t.w.} j)] \text{ \& } [(\forall j \in I(w'))(\exists i \in I(w))(j =_{t.w.} i)] ] \quad (4)$$

$$(\exists w \in \mathcal{W})(\exists w' \in \mathcal{W}) [ [(\forall i \in I(w))(\exists j \in I(w'))(i \neq_{t.w.} j)] \text{ \& } [(\forall j \in I(w'))(\exists i \in I(w))(j \neq_{t.w.} i)] ] \quad (5)$$

If we admit that transworld identity follows from transworld indiscernibility, then (4) follows from (5). What we want to know is, does  $w =_{\omega} w'$  follow from (4)?

The Transworld Identity theorist might allow that if worlds are construed as nothing more than sets of individuals, then the fact that two worlds consist of the same (in some sense) individuals implies that they are the same (in some sense) world. But, he will remind us, although (5) is a sufficient condition (if it is a sufficient condition i.e. if  $II_{t.w.}$  is accepted) for (4), it is not necessary condition & two entirely discernible individuals may be transworld identical. Hence from (4) it does not follow that  $w =_{\omega} w'$ . So if we allow that from (4) it follows that  $w =_{\omega} w'$ , the sense of ' $=_{\omega}$ ' implied here is not compatible with the Indiscernibility of Identicals. In other words, it is not a notion of absolute identity which is represented by ' $=_{\omega}$ '.

So what notion of identity is thus represented? I suggest that it is a meta modal notion of identity - one which both helps to explicate modality, and is itself explicated by modality. Two possible worlds which share the same domain of individuals may indeed be regarded as two states of the same world, where 'world' is here understood in some metamodal sense. But they are not each the same possible world i.e. qua possible worlds they are distinct. Call this notion of identity, identity (1).

This is clearly not the sense of identity that is of interest to us in connection with the question of the indiscernibility of two worlds. What we want to know is, is  $(\frac{5}{2})$  a sufficient condition for the identity of  $w$  and  $w'$  in an absolute sense of identity i.e. does it render them identical qua possible worlds, or are there two distinct possible worlds here? Call this notion of identity, identity (2).

The question of whether the Identity of Indiscernibles applies to worlds is understood in the sense of identity (2), since indiscernibility is not even a necessary condition<sup>for</sup> - is not entailed by - identity (1). The 'identical twins' argument can claim to be a reductio ad absurdum of the Transworld Identity Theory position only if it assumes that Transworld Identity Theory endorses the Identity of Indiscernibles understood in terms of identity (2). That is, it is the Identity of Indiscernibles under this interpretation which the Transworld Identity theorist has to either reject or trivialise in order to escape from that reductio.

We can therefore pose our question once more, abolishing the subscripts ' $w$ ' and ' $w'$ '. Now '=' is to be interpreted as

identity (2) i.e. absolute identity, where intraworld identity is subsumed under absolute identity. Similar revisions are to apply to ' $\equiv$ '.

So, our renewed question is, can we from  $(\overset{5}{X})$  infer  $\omega = \omega'$ ?

The Transworld Identity theorist will use his trivialisation of the Identity of Indiscernibles - which he of course denies to be a trivialisation - to show that from the antecedent, viz  $(\overset{5}{X})$ , it does not follow that  $\omega = \omega'$ , hence nor does it follow that where this latter conclusion does not now violate the Identity of Indiscernibles.

Does his argument, which involves assuming the distinctness of the transworld identical individuals, and then indexing their respective properties in the appropriate way, hinge on an assumption concerning the ontological status of individuals, qua individuals? Ultimately, no, but it is interesting to trace the argument here, as it brings us face to face with the original purpose of the principle of the Identity of Indiscernibles, and hence helps us to assess the Transworld Identity theorist's defense via his interpretation of that principle.

Our first step is to challenge the Transworld Identity Theory strategem of indexing properties relative to the individuals which exhibit them, and thereby distinguishing properties which would otherwise be indistinguishable. To do so we adopt a Parmenidean, as opposed to a Democritean, view of worlds  $\neq$  a world is considered as a plenum, rather than as a set of individuals; it is to be viewed in the round, rather than in terms of constituent units.

We can, on this view, eliminate individuals from our ontology altogether. They are constructs, property-boxes differentiated and reified by us. The properties normally attributed to individuals may instead be attributed directly to the world in question, e.g. we could say that a world,  $\omega$ , exhibits property F at spacetime point,  $S_n$ .

Eliminating individuals in this way has eliminated the possibility of indexing the properties normally attributed to them. Any given world is now, not a set of individuals, but simply a property pool. If two worlds share the same distribution of properties, they are indiscernible.

Transworld Identity theory has a choice of moves at this juncture in the argument:

- (1) <sup>it</sup> ~~he~~ can opt to index properties relative to the worlds in which they are exhibited.
- (2) <sup>it</sup> ~~he~~ can opt to index properties relative to the spacetime points at which they are exhibited.

(2) ultimately boils down to (1), as indeed <sup>does</sup> the original suggestion to index properties relative to the individuals which instantiate them. A spacetime point  $S_n$  in  $\omega$  which shares the same co-ordinates with a spacetime point  $S_n'$  in  $\omega'$  is only distinguishable from  $S_n'$  in  $\omega'$  if each point is indexed relative to its own world.

Let us notice, however, the intimate connection between the identity of a particular spacetime framework, and the identity of a world. For in a sense, it is really (1) which boils down to (2): the worlds in question are distinct because their spacetimes are distinct. In this connection it is also advisable to remember the circumstances of the historical genesis of the Identity of Indiscernibles.

The Identity of Indiscernibles and the Relationist vs. the Substantialist View of Spacetime

In the framework of the Leibnizian system, the Identity of Indiscernibles<sup>(11)</sup> was used to corroborate the relationist view of spacetime. Leibniz did not question the assumption that the spatiotemporal coincidence, or spatiotemporal identity, of 'two' objects was sufficient to secure their identity. But according to a relationist view of space (and we shall now confine our attention to space, as opposed to spacetime), points in space are not ontologically given, ontologically antecedent to the existence and nature of physical entities. Rather they are a function of the nonspatial relations obtaining amongst those entities. The point of Leibniz's II postulate, within the context of his system, was to ensure that if (supposedly) two individuals share all their nonspatiotemporal relational and nonrelational properties, then it will be impossible for us to distinguish their locations in space and time. Hence they may be said to be spatiotemporally coincident. From this it follows that they are identical. For Leibniz then, the trivialisation of II<sub>i.w.</sub> proposed by Transworld Identity Theory, and by extension the Transworld Identity Theory treatment of the Identity of Indiscernibles for absolute identity, could never be acceptable: the intraworld numerical distinctness of individuals follows from their spatiotemporal distinctness, and their spatiotemporal distinctness is a function of the differences in their nonspatiotemporal properties and relations. Thus the intraworld nonidentity of individuals cannot be presupposed independently of attention to their nonspatiotemporal properties. This nonidentity is not ontologically given, in the sense of being ontologically antecedent to the particular sets of properties exhibited by the

individual in question. On a relationist view of space and time, in which spacetime points are not ontologically given, in this sense, it follows a fortiori that 'two' worlds which are indiscernible save for the alleged ontological distinctness of their respective spacetime frameworks, will in fact be identical, since the relationist view will of course in this case deny the ontological distinctness of those spacetime frameworks. The reason for this should by now be clear, but I shall spell it out just once more: a spacetime framework is, according to the Leibnizian relationist view, a construct out of a set of nonspatio-temporal (which we shall call 'qualitative') relations amongst individuals. Two indistinguishable sets of such qualitative relations will therefore demand the construction of the same spacetime framework. Two worlds manifesting the same set of qualitative relations amongst their individuals will therefore reduce to the same world.

In order for the Transworld Identity theorist to defend his interpretation of the Identity of Indiscernibles, he will find himself committed to a substantival/<sup>ist</sup> view of space. This might well be a consequence of his theory which he had not anticipated.

The substantival/<sup>ist</sup> view of spacetime does however provide adequate immunity against the Identity of Indiscernibles as Leibniz intended it. At any rate, it does so if the Identity of Indiscernibles is taken to be a principle i.e. a necessary, as opposed to a merely contingent, truth. The substantival/<sup>ist</sup> view asserts that the distinctness of spacetime points is ontologically given - given independently of the properties exhibited at those points. It

thus provides no evident justification for the claim that the sets of properties exhibited at any two such points must be qualitatively different. The claim of Transworld Identity Theory, that numerically distinct i.e. spatiotemporally distinct, individuals will be discernible just in virtue of that numerical distinctness i.e. spatiotemporal distinctness, thus appears on this view to be wholly unobjectionable.

The Transworld Identity theorist, being committed to a substantivalist view of spacetime, is committed to a substantival<sup>1st</sup> view of possible spacetimes. On this view of spacetime, his interpretation of the Identity of Indiscernibles is non-trivial and legitimate, but only because the substantival<sup>1st</sup> view already implicitly contradicts the Identity of Indiscernibles, or at any rate as Leibniz intended the latter to be understood.

#### The Transworld Identity Theory and the Problem of Qualitatively Indiscernible Worlds

This adherence to the substantival<sup>1st</sup> view of spacetime and possible spacetimes thus saves the Transworld Identity Theory from one paradox (viz the conclusions of the 'identical twins' argument), but it does not save it from the situation that a full-blooded, Leibnitzian rendering of the Identity of Indiscernibles would obviate, viz the unlimited proliferation of possible worlds which are qualitatively indiscernible. That is, the problem for Transworld Identity Theory is that it allows that for every world in the set of qualitatively discernible worlds, there will be an indefinitely great number of worlds qualitatively indiscernible from the prototype.



### Strengthening the Similarity Requirement

The Transworld Identity <sup>theorist</sup> Theory might seek to avoid this result so contrary to Occam's Razor by placing further constraints on the relation of ~~the~~ transworld identity. \* He might hope ~~to~~ thereby to invalidate the 'identical twins' argument, and so preserve a stronger, more Leibnizian interpretation of the Identity of Indiscernibles. One suggestion for such a constraint on this relation is that we should strengthen the similarity requirement. When this requirement was initially introduced, it was asserted that the minimum degree of similarity required for the transworld identity of individuals was that they should belong to the same sortal category. We can now impose a condition of intrasortal similarity: in order for  $j \in I(w')$  to be the trans-substantiation in  $w'$  of  $i \in I(w)$ ,  $j$  has to be not only (to a given extent) similar to  $i$ , but more similar to  $i$  than any other individual in  $w'$  is.

The imposition of this condition has the following result in relation to our 'identical twins' argument.  $A_0$  is now transworld identical, not with  $A_1$ , but with  $B_1$ , since  $B_1$  is more similar to  $A_0$  than is  $A_1$  (\*indeed this is a limiting case of similarity:  $B_1$  is not merely similar to, but qualitatively indiscernible from,  $A_0$ ) In the same way,  $B_0$  will be transworld identical, not with  $B_1$ , but with  $A_1$ , since  $A_1$  is more similar to  $B_0$  than  $B_1$  is. In this way,  $II_{+w}$  now becomes a limiting case of a principle, espoused by the Transworld Identity theorist, of transworld identity of discernible (but intra-sortally similar) individuals. More importantly, the Transworld Identity theorist can now allow the Identity of Indiscernibles for worlds, where the qualitative indiscernibility of

worlds yields their absolute identity. Thus he can allow, in the case of worlds  $\omega_0, \omega_1$  that  $\omega_0 = \omega_1$  without thereby incurring the paradoxical consequence that previously followed from <sup>the</sup> 'identical twins' argument, in the shape of an instance of intraworld identity of discernibles.

Let us examine a further example of this similarity condition. Suppose Brutus and Cassius to be inhabitants of our world,  $\omega_0 \in \mathcal{W}$ . Call them  $B_0$  and  $C_0$ . Then take a world,  $\omega_1 \in \mathcal{W}$ , inhabited by an individual  $B_1$ , more similar to  $B_0$  than to  $C_0$ .  $B_1$  therefore cannot be the trans-substantiation of  $C_0$  in  $\omega_1$  - unless there is an individual  $B_1'$  in  $\omega_1$  even more similar to  $B_0$  than  $B_1$  is; we are assuming this is not the case.

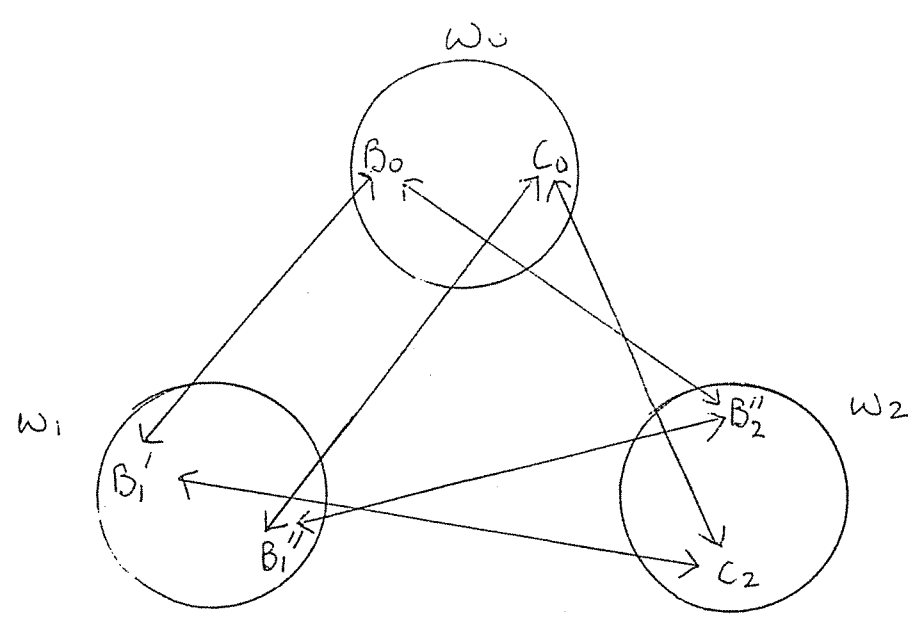
The situation just illustrated has extremely interesting implications for our existential notions. For now the determination of the relation of transworld identity between individuals depends not merely on the respective descriptions of the individuals in question, but also on the descriptions of all the other individuals in each of the worlds in question. Our possible natures are thus strongly interdependent - our potentialities are determined not in isolation but en masse. This means that I could not possibly have been more like you than like my actual self, and still been me, if you had been more like me than like your actual self. I could however have easily been as much like you as God cared to make me, and still been me, provided that you remained even more like, or indiscernible from, your actual self. In other words, how similar could I have been to you depends on how similar you could have been

to me, and vice versa. Such interaction and interdetermination of the identities of individuals within the domain of a given world represents a sharp divergence from conventional notions of identity and existence.

It would be fascinating to pursue the implications of this divergence from the conventional views, but we are unfortunately not justified in doing so here, for this new view follows from the assumption that the transworld identity relation is still workable under the new similarity requirement. This, as it turns out however, is not so. For now consider the following situation:

$B_0$  and  $C_0$  are inhabitants of  $\omega_0$  as before. Then suppose there is a world,  $\omega_1$  containing two individuals  $B_1'$  and  $B_1''$ .  $B_1'$  is more similar to  $B_0$  than  $B_1''$  is, though  $B_1''$  is also (intrasortally) similar to  $B_0$ . Hence  $B_1'$  is the trans-substantiation of  $B_0$  in  $\omega_1$ , and  $B_1''$  is the trans-substantiation of  $C_0$  in  $\omega_1$ .

Now suppose there is a further world,  $\omega_2$ , with inhabitants  $B_2''$  and  $C_2$ .  $B_2''$  is qualitatively indiscernible from  $B_1''$ .  $B_2''$  is more similar to  $B_0$  than  $C_2$  is. Therefore  $B_2''$  is the trans-substantiation of  $B_0$  in  $\omega_2$ .  $C_2$  is the trans-substantiation of  $C_0$  in  $\omega_2$ . But as  $B_2''$  is qualitatively indiscernible from  $B_1''$ , it is the trans-substantiation of  $B_1''$  in  $\omega_2$ . We can illustrate our results as follows:

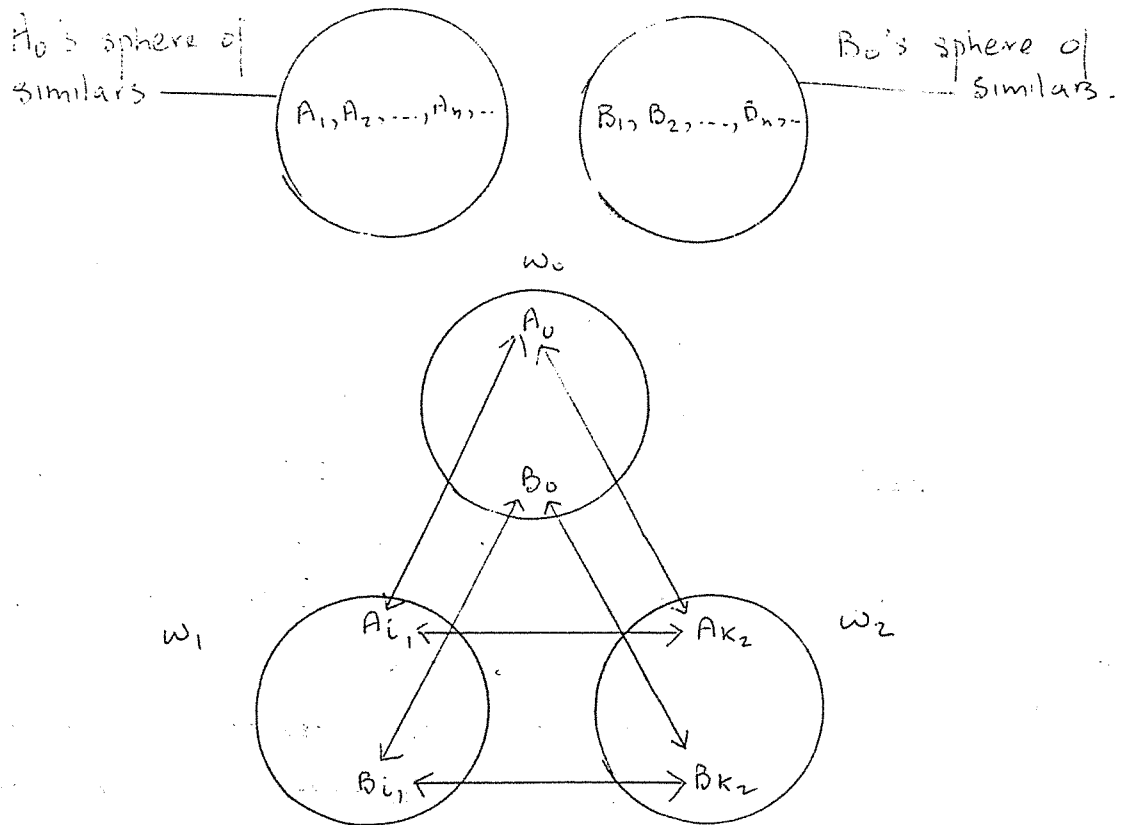


i.e.  $B_0 =_{tw} B_1' =_{tw} C_2 =_{tw} C_0 =_{tw} B_1'' =_{tw} B_2'' =_{tw} B_0$

This identifying of all the individuals in I, discernible and indiscernible alike, with its obliteration of the all-important distinction between transworld and intraworld identity, represents a reductio ad absurdum of the proposal to place the stronger constraint on the similarity - and hence the transworld identity - relation.

However this argument presupposes the transitivity and symmetry of the transworld identity relation. Since this is the identity relation, this seems unobjectionable, indeed unavoidable. But later we shall consider D. Lewis's counterpart relation, which need not be transitive or symmetric.

Can this reductio be dodged by making the similarity condition more strict still? The Transworld Identity Theorist might suggest the following strategem: the similarity relation is now to be construed as follows: each individual can be envisaged as the centre point of a 'sphere of similars' i.e. a set of individuals related to it by the (new) similarity relation. The similars can be envisaged as points on the radii, with degree of similarity diminishing with distance from the centre. But although there is a similarity continuum within any given sphere, which is to say, relative to any given individual (the centre point) within a world, there is no axis of similarity connecting any two individuals constantiated in a world. In other words, between any two such individuals, there is no continuous similarity scale. The spheres of similars for different individuals do not intersect: the (possible) individuals who become less and less like me, do not, as long as they may be said to retain any likeness to me (i.e. remain in <sup>my</sup> any sphere of similars), become more and more like someone else. In short, no individual in a given world can be said to be similar, in the new, strict sense, to any other individual in that world; nor can it be similar to more than one individual in any other given world. Note that the notion of similarity has, on this interpretation, undergone a strict quantification: only a specified degree of similarity (in the old sense) counts as similarity (in the new sense). The result of this new constraint on similarity - and it is the result that we set out to obtain - is that all my trans-substantiations are now more like my actual self than like any other individual in any possible world. We can illustrate this result as follows:



Under this condition, then, the transworld identity relation remains perfectly well-behaved.

My reaction to this latest Transworld Identity Theory strategem, however, would be to argue that the new requirement has strongly counterintuitive consequences. From the viewpoint of naive possible world theory there is surely no objection to positing a world at least partly inhabited by a family of clones. Indeed we can do better than that. The actual world is already such a world, hence there can be no objection, naive or otherwise, to positing such a world. We need only resort to merely possible worlds in order that the clones should become as similar to one another as we like:  $\rightarrow$

we want them to approximate a similarity continuum on some idealised similarity scale. Such a family of clones will of course represent the instantiation, in one world, of the entire sphere of similars of their single progenitor. Given the formal prohibition on the instantiation of more than one member of a given sphere of similars in any given world, the fact that such a possible world exists means that the sphere of similars of this particular individual, viz the progenitor, will contract to vanishing point - to the centre point, viz the original individual itself. The consequences of this would be that the trans-substantiation of this individual in any world would have to be exactly similar to, i.e. qualitatively indiscernible from, the original individual.

Since cloning is a process which all organisms can in principle undergo, this argument can be generalised to pertain to the possibility<sup>125</sup> of transworld identity amongst all organisms, ~~etc.~~. Hence the sphere of similars of all organisms will be collapsible in this manner. And since from a logical point of view there is no distinction between organisms qua individuals (i.e. qua members of I) and other individuals, the argument can be further generalised to regulate the possibilities of transworld identity amongst all individuals.

The net consequence of this argument is that for any  $i \in I(w)$ , its trans-substantiation  $j \in I(w')$  will have to be qualitatively indiscernible from  $i$ , i.e.

$$(\forall i, j \in I) [ (i =_{t.w.} j) \equiv (i \equiv_{t.w.} j) ] \quad (6)$$

The effect of this, in the terms of possible world semantical analysis, will be that every individual necessarily<sup>ily</sup> has all the properties that it has in the actual world. Since a crucial purpose of possible world semantics in this connection is to clarify the notion of identity by means of distinguishing the necessary (or 'essential') properties of an individual from its contingent properties and since this result nullifies that distinction, it is clearly a result which undermines the *raison d'être* of possible world semantics.

It may be the case that it undermines the possible worlds apparatus at<sup>a</sup> different level. To see this, however, requires some discussion of the relationship between the transworld identity relation and the alternativeness, or accessibility relation - the relation of relative possibility,  $R$ .

It is plausible to suggest that the relation of relative possibility,  $R$ , may be defined by constructing  $R$  out of the relations of transworld identity holding amongst the individuals in the worlds whose relative possibility is in question.

My proposal for effecting such a construction is roughly that if all the individuals in a world  $w_i$  have trans-substantiations in a world  $w_j$  then, since  $w_j$  furnishes alternatives to every individual in  $w_i$ ,  $w_j$  is possible relative to  $w_i$ . If furthermore, every individual in  $w_j$  <sup>has a trans-substantiation</sup> ~~has a trans-substantiation~~ in  $w_i$ , then  $w_i$  is also possible relative to  $w_j$ , and so the relation of relative possibility, or alternativeness, holding between  $w_i$  and  $w_j$  is here symmetric. We can lay down similar sorts of conditions for the transitivity of  $R$ , and, of course for its reflexivity. Moreover,



this method of constructing  $R$  will permit us to introduce a new variation of  $R$ , which I shall call 'partial' relative possibility or alternativeness. This relation obtains between  $\omega_i$  and  $\omega_j$  when some (but not all) of the individuals existing in  $\omega_i$  have trans-substantiations in  $\omega_j$  and some (but not all) of the individuals in  $\omega_j$  have trans-substantiations in  $\omega_i$ . Conditions can be laid down concerning the symmetry and transitivity of partial alternativeness.

But now let me formulate this proposal more rigorously.

(1) Every world is an alternative to itself i.e.  $R$  is reflexive for every world. The reason for this is that, for every individual belonging to a given world, there is an individual in that world which is (intraworld) identical with it i.e.

$$(\forall w \in \mathcal{W})(\forall i \in I(w))(i =_{i.w.} i) \quad (7)$$

Hence  $R$  is reflexive for every  $w \in \mathcal{W}$ .

(2) If for ~~any~~  $w, w' \in \mathcal{W}$ ,

$$(\forall i \in I(w))(\exists j \in I(w'))(i =_{i.w.} j) \ \& \ (\forall j \in I(w'))(\exists i \in I(w))(j =_{i.w.} i)$$

then  $R$ , in  $wRw'$ , is reflexive, symmetric, but not transitive.

(3) If for  $w, w', w'' \in \mathcal{W}$ ,

$$(\forall i \in I(w))(\exists j \in I(w'))(i =_{i.w.} j) \ \& \ (\forall j \in I(w'))(\exists k \in I(w''))(j =_{i.w.} k)$$

then  $R$  is reflexive, transitive, but not symmetric.

(4) If for  $w, w', w'' \in W$ :

$$\begin{aligned} & [(\forall i \in I(w))(\exists j \in I(w'))(i =_{t.w.} j)] \& [(\forall j \in I(w'))(\exists i \in I(w)) \\ & (j =_{t.w.} i)] \& [(\forall j \in I(w'))(\exists k \in I(w''))(j =_{t.w.} k)] \& \\ & [(\forall k \in I(w''))(\exists j \in I(w'))(k =_{t.w.} j)] \end{aligned}$$

then  $R$  is reflexive, transitive and symmetric.

In short, if the domain  $I$  of the set of all possible worlds is identical with the domain  $I(w)$  of each of its members, then every individual in every world has a trans-substantiation in every other world, and the relation of relative possibility, or alternativeness, holding amongst these worlds is an equivalence relation. If the alternativeness relation between three worlds,  $w, w', w''$  is merely reflexive and transitive, this signifies that  $I(w) \subset I(w') \subset I(w'')$ . If the alternativeness relation at a given world  $w$  is neither transitive nor symmetric, this signifies that the domain of  $w$  does not intersect with that of any other world. In other words, none of the individuals in  $w$  has a trans-substantiation in any other world.

But in none of the cases so far described have we dealt with the situation in which some, but not all, of the individuals in a given world have a trans-substantiation in a different world, and vice versa. Yet this situation is perhaps typical. I shall call the relation holding between such worlds the relation of 'partial' alternativeness,  $R'$ . The condition for partial alternativeness is thus as follows:

(5) If  $(\exists w \in W)(\exists w' \in W)[(\exists i \in I(w))(\exists j \in I(w'))$   
 $(i =_{t.w.} j)]$   
 then  $w R' w'$ ,

where  $R'$  is reflexive and symmetrical but not transitive.

Notice that the negation of (5) gives us  $R$  as reflexive only; in other words, if two worlds do not share any of the same individuals, then they are not even partial alternatives to each other.

Let us now return to our considerations on the latest proposal for strengthening the similarity condition on the transworld identity relation.

We have seen that this proposal leads to the conclusion that qualitative indiscernibility is a necessary condition for transworld identity of individuals. In the light of our above remarks on the relationship between the transworld identity relation between individuals and the alternativeness relation between worlds, we can predict that worlds will be possible relative to one another only <sup>to</sup> the same extent that they are qualitatively indiscernible from one another.

This general result needs some qualification when applied to particular modal systems. If  $R$  is an equivalence relation, as it is for  $S_5$  then every individual in every world in the  $S_5$  set of worlds will be transworld identical with some individual in each of the other worlds. But if, as the new similarity requirement entails, from the transworld identity of individuals follows their qualitative indiscernibility, then all the members of the  $S_5$  set of worlds will be qualitatively indiscernible. Such a set of worlds will be useless for semantical purposes. If  $R$  is merely transitive and reflexive, as it is for  $S_4$ , then the  $S_4$  set of worlds will be an ordered <sup>n-tuple</sup> ~~triple~~,  $\langle w_1, w_2, \dots, w_n \rangle$ ,

~~such that~~ such that  $I(w_1) \subset I(w_2) \subset \dots \subset I(w_n)$ .  
That is,  $w_2$  will be possible relative to  $w_1$  because  $w_1$  will have  
as members of its domain all and only individuals which have  
trans-substantiations in the domain of  $w_2$ . But  $w_1$  will not be  
possible relative to  $w_2$  because <sup>the</sup> ~~its~~ domain <sup>of  $w_2$</sup>  will include  
individuals which lack trans-substantiations in  $w_1$ . And so on for  
the other worlds. Thus the members of the  $S_4$  set of worlds are  
not all qualitatively indiscernible from one another, but within  
that set one world,  $w_i$  is possible relative to another  $w_j$  only  
insofar as  $w_i$  contains a qualitative duplicate, so to speak, of  $w_j$ ,  
i.e. iff the domain of  $w_i$  includes individuals which are trans-  
world identical with, and qualitatively indiscernible from, every  
individual in the domain of  $w_j$ .

We could spell out the results of our analyses of the altern-  
ativeness relation for each of the <sup>modal</sup> ~~mortal~~ systems, but the general  
result would in each case be that alternativeness supervenes on  
some degree of qualitative indiscernibility amongst the worlds  
thus related. This result inverts the entire purpose of the  
alternativeness relation - since alternativeness ordinarily  
implies qualitative difference. When a set of alternatives all of  
become qualitatively indistinguishable, it becomes superfluous to  
introduce them. I take this result, therefore, to be damnatory  
of the possible world apparatus.

If this result does indeed follow, in the way I have argued,  
from the new similarity requirement, then the Transworld Identity  
theorist will be driven to relinquish this requirement. This will  
leave him in the position in which the original 'identical twins'

argument left him. That argument, we remember, brought him into collision with the Identity of Indiscernibles, rendering him unable to prevent the proliferation of qualitatively indistinguishable worlds. We have introduced two stronger constraints on the transworld identity relation in order to avoid that result, but both these have failed. Nor will the Transworld Identity theorist do himself any good by jettisoning the minimal similarity condition - The requirement that transworld identical individuals belong to the same sortal category. For the 'identical\* twins' argument did not require this condition as a premise in any case. Besides, if it had, we saw that even philosophers such as Kripke who are unwilling to construe transworld identity as supervening <sup>do conceive it as entailing a certain minimal degree of similarity, viz that</sup> on similarity/entailed by essence preservation. It therefore seems open to question whether this minimal requirement could coherently be rejected.

One Man's Alternative to Transworld Identity Theory:  
the Counterpart Relation

David Lewis substitutes a new relation, which he calls the counterpart relation, in order to avoid the problems raised by the transworld identity relation. Let me quote Lewis' own account\* of his motivation, and his explication of his innovation:

"Unactualised possibles, things in worlds other than the actual one, have often been deemed *"entia non grata"*, largely because it is not clear when they are or are not identical. But identity literally

---

\* 'Counterpart Theory and Quantified Modal Logic', JP 68, p. 114-115.

understood is no problem for us. Within any one world, things of every category are individuated just as they are in the actual world; things in different worlds are never identical,... The counterpart relation is our substitute for identity between things in different worlds. Where some would say that you are in several worlds, in which you have somewhat different properties and somewhat different things happen to you, I prefer to say that you are in the actual world and no other, but you have counterparts in several other worlds. Your counterparts resemble you closely in content and context in important respects. They resemble you more closely than do the other things in their worlds. But they are not really you. For each of them is in his own world, and only you are here in the actual world. Indeed we might say, speaking casually, that they and you are the same; but this sameness is no more a literal identity than the sameness between you today and you tomorrow. It would have been better to say that your counterparts are men you would have been, had the world been otherwise.

The counterpart relation is a relation of similarity. So it is problematic in the way all relations of similarity are: it is the resultant of similarities and dissimilarities in a multitude of respects, weighted by the importance of the various respects, and by the degrees of the similarities."

The formal conditions imposed by Lewis on the counterpart relation are as follows:

- (1) If an individual  $A_1$  is the counterpart in  $\omega_1$  of  $A_0$  in  $\omega_0$ , then  $A_1$  is more similar to  $A_0$  than is any other individual in  $\omega_1$ .
- (2) The counterpart relation need not be transitive (since similarity - particularly strong similarity as defined in (1) - need not be transitive).
- (3) The counterpart relation need not be symmetric (since while  $A_1$  might be more similar to  $A_0$  than is any other individual in  $\omega_1$ , there might be an individual in  $\omega_0$  which is more similar to  $A_1$  than  $A_0$  is).

- (4) The counterpart relation need not be a one-one relation.
- (5) Not every individual in a given world has a counterpart(s) in every other world.

This set of conditions completely immunises Counterpart Theory from all the arguments I advanced against the Transworld Identity Theory. My first argument presupposed the absence of condition (1) on the transworld Identity Theory relation. My second argument then imposed condition (1), but presupposed the absence of conditions (2), (3) i.e. it presupposed that the transworld identity relation was both transitive and symmetric. My third argument presupposed the absence of condition (4).

It would therefore seem that, if my objections to Transworld Identity Theory were justified, the counterpart relation rightly displaces the transworld identity relation in possible world semantics. Counterpart Theory raises no questions about the Identity of Indiscernibles, because it is not a theory about identity. Therefore the question whether or not to admit qualitatively indiscernible worlds does not arise; at any rate, it is not directly precipitated by the role of the counterpart relation.

I have two things to say about the counterpart relation. The first is an endorsement of it in its general metaphysical aspect. The second is a rejection of conditions (2), (3), (4) above. For I think that while the counterpart relation is better adapted to its metaphysical purpose than is the transworld identity relation, its metaphysical role also demands that it should be a 1:1 equivalence relation. But then, as such, it will still be open to the objections I have presented in this chapter.

In what respect, then, is the counterpart relation peculiarly well adapted to the metaphysical situation embodied in the possible world apparatus? Let us recall my earlier remarks concerning 'metamodal' identity. Those remarks occurred in connection with the question whether two qualitatively indiscernible worlds were identical. This question itself demanded qualification, calling for a distinction between two senses of identity. In a certain metamodal sense, all possible worlds, or worlds possible relative to one another, are the same world, or states of the same world. But in another sense, possible worlds may only be said to be identical if they are the same possible world - as opposed to the same metamodal world.

We can here apply this distinction to transworld identical individuals. In a metamodal sense, a set of transworld identical individuals is just the set of (possible) states of a unique individual, i.e. there is 'really' just one individual in question in this case. However, qua possible individuals, the members of this set are really (i.e. ontologically) distinct. There is thus a tension in this situation, in that at different ontological levels these individuals are both identical and distinct. The transworld identity relation does not, I think, allow this tension proper expression; it does not bring out the ontological distinctness, qua possible individuals, of the individuals it relates. The counterpart relation, in contrast, acknowledges this distinctness, but is also intended to simulate, to some extent, the identity relation. The counterpart relation does therefore reflect the tension that we pointed out as being objectively intrinsic in the metaphysics of the possible world apparatus.



The question is, does the counterpart relation succeed in reconciling distinctness with identity? This brings me to my objection to conditions (2), (3), (4). Any relation which purports to be a surrogate for identity must, I think, share the essential properties of the identity relation. These I take to be that it is a one : one equivalence relation. David Lewis would doubt less reply that the counterpart relation is a (strong) similarity relation, and that it is this which qualifies it to serve as a surrogate for identity. For identity, in an ordinary, intra-world context, entails qualitative indiscernibility, where qualitative indiscernibility is the limiting case of similarity. But at the same time, Lewis would point out, the fact that the counterpart relation is a similarity relation precludes it from being a one : one equivalence relation, since strong similarity, as defined in condition (1), need not be either transitive or symmetric or one : one.

My rejoinder would be that this latter feature of similarity demonstrates its unfitness to act as a surrogate for identity. In defense of this I would cite the kind of modal claims we are in fact prepared to make.

Let me offer some examples. I believe I would be prepared to countenance a high degree of (intra-sortal) dissimilarity from my actual self in my possible selves, if circumstances required such a claim. But I can think of no circumstances which would make me willing to claim that I could have been, say, ten different women, all at once. That is, there may of course be ten alternatives to the way I am, but no one of these alternatives is

that I am ten distinct women all at once. Nor would I ever be prepared to deny that the person I could have been, could have been me, nor, again, that if I could have had a certain property,  $\Phi$ , and having had  $\Phi$  would have made me capable of having  $\Psi$ , then I could have had  $\Psi$ .

Consider once more the analogy between identity across worlds and identity through time. Temporal identity is a one : one equivalence relation. I cannot, in the future, become ten different selves, while still remaining myself.\* The future of my future self is my future. I am the past self of my future self.

David Lewis likens the relation between identity-through-time and 'literal' identity to the relation between the counterpart relation and 'literal' identity. He implicitly appeals to the acceptability of the identity through time relation in order to confer acceptability on the allegedly analogous counterpart relation. I agree that there is an analogy between these two relations : identity-through-time does reconcile the distinctness and qualitative difference of different time slices of an object with the persisting identity of that object. But as I have already remarked, identity through-time is a one : one equivalence relation, and hence is formally equipped to do the work of the identity relation, or to be a variant of identity. But the counterpart relation is not. Hence I think it cannot serve as a

---

\* There are the troublesome cases of cloning and cell and organism division. But these are special cases which call for special decisions as to how the identity relation should be made to behave. We do not need to go into this borderline problem here.

surrogate for identity. Nor can the need for at least a surrogate for identity in this context be denied. When I claim that I could have been such and such, or could have done so and so, I am talking about myself. \* The 'I' who is such and such is me, if not literally my actual self, at least a self which simulates identity with my actual self.

In my view, then, the imposition of conditions (2), (3), (4) on the counterpart relation is unjustified. Yet it was conditions (2), (3), (4) which immunised Counterpart Theory from the objections presented in this chapter against Transworld Identity Theory. If conditions (2), (3), (4) are unjustifiable, in the light of the purpose Counterpart Theory is intended to serve, then those objections cannot be escaped by adopting Counterpart Theory in place of Transworld Identity Theory.

## Postscript to Chapter 2

I find, after completing this chapter, that L. Sklar, in *Space, Time and Spacetime*, p. 176-178, has presented an argument very similar to my initial, 'identical twins' argument. Sklar offers his argument as a counter-example to a particular version of the Identity of Indiscernibles, viz the identity of indiscernible worlds, but argues that it does not succeed as such, and hence serves rather to confirm, than to refute, this principle. Let me state his argument.

He proposes, as a third version of the principle of the Identity of Indiscernibles, (<sup>the</sup>~~The~~ two earlier versions having been concerned with the identity of indiscernible individuals), ~~The~~ the following: P.3. Suppose we have possible worlds A and B such that they are the same with regard to every purely qualitative feature. Then A is the same possible world as B.

A counterexample to P.3., he says, would have to show two possible worlds, A and B, such that (1) A and B have every qualitative feature in common, (2) yet A is a different possible world than B. He suggests the following such example, 'Suppose our only two qualitative properties are F and G, and the individuals of possible world A can be denoted a and b. Let A be the possible world in which a has F and not G, and b has G but not F. Consider the possible world B in which b has F and not G, and a has G and not F. Isn't B qualitatively just like A? In both there is one thing with F but not G, and one thing with G but not F. But isn't A a different possible world than B, since the thing with F but not G is in A but b in B?'

Sklar then argues that we cannot regard  $a$  in  $A$  as transworld identical with  $a$  in  $B$ ; he assumes that the criterion of transworld identity is commonality of essential properties. Since  $a$  and  $b$  each have, in his example, only one property, then this property must be in each case the essential property. Hence  $a$  in  $A$  must be transworld identical with  $b$  in  $B$ , and  $b$  in  $A$  must be transworld identical with  $a$  in  $B$ .

The difference between this argument of Sklar's and my 'identical twins' argument is that my twins differ in respect of nonessential properties. Their strong mutual qualitative similarity, and similarity of origins, is intended to ensure that they share all the same essential properties (if these be admitted). Hence even if we accept essence-preservation as a criterion of transworld identity - and of course it is this criterion which is at issue, in my argument, and which cannot be merely assumed - then the identical twins argument still provides a counterexample to P.3.

Sklar does not develop, or make any further use of, this argument.

POSSIBILIA AS NOUMENA: EPISTEMOLOGICAL OBJECTIONS  
TO BASIC MODAL REALISM

If possibilia are real, or mind-independent, entities, how do we acquire our knowledge of them? It is this epistemological question which I want to pursue in the present chapter. It is a question which arises at the level of basic modal realism, and our answer to it will carry over into our attitude to possible worlds.

Four Epistemologies for Possibility

In Chapter 3 I alluded to various possible views on the epistemological significance of the existence of uninstantiated ideas. I now want to develop those suggestions, distinguishing four epistemological theories concerning our ideas of possible objects. I shall call these theories the Rationalist view, the empirical idealist view, the empirical or natural realist view, and the subjective idealist view, respectively. After initially outlining the views, I shall add some critical comments.

(1) The Rationalist view of possibility. I am here construing this as both a realist and an a priorist view. That is, it affirms the reality of the objects which are represented in thought - in this case, possibilia. At the same time it denies an empiricist epistemology for our knowledge of these objects. By an empiricist epistemology I mean, in this context, an epistemology which attributes our knowledge of the objects in question, viz possibilia, to the causal interaction of these objects with our minds. I do not mean an epistemology which views all our knowledge as being derived from the causal interaction of our minds with actual objects: according to such an epistemology, our ideas of possible objects would be constructed out of our experience of the properties of actual

objects. Such a view would thus not be realist with respect to possibility - or not, at any rate, in the sense in which 'realist' is being understood here.<sup>1</sup> The view is, in fact, that which we shall be describing below under the title of empirical idealism (with respect to possibility). For the Rationalist view to account for our knowledge of these real objects, viz possibilia, it would have to propose either a pre-established harmony between these ideas and their objects, or a view according to which both ideas and objects reflect certain fundamental principles of reason, so that we could discover how the objects are by consulting our ideas. A further, more tenuous, option open to the Rationalist is to postulate the ontological efficacy of ideas, so that the ideas of possible objects somehow have the power to bring those possible objects into existence.

(2) The empirical idealist view of possibility.<sup>2</sup> This rejects realism with respect to possibility. Its rejection of this realism is a consequence of its empirical realism with respect to actual objects. <sup>For it is committed to the exclusive reality of actual objects.</sup> This commitment follows from an assumption

---

1 Such views are sometimes described as realist, because according to them, the language of possibility furnishes an indirect way of speaking about the actual world, which is real. But this is clearly not the sense in which I wish 'realist' to be understood here. (See Ch. 5) Also, it should be clear that I am here using 'empiricism' to connote an essentially causal epistemology, and hence one which confirms the reality of the objects which cause the corresponding knowledge of them.

2 Known as the 'jumble theory' of imagination. (See Ch. 6)

concerning the kinds of entities which may participate in causal processes. For the empiricist adheres to the general principle that our ideas, or knowledge, of objects must be causally produced by the interaction of those (real) objects themselves with our minds. The empirical idealist (with respect to possibility) assumes that only actual objects can participate in causal interactions. Hence he denies that possible objects could causally produce our ideas of them. It follows, for him, that possible objects are not real*i.e.* do not really exist, and hence that the ideas which we purportedly have of them are not ideas of real objects, but are constructs, which must be otherwise explained.

Alternatively, the empiricist can forgo any presuppositions concerning what kind of entities can participate in causal interactions. We can suppose that he conducts an honest search for a causal mechanism operating between hypothetical metaphysical entities, viz. *possibilia*, and our ideas of possible objects, and that he fails to find one. He then concludes that there are no such objects, and that our ideas of them are therefore not acquired according to the empiricist principle. He further concludes, not that this constitutes counterevidence against his empiricist principle, but that these ideas, ostensibly of possible objects, have really been derived from our experience of the actual world, this experience having undergone a certain amount of conceptual reorganisation.\*

---

\* For an outline of the empirical idealist's account of the psychogenesis of ideas which are ostensibly of *possibilia*, see Ch. 6.



(3) The empirical or natural realist view of possibility.\* This view, like the empirical idealist/<sup>view</sup> adheres to the principle of empiricism. Let me compare the reasoning of the two views, in order to bring out the contrast between them.

The empiricist principle to which I have been adverting, and to which both the empirical idealist and empirical/<sup>realist</sup> (both with respect to possibility) subscribe, can be stated as follows.

The empiricist principle: for all (subjective) ideas\*\* and for all (real) objects, ideas can only be considered as constituting knowledge of (real) objects i.e. as 'matching' objects, if they are the product of causal interaction between the objects they purportedly match and the mind.

A corollary of this principle is that where no such causal mechanism exists, there is no correspondence between ideas and real objects. There may in this case be real objects, of which there are no ideas, or there may be ideas, of which there are no real objects.

The empirical idealist with respect to possibility denies that any causal mechanism connecting our minds with possibilia exists. His reasons, as we have seen, are either that the nature of causality is such that it precludes causal connections between actual objects

---

\* Such a view is suggested by W.D. Hart, in 'Imagination, Necessity and Abstract Objects' in *Studies in Frege I*, ed. Verlag, Hulzboorg.

\*\* Inevitably, I am using this Lockean term, 'ideas', very loosely, but I do not think that this will lead to any confusion in the present context.

and metaphysical entities, or simply that a search for such a mechanism has proved unsuccessful. Since there is thus, according to him, no causal mechanism connecting ideas of possible objects with real objects, there can be no matching of those ideas with objects. From the corollary of the empiricist principle, it follows <sup>there are no ideas of possible objects, or that</sup> either that/there are no real objects of those ideas. Since in the case of possible objects it is the ideas which are given, the empirical idealist concludes that there <sup>are</sup> ~~is~~ no real objects of such ideas i.e. possibilia do not really exist.

The empirical realist, on the other hand, while he endorses the empiricist principle and its corollary, is not convinced that there is no causal mechanism connecting our ideas of possible objects with real, metaphysical entities. He rejects the view that there cannot be such a mechanism. And although he has not actually discovered the mechanism himself, he does not believe that it has been shown not to exist. He believes that it is embodied in the imagination.

(4) The subjective idealist view of possibility. As we have seen, empirical idealism with respect to possibility is an idealist view of possibility which is held in conjunction with, and sometimes as a presumed consequence of, a ~~realist~~ view of actual objects. I add subjective idealism to our list of epistemologies for possibility only for the sake of exhaustiveness; <sup>it is</sup> as the view of possibility which would be included in a wider subjective idealism, <sup>viz one</sup> according to which not even ideas of actual objects are matched by real objects. ~~As it happens, however, I doubt whether such a wider subjective idealism, according to which not even ideas of actual objects are matched by real objects.~~ As it happens, however, I doubt whether such

a wider subjective idealism can answer the demand for an adequate general epistemology in any case. In addition, I think that on such a view a distinction between ideas of actual and of possible objects would be hard to establish in the first place. However I shall not discuss these questions here, because criticism of either empirical or subjective idealism with respect to possibility is in the present context superfluous. For the aim of this chapter is to attack the epistemology of basic modal realism. I shall therefore confine my critical remarks to the two realist views, (1) and (3), the Rationalist and the empirical or natural realist views respectively.

We can bring out the distinction between these two views by a metaphor: according to (1), we lack the kind of direct access to the realm of possibilia that we have, via perception, to the realm of actualia. Rather we are as spectators at a slide show, with though the slides <sup>are</sup> not taken by an ordinary camera). According to (3), on the other hand, we do have direct access - we are literally tourists in that realm.\* Without metaphor, we can state the contrast as follows: according to (1), imagination provides us with

---

\* In drawing this distinction we are begging certain fundamental questions about the kind of access that perception does provide to the actual world. Some would say precisely that it gives, not direct access, but a representation. But I shall here assume a naive realism with respect to perception, and any further ambiguities can be cleared away by specification of the role of causal factors. This will become clearer as we proceed.

the means for constructing a map of the realm of possibilia; according to (3), imagination provides us with

direct evidence of the contents of that realm.

### The Rationalist Option

Let us now turn our critical attention to view (1). We shall first interpret it as postulating a pre-established harmony between ideas of possibilia and those possibilia. I won't pause long over this interpretation, because the assumption of a pre-established harmony is a confession of failure - failure to provide an epistemology for the knowledge in question. Without a God to help out as the establisher of the said harmony, the 'pre-' of the pre-established harmony begs all the interesting questions.

Certainly if we entertain a set of ideas, and these ideas are matched by real objects, without the latter having caused the former, or the former, the latter, or both having been derived from a common antecedent cause, then this situation indeed constitutes what might be called an established harmony. But to call it this is just to articulate the problem that this situation presents, which is, why does this harmony obtain?

I think we can also dispense quite quickly with the interpretation of (1) which confers a causal role on ideas - the power to bring into existence the real objects of which the ideas in question are the ideas. So far as I know, historical Rationalism i.e. Rationalism with respect to our knowledge of actual objects, has never taken this form. This is just as well. For consider what such a theory would be like. It would assert that actual objects are somehow really generated by our ideas of them, or our <sup>having</sup> ideas of them. But our ideas are themselves amongst the contents of the actual world, since they are the product of actual minds. Yet the actual world, according to

this theory, came into existence as a result of the causal activity of ideas. Did ideas then cause the minds (which are contents of the actual world) of which they are themselves the product?

Perhaps the theory could be groomed so as to circumvent this crude inconsistency. This would presumably be achieved by the ascription of some transcendental status to minds, to set them metaphysically apart from the other contents of the actual world. But ugly consequences still abound. For now the theory entails that the genesis of the world, complete with all its traces of a long historical past, occurs simultaneously with the advent of minds in the world. That is, in spite of all the evidence that minds made their appearance in the world a very long time after the world's beginning (if there was a beginning), we have to assume that the world came into existence as an effect of the activity of minds, and hence did not antedate the existence of minds. This makes nonsense of realism. The same nonsense can be made of realism with respect to possibility: possibilia would, according to this theory, only become real after, and as an effect of, being thought of. This would render all the operations of modal logicians on hypothetical sets of possible worlds vacuous, since these worlds have certainly not yet been individually imagined or conceived of, and until they are, no such worlds exist.

The most interesting interpretation of Rationalism is that which postulates that ideas reflect the same rationalist principles ('principles of reason') as do their ostensible (real) objects, so that we can discover how those objects are by consulting our ideas. This is a view which affirms a prior knowledge of reality - where 'reality' includes the actual world, as well as any other

metaphysical domains that are presumed to exist. e.g. the domain of possibilia.

I take it that almost all contemporary philosophers would reject this Rationalist principle as applied to our knowledge of the actual world. That is to say, we would not nowadays suppose that the mind is in principle capable, by a priori methods alone, of constructing an exhaustive representation of the external world. I want to suggest, however, that exactly the same Rationalist principle is being invoked by the Rationalist with respect to possibility, when he claims that the mind can effect an a priori representation of a particular genre of real entity viz possibilia. As uncongruous as this general principle of Rationalist epistemology is with the modern outlook, I think that most people assume - albeit subconsciously - an epistemology of this sort when it is knowledge, not of actual objects, but of possible ones, that is in question. To criticise this Rationalist theory in its own terms would be a difficult and perhaps doomed undertaking. I shall content myself here with pointing out the general principle of which Rationalism with respect to possibility is a special application, in the hope that this in itself will prove such a deterrent to Rationalism with respect to possibility that I may be excused from providing a critique of the latter. I want to note, however, before moving onto view (3), that in denying that our knowledge of necessary truths is (always) a priori, Kripke, in Naming and Necessity, is implicitly rejecting a Rationalist epistemology for our knowledge of necessities. Since the necessities with which he is concerned are, as he expressly states, metaphysical

necessities. Since the necessities with which he is concerned are, as he expressly states, metaphysical necessities, it follows (by the interdefinability of necessity and possibility) that he is implicitly rejecting a Rationalist epistemology for our knowledge of possibilities. Yet he does not address this epistemological problem directly; he does not suggest an epistemology for our knowledge of possible objects.\*

Let me now turn to the view I called empirical or natural realism with respect to possibility. In its attempt to reconcile basic realism with an epistemology which satisfies our present intuitive standards of viability for epistemologies - in other words, with an empiricist epistemology - I think it is the view most deserving of our serious attention.

#### The Natural Realist Option

As we have already noted, this view rests on the highly controversial assumption of causal interaction between possibilia and our ideating faculties. One's initial reaction to this assumption tends to be a dogmatic assertion that the domain of actualia and the domain of possibilia are causally disjoint - that there is no spatiotemporal, and hence no causal, connectivity

---

\*Kripke is not, as I remarked earlier, very explicit about what he takes his ontological commitment vis a vis possibilia to be. He describes the notion of possible worlds as a metaphor. Yet he affirms metaphysical necessity, which I take to imply an affirmation of metaphysical (or ontological) possibility. Hence I take him to be a basic realist with respect to possibility but a possible world constructivist. As a basic realist it is incumbent on him to offer some kind of epistemology for our knowledge of possibilia.

between the two domains. But then one realises that this too, as it stands, is merely an assumption - and precisely the one that the natural realist contests. The onus of proof, or defense, we find, rests with us.

W. D. Hart, in his paper 'Imagination, Necessity and Abstract Objects'\* suggests a theory - or as he calls it, a speculation - which I take to be in some respects a version of what I have here called natural realism. "The really crucial question is whether .... all modal knowledge is a posteriori or some of it is a priori, for historical failures of nerve notwithstanding, empiricism ought to be the view that all knowledge is a posteriori. Very roughly, I (distinguish) between a posteriori<sup>vi</sup> and a priori knowledge as follows: knowledge that p is a posteriori when the subject matter of the knower's belief, or the ground or reason of his belief, is invoked in the correct causal explanation of the genesis of his beliefs; otherwise knowledge that p is a priori....

....Is the contemporary assumption that ... possibilia are inert so plainly justified as it might at first seem?.....

The capacity to imagine confers the ability to plan; ceteris paribus, the ability to plan increases an animal's chances of survival. Imagination is epistemic access to other possible worlds and possibilia; such imaginative access will only increase one's chances of survival if, say, the possible dangers it reveals really are, as a matter of independent and objective fact, possibilities. So, by natural selection, it stands to reason that

---

\* op.cit. p. § 81



we should have imaginations which give us access to other possible worlds and possibilia whose existence is independent of our access to them. In this way the theory of evolution to some extent naturalises the epistemology of possibilia whose existence is independent of our imaginative contemplation of them. This... speculation (and it is only that) does not leave possibilia inert; but it is silent about mechanisms of access?" (p. 189-190)

We shall consider the evolutionary argument for natural realism a little later. For the moment, let us focus on the supposition that possibilia are not 'inert', i.e. that there may be causal interaction between actualia and possibilia. Despite its radical appearance, this supposition is not wholly without precedents. At least one of its precedents is none other than the archetypal Plato himself, for Plato claimed that certain real but nonactual entities, viz Forms, determine the nature both of actual objects, and of our ideas. Plato expresses his incipiently causal thesis in the following passage from Hippias Major 287 c - d:

'If beauty is that by which beautiful things are beautiful, and if beautiful things exist, beauty exists. Beauty is not a word, not a thought, not a concept. It is an existing thing, for the things it makes beautiful are existing things, and they are not made beautiful by our words or thoughts or concepts'.

Forms thus have the power to influence actualia - to shape their nature. They also have the power to shape our ideas. This is the important point for us of the Platonic precedent: that it allows, indeed requires, that metaphysical entities interact with the contents of the actual world. Plato expresses his criterion of ontological commitment in the Sophist, 247e, thus:

'My notion would be, that anything which possesses any sort of power to affect another, or to be affected by another, even for a moment, however trifling the cause and however slight and momentary the effect, has real existence; and I hold that the definition of being is simply power'.

Clearly this Platonic definition not only legitimises the move of the natural realist, but demands it: if possibilia exist, then they must have some effect; the most natural, because detectable, power to assign to them is a power to produce ideas of themselves in actual minds.

Our attitude to the natural realist view will be influenced by our attitude to this Platonic principle of ontological commitment. In my own opinion, which I shall not here defend, this is an extremely strong metaphysical principle, comparable to, say, Occams Razor. Occams Razor is not logically demonstrable, but it serves to constrain metaphysical speculation within plausible limits, deleting from ontology features which would intuitively appear to be redundancies and excrescences. Plato's principle has a similar sort of pruning function. If we accept this principle, it is credible that if possibilia exist, then they cause our ideas of them. But it also follows that if we can demonstrate the lack of a causal connection between hypothetical possibilia and our ideating faculties, then the conclusion that possibilia do not exist inherits this high degree of credibility.

Possibilia as Causal Agents: the Localisation of Possibilia in Spacetime

Let us now turn back to natural realism. Our first question is simply what will a theory postulating causal interaction between actual objects and metaphysical entities, in this case possibilia, look like?

Presumably any such theory will have to retain the requirement that causal processes occur exclusively in spacetime, because one of the essential features of causal processes is their direction, where this is of course a temporal direction. Another feature of causal processes is the role played in them by contiguity i.e. the spatial continuity between cause and effect. It may be that the latter feature is not really essential to causation; action at a distance may be admitted in the end after all. But that causation should have a temporal direction is essential: even if we do not insist that this direction must be from earlier to later, we do require that it be either from earlier to later or from later to earlier. For these reasons I think we must demand that causality remain confined within a spatiotemporal framework.

This condition on causality leaves only one option for the natural realist, namely to locate possibilia in spacetime. The spacetime in which he locates them must however be modally neutral i.e. it can neither be exclusively actual, nor exclusively possible, since it is simply analytic that the contents of exclusively actual spacetime must be actual, and the contents of exclusively possible spacetime, possible. In order to locate itself both actual objects and possible objects in spacetime, spacetime/ must be neither actual nor possible, but capable of containing both actualia and possibilia.

41

The relationist, as opposed to the substantivalist view of spacetime might be thought to satisfy this requirement. The substantivalist view treats spacetime as a physical entity, and therefore calls for the actual/possible distinction to be made with respect to it. But the relationist view treats it as a construct, a geometry or set of geometrical relations amongst physical entities, a conceptual ordering of those physical entities. It is plausible to suppose - though I will not argue for the claim here - that for such conceptual constructs the distinction between actual and possible is not appropriate. Let us here assume this to be so.

On the relationist view of spacetime then, it seems innocuous to say that possibilia are located at particular points in spacetime. But at which points are we to locate individual possibilia? In order to answer this question, we have first to determine whether or not possibilia are particulars.

If possibilia are not particulars, then they will presumably have the same sort of status as either facts or propositions, on the one hand, or kinds (of objects or events), on the other. But according to the natural realist they are particulars, precisely because they are on his view, localised in spacetime. Facts or propositions are not localised in spacetime, though they may concern objects or events which are. Kinds have as their extensions objects or events which are localised in spacetime; but being abstract objects they are not themselves thus localised: a kind may be instantiated at a particular point, but it is not itself localised at that point. We conclude that possibilia, being local are on the natural realist's view, particulars.

Let us consider how this point bears on the following example. Suppose  $X$  is a particular woman, and  $\phi$  is a possible event of biological conception on  $X$ 's part (i.e. in  $X$ 's body). The natural realist says  $\phi$  must be localised in spacetime. But at which point(s)? One answer may be that  $\phi$  is possible at  $X$  from the first moment of  $X$ 's sexual maturity until the onset of her infertility. A second, alternative answer may be that  $\phi$  is possible at  $X$  only at those moments in which  $X$  is engaged in, or has recently been engaged in, sexual intercourse. The first answer proceeds from a view we could describe as the dispositional view of possibility, which links the localisation of possible events with the dispositions, or powers, of particular actual objects. The second answer proceeds from a more strictly causal view of possibility, which links the localisation of possible events to appropriate constellations of causal factors which actually obtain.

Both these answers, as they stand, are inaccurate. The possible event whose spacetime co-ordinates the natural realist wishes to establish is a particular. As such it must occur at a particular place and time. The name ' $\phi$ ' as used in the above two answers names not a particular, but a kind of event. As such, it does not name something which can be localised. A more accurate formulation of these answers, reflecting the dispositionalist and the stricter causal view respectively, would be as follows.

1) A series of possible events  $\phi_1, \phi_2, \dots, \phi_n$  can be mapped onto the segment of  $X$ 's worldline which begins with the first moment of  $X$ 's sexual maturity and ends with the onset of her infertility, such that there is a one-to-one correspondence between

each member of the  $\Phi$ -sequence ~~series~~ and each point in that worldline segment.

2) There is a set of discontinuous  $\Phi$ -sequences ~~series~~, and a mapping from this set of ~~series~~ <sup>sequences</sup> into a set of segments of X's worldline, in which each ~~segment~~ <sup>g</sup> in this ~~set~~ represents a period during which X engages in sexual intercourse. The mapping of the members of a given  $\Phi$ -sequence ~~series~~ into the corresponding segment (set of spacetime points) of X's worldline is also one-to-one.

From the viewpoint of either (1) or (2), the only correct answer to the question 'at which point is a given particular possible conception,  $\Phi$ , localised?' is now that  $\Phi$  is localised at just that point on X's worldline to which it has been mapped. In other words, a particular possible conception is located at just that point at which it would be realised, if it were realised; that particular conception is therefore possible neither before, nor after, that point in time. The difference between the two viewpoints is thus not that a particular possible event is located in a greater or smaller region of spacetime; a particular possible event is identified, qua particular, by its spacetime co-ordinates - in which case it is analytic that that particular possible event is located there. There is no room for disagreement on this point. The disagreement arises over the question of the places and times at which a certain kind of possible event may be instantiated (by particular possible events). For example, the dispositionalist would affirm the possibility of a conception long before X had

engaged in any sexual intercourse, while according to the more strictly causal view, a conception would not be possible until this first sexual event occurred.

Before we investigate this issue, we should consider its relevance for the natural realist's purposes. The natural realist wishes possible events to be localised in spacetime because there is a constraint on causal processes that such processes take place in spacetime. The natural realist wishes possible events to be eligible to participate in causal interaction with actual events. For this reason, he wants to establish their localisability.

The natural realist wants possible events to be eligible for participation in causal interactions so that he can provide an empiricist epistemology for our knowledge of modal facts. Such an epistemology requires that the possible events themselves cause our awareness of them, in a manner analogous to that in which our awareness of actual events is, on an empiricist epistemology, caused by those events.

Concomitantly with this empiricist epistemology, the natural realist will want to provide an evolutionary argument for the existence of a faculty (incorporating a causal mechanism capable of interacting with possible events) for detecting possible events. He may, as we saw in the passage from Hart, identify the imagination as this faculty, though he has not discovered the causal mechanism, which it purportedly incorporates, whereby it interacts with possible events. The evolutionary argument will be simple. The adaptive or survival value attaching to this faculty

will be that it enables the organism which possesses<sup>ses</sup> it to detect possible benefits and possible hazards in its environment.

Armed with this knowledge, the organism can act so as to realise the possible benefits, and prevent the realisation of the possible hazards.

The usefulness of this argument depends on the possibility - detector, viz the imagination, being such that it enables the organism to detect, not merely present or past possibilities, but future ones. At first sight this requirement seems incompatible with the specifically causal nature of the natural realist's proposed epistemology. For if the possible events in question themselves cause the organism's awareness of them, then, given the earlier-to-later direction of causality, the awareness of a possible event will have to occur at a point later than that at which the possible event itself is localised. In this case, the awareness of the possibility will come too late for the organism to take action, either to realise it or to prevent its realisation. It follows from this that the possibility-detector lacks survival value, and hence evolutionary justification.

This argument however rests on certain assumptions concerning the location of possible events in spacetime. It assumes that a particular possible (point) event is located at a particular spacetime point, and that our causal faculty for detecting possible events operates like our perceptual faculties in that it detects particular possible events. Any knowledge of possible events, that we can acquire will thus be, first, knowledge of particular possible



events - though of course all such particulars will be instantaneous of some kind of possible event.

Now we see the purpose of the dispositionalist's move. He asserted, loosely, that a certain event,  $\phi$ , is possible from the moment an actual object acquires the appropriate dispositional property, or power, until the moment it loses it. In the case of our example above, this implies that it is possible now that X will conceive (at a later time), if X is sexually mature now. In other words, if we detect the possible event in the early stages of the duration of its possibility, then we can take action to promote or prevent its realisation.

I have already criticised this formulation of the dispositionalist view. The 'possible event' cited in this formulation is not a particular possible event, but a kind of possible event. As such, it cannot be localised in spacetime, and hence cannot be detected via a causal mechanism or faculty since only particulars can participate in causal processes. Instances of this kind of possible event, i.e. particular possible events, however, may be localised in spacetime in the required manner, and hence may be detectable by this faculty. But if the detection of a particular possible event is the result of causal interaction between the possible event itself and the purported mind mechanism, then the awareness of this particular will occur later than the particular itself. Hence by the time the organism becomes aware of the possibility in question, it will be too late for it to act so as to realise, or prevent the realisation of, this particular event. You might object that once it has detected an early instance of a certain

kind of possible event in a series of such instances, it can infer to the later instances, and act so as to realise<sup>them</sup>, or prevent their realisation, ~~of these~~. But why should it be able to so infer? This is not a situation in which induction is applicable. When I detect, via the ordinary channels of perception, an actual, physical event, there is no logical<sup>or</sup>/inductive principle that dictates that I should infer to the subsequent occurrence of further instances of this kind of event. This situation is quite different from the sort of situation in which induction is applicable. Inductive situations are such that I have repeatedly observed a certain ordering amongst instances of certain kinds of events. I come to view this as a regular ordering amongst instances of those kinds of events. Henceforth, when I observe instances of the kinds of events which occurred antecedently in the previously observed ordering, I expect these events to be succeeded by instances of the kinds of events which occurred subsequently in that ordering. But there is no principle, inductive or otherwise, which requires that when one instance - or indeed, any number of instances - of a given kind of event is perceived, further instances, or at least further immediate instances, can be expected. Hence there are no grounds for supposing that an organism which detects one instance of a particular kind of possible event can infer that this particular belongs to a series of like particulars, some of them future. The causal theory of detection of possibilities is thus incompatible

with any survival value accruing to this detective faculty. Hence no evolutionary justification can be adduced for the existence of such a faculty. Since the (causal) theory of evolution is a natural extension of the causal epistemology to which the natural realist is committed, I take the absence of an evolutionary justification for his hypothetical faculty to be evidence against the existence of this faculty.

We can note, incidentally, that the distinction between the dispositional and the more strictly causal view of possibility is now idle. In neither case is the faculty for detecting possible events capable of detecting future possible events i.e. future instances of given kinds of possible event; yet it is future possibilities of which an organism needs to be apprised of in order to plan or to take precautions.

It might be objected that my argument shows that we cannot become aware of future possibilities, and that this conclusion conflicts with our apparent ability to (sometimes) make successful predictions.

This is not a consequence of my argument. My argument claims only that we cannot acquire knowledge of future possibilities by means of some cognitive mechanism of causal interaction with those possibilities. This is not to say that we do not still have our ordinary inductive methods by which to arrive at predictions; induction relies on our causal interaction with present actualia, which yields knowledge of present initial conditions and causal trends; with this data we can take the logical step of inductively inferring to future events. The knowledge of future events thus

acquired will be the joint product of causal ~~inter~~<sup>present</sup>action with/  
 actualia (via perception), and inductive inference - not of causal  
 interaction with future (actual or possible) entities.

However, induction is said to apprise us of future possibilities;  
 it is not baldly said to apprise us of future actual events ~~of~~ <sup>or</sup>  
 circumstances. This calls for some explication. We seek to  
 discover by induction not events which will be, as a matter of  
 ontological fact, possible but unrealised, but rather events which  
 will be actual. However, the knowledge of present conditions and  
 causal trends which provides the data for our inductive inferences  
 is fallible, so we cannot assume that the inductive procedure will  
 invariably result in correct predictions i.e. predictions of events  
 which will in fact actually occur. So this procedure is said  
 instead to yield possible truths, rather than truths simpliciter,  
 where 'possibility' is here understood as epistemic possibility.\*  
 We say that, so far as we know, these are the events which will be  
 (not merely ontologically possible but) actual. Yet since we  
 know that our knowledge of these events is merely inferred, we are  
 not prepared to assert without qualification that these are the  
 events which will be actual.

Inductive inference thus properly yields conclusions concerning  
 actual future events, not merely (ontologically) possible ones.  
 But the fallibility of the method induces the user to qualify his  
 results. It is this epistemic, subjective qualification of  
 assertions concerning future actual events which is implied when it

---

\* For our initial definition of epistemic possibility, See Ch. I's  
 for further discussion of this notion, see Ch. 6.

is said that inductive inference apprises us of future possibilities; 'possibility' here signifies the epistemic possibility that certain events will be actualised.

Further discussion of the relation between epistemic and ontological possibility ensues, in Chapter 6. I hope to have here said enough merely to demonstrate that my argument against the natural realist epistemology does not entail that we cannot make successful predictions; my argument in no way conflicts with induction.

Indeed, it is open to the natural realist himself to apply induction to his data concerning present and past unrealised possibilia, data acquired causally via the imagination. He could inductively infer future possibilia from his knowledge of present possible initial conditions and the corresponding possible laws. Such an exercise may or may not be considered idle, from an evolutionary viewpoint. For it may or may not be supposed that actual future events are inductively inferable from present possible events and possible laws. This raises the question whether branching lawlike worlds can reconverge. Interesting as this question may be, we have little reason to pursue it here. For in practice it would be merely perverse to attempt to predict the actual future by this indirect method. We can perform our inductive inferences directly on data concerning the actual initial conditions and laws, since this data is already given to us, via perception. Why then, resort to the comparatively dubious data concerning unrealised (but ontologically possible) initial conditions and laws.

I now want to raise one final objection to the prerequisite of natural realism, viz that possibilia are localised in spacetime.

We have already noted that this postulation entails a non-substantivalist view of spacetime. But might not the subversion of the ontological status of spacetime that is represented by such a view be thought to place in jeopardy our requirement that causal processes necessarily occur in spacetime? No; or at any rate, not with a little reformulation of the requirement: spacetime is now seen as the geometry in which a set of physical entities is embedded i.e. it comprises a set of specific geometrical relations amongst physical entities. Our condition on causality therefore now reads: in order to participate in a causal process, entities must stand in certain geometrical relations to one another.

Given this reformulation, is there still any problem in supposing that possibilia participate in causal processes i.e. that possibilia stand in certain geometrical relations with actualia?

There is. It may well be that the set of possibilia constituting a particular possible world 'yields' a different geometry to that which is constructable relative to the set of actual events. And it may well be that there exists no one-to-one mapping from the set of points defined by the former geometry into ~~that defined by the former geometry into~~ that defined by the latter. It might, in other words, be impossible to 'superimpose' the one geometry on the other. In this case, a given spacetime point belonging to actual spacetime will not be identical with any point belonging to this possible spacetime. Hence the individuals existing in this possible world cannot be located in the spacetime occupied

by the contents of the actual world. It therefore becomes imperative to distinguish between spacetimes - between actual and possible spacetimes, and presumably also between one possible spacetime and another. Yet it was our contention earlier - and we attempted to justify it - that in order to qualify as a causal process, a process must occur within a given spacetime. For this reason we introduced the modally-<sup>u</sup>ne~~t~~ral, relationist spacetime, which was intended to serve as the common framework for actualia and possibilia alike. Now we find that a distinction has to be made between actual and possible spacetime frameworks after all. We therefore conclude that causal processes cannot span these frameworks, since so to span them would violate the condition that such processes should occur within a given spacetime.

The natural realist might object that it would only be of any evolutionary value for us to be able to detect possibilia which could have existed in our world i.e. could have been embedded in the geometry of our world. Therefore the possibilia which are detectable to us do exist in the same geometry as do actualia, which is to say, in the same spatiotemporal framework as do actualia. Hence there is no objection to causal interaction between these particular possibilia, and actualia.

This counterargument begs a certain important question, namely that of the permiss<sup>i</sup>ability, from the realist viewpoint, of the notion of possibility relative to a particular world, e.g. our world.\* But even overlooking this, it does not prevail against

---

\* See Note 1

my argument. For given that my argument shows that there may be differences in the geometry of different worlds, it follows that the notion of a spacetime framework is not modally neutral, but rather that the spacetime framework of each world has to be individually defined or constructed for that world. This entails that the spacetime of each world is a distinct construct in every case. This distinctness of spatiotemporal frameworks precludes the satisfaction, on the part of ordered pairs of possibilia and actualia respectively, of our condition on causal relations, viz that the terms of these relations should occupy the same spacetime framework.

If we have succeeded in demonstrating the impossibility of causal relations between possibilia and actualia, we have refuted the principal premise of the natural realist view.

The Question of the Efficacy of Causal Explanation,  
and hence of that of Empiricist Epistemologies

This concludes my investigation into the various proposals for providing an epistemology for the realist view of possibility.

But there is, finally, a quite general question which arises in connection with the very demand for an epistemology: the basic modal realist is only obliged to furnish such an epistemology if (causal) explanation is assumed to be effective in answering the 'how' question in the first place - where this question is, in this case, 'how do we acquire knowledge of such metaphysical entities as possibilia?' It is sometimes claimed that causal explanations leave the most important or fundamental 'how' or 'why'



questions unanswered; that is, they do not explain why the basic laws of nature are as they are. If there were such an explanation for laws, it would demonstrate the necessity of those laws. If the necessity of laws is, however, denied, and laws are regarded merely as universal but contingent regularities in the order of actual events, then there seems, *prima facie*, no reason to deny the existence of similar regularities in the ordering between possible and actual events. For if the so-called laws of nature are nothing more than the expression of the way actual events happen to be ordered, without any 'intrinsic necessity' attaching to this ordering, then there seems no justification for <sup>o</sup>prescribing the hypothesis that there may be an ordering between actual and possible events, an ordering spanning different spacetime frameworks, and expressible by means of lawlike statements.

Although this devaluation of the explanatory power of causal explanation confers legitimacy on the natural realist hypothesis, it is self-defeating for the natural realist to seek to procure legitimacy at this price. For the effect of this view of causal explanation is to transform the supposedly causal ordering of actual events into a form of pre-established harmony amongst those events. Yet it was precisely from a pre-established harmony view of the relations between possibilities, and the ideas of possibilities entertained by actual minds, that the natural realist was seeking to escape, by advancing his causal epistemology for these ideas. He assumed that his epistemology would explain the fact of our knowledge of possibilities in a way that a pre-established harmony view

could not. But if the legitimacy of his epistemology is only earned at the cost of the efficacy of causal explanation i.e. at the cost of its superiority vis a vis pre-established harmony 'explanations', then clearly this defeats his purpose in proposing his epistemology in the first place. He might just as well have plumped for the pre-established harmony at the start.

Notes:

1. As we argued in Chapter 1, if an object is ontologically possible at all, then it is so relative to all worlds - precisely because ontological possibility is not relativised to any world or viewpoint. The argument was, basically, that to be ontologically possible is to exist, and existence is an absolute status - a status that attaches to an object, if at all, relative to everything. What then justifies the assertion that such and such is (ontologically) possible relative to our world? Strictly speaking, this assertion is not justified - for the reason just given. But we can at least consider what it is intended to convey. This involves considering what is meant by 'our world'. This expression can be understood as connoting just the world which happens to be actual, or a world which is identified by its qualities. In the passage in question here, 'our world' is identified, at least partly, by its geometry; therefore it is the latter kind of identification which is intended. When it is said that such and such is (ontologically) possible relative to our world, therefore, what is meant is that in a world similar in fundamental respects to our world, such and such is the case; or alternatively, it means that such and such could have been actualised without this causing a significant alteration in the nature of the actual world i.e. the actual world would still in this case be recognisable as 'our' world, in the sense that it would have the same basic qualities as the world which is in fact actual.

But strictly speaking, as I have remarked, the statement that such and such is possible relative to our world ought not to be tolerated; for this statement implies exclusive relativity to our world; whereas the fact that an object is ontologically possible at all entails that it is possible relative to all worlds.

## Chapter Four

### Possibilia: Abstract or Particular

In the previous chapter we investigated an epistemological theory I christened natural realism. This epistemological theory presupposed a certain metaphysical view, viz realism with respect to possibility. It assumed that the only acceptable kind of epistemology for knowledge of real entities is an empiricist, a posteriori epistemology, which accounts for that knowledge in terms of the causal interaction between the real entities themselves and our minds. In order to flesh his epistemology out, the natural realist was, we argued, obliged to consider the real entities in question, viz possibilia, as existing in spacetime - as localised in spacetime. Only such localised entities are eligible, we claimed, to participate in causal interactions. The result of thus localising possibilia is that they have to be considered as particulars.

It is this question of the particularity of possibilia that occupies this chapter. Are possibilia indeed particular, or are they abstract - where I take it that to be a particular is to be nonabstract, nonuniversal. I take it that concepts (platonistically understood) are abstract entities, and that they are not particulars. We do of course speak of particular concepts or ideas, but I do not think we should understand this as literally implying that concepts are particulars. I take particulars to be the kind of entities that can duplicate one another; that is to say, while we can have two apples of the same shade of red, we cannot have two concepts

(again, platonistically, not subjectively, understood) of a given object or property. Hence appl~~i~~es are particulars, but concepts are not. If possibilia are particular, what is the peculiar ontological nature of these particulars, which are neither actual nor concrete? I shall take these two questions in turn.

### Possibilia as Platonic Forms

Before considering the arguments for or against the proposal that possibilia are abstract entities however, I want to suggest that, if they are, then not only are they platonic entities, they may be indistinguishable, from an ontological viewpoint, from the classical Platonic entities, viz Forms. This suggestion is a digression from the main argument of this chapter, which is simply to determine whether possibilia are abstract or substantival. But it is, I think, worth drawing attention to<sup>it</sup>, before we come to firm conclusions as to whether or not possibilia are abstract entities.

My suggestion is that, if possibilia are abstract entities, then there is nothing to distinguish them from Platonic Forms. This requires a particular interpretation of the Platonic Theory of Forms. There are of course many such interpretations; even Plato's own interpretations varied, or evolved. But I think we can distinguish two categories of interpretation: the first (Platonism<sub>1</sub>) countenances such Forms as Beauty, Justice, Virtue, Equality, and so on, the second (Platonism<sub>2</sub>) includes, along with these, Forms for animal, bed, fire, water, and so on. I propose that one version of the Theory of Forms which belongs to Platonism<sub>2</sub> admits Forms not only for genera, species and subspecies but eventually for (qualitatively distinguishable) individuals -

possible as well as actual ones.\*

Now, suppose I have an idea of, say, a statue of myself, an idea which, though intelligible, is not instantiated in the actual world. According to the realist with respect to possibility, this is an idea of a possible statue - of a possible object, where possible objects are real entities. But what distinguishes the notion of a Platonic Form for such a statue, from the notion of a platonic 'instantiation' of that statue? The Form is not a subjective idea, the product of some mind; nor is it, of course, a concrete entity. Thus it is not a content of the actual world. By what means can we distinguish the Form from the possible entity, which is also nonconcrete and nonsubjective i.e. nonactual, in the case where both the Form and the possible entity subtend the same description of a physical object?

If this suggestion is accepted, basic realism may be assimilated into Platonism<sub>2</sub>. But Platonism<sub>2</sub> involves no reference to worlds, possible or actual.\*\* How are we then to match it up with possible world realism? We can start by envisaging the unorganised array of Forms - the Form - manifold - postulated by Platonism<sub>2</sub> as being ontologically equivalent to an unorganised pool of possible objects i.e. a domain consisting of the pooled domains of all possible worlds. The contribution of possible world realism to the antecedent metaphysics of Platonism<sub>2</sub> is thus to introduce order into the Form - manifold, <sup>it effects a partition of this manifold,</sup> such that each subset of Forms

---

\* Plato never held this view, though Plotinus is supposed to have. There is strong evidence in the Parmenides however that Plato drew the line around his favoured Forms with a shaky hand.

\*\* In the Timaeus, 31, Plato asks whether there are many worlds, or one only, and replies that there is one only. But he is there concerned only with actual worlds, and is claiming merely that if there were more than one actual world, then these worlds would be parts of a higher unity. Yet it is just the highest unity that he wants to denote by the term 'world

represents a set of individuals which are capable of being constant-  
iated. These subsets may intersect: one individual may belong to  
more than one set of constant<sup>in</sup>ables. The possible world realist  
treats this partition not as imposed by us on the unorganised Form -  
manifold, but as an objective feature of that manifold - one which  
went unrecognised by Plato and his followers.

We should note, however, that the Form-manifold may be greater  
than the union of the domains of all possible worlds. For the Form-  
manifold contains Forms for universals e.g. for redness, bedhood,  
beauty, as well as for individuals. Possibilia may exemplify such  
properties as redness, or beauty, but no member of the domain of any  
possible world is itself redness or beauty. However, the question of  
the relations between Forms belonging to different 'levels' was  
already uncertain for Plato. Were all Forms simple, or was the Form  
for, say, Man, compounded out of the Forms for Animal, Mammal,  
Intelligence, Biped, and so on? Was the Form-manifold a hierarchy, or  
was it flat? Without trying to decide this issue,\* we can allow that

---

\* Scholarly opinion is divided on this issue. Let me quote two  
commentators. In 'the Riddle of the Early Academy', Cherniss says: 'No  
idea is to any other as a constituent part to a whole or as a genus to  
its species. Nor does Plato anywhere make the distinction of genus  
and species among the ideas; but what Aristotle calls genus, differentia  
and species are all for him distinct ideal units, each other than the  
others, each having aspects which imply the existence of the others or  
are compatible with them, but each being an independent nature which  
cannot be exhaustively analysed into the others.' Commenting on this  
passage, Allen in 'Plato's Euthyphro and the Earlier Theory of Forms',  
cites ample evidence to support the contrary interpretation, viz that  
certain Forms are compounds of simpler Forms, so that the structure of  
the Form-manifold is hierarchical.



if a hierarchy interpretation is accepted, then the Form-manifold can be seen as being coextensive with the manifold of possibilities, in which the only ontologically distinct entities are individuals - possible physical objects - but in which an immanent manifold of properties, or alternatively of classes (genera, species, etc.), is also present. If the Form-manifold is, on the other hand, considered to be flat, then the manifold of possibilities is assimilated into, but is not coextensive with, the Form-manifold.

An objection to my suggestion that possibilities are Forms arises when we consider the relation of a Form to its instantiation. There is apparently no difference in ontological status between an uninstantiated and an instantiated Form. I have suggested that an uninstantiated Form is identical with the possible entity subtending the same empirical description. But with what is an instantiated Form identical? Certainly not with an actualised possible, for an actualised possible is an actual object, while an instantiated Form is still a Form, not the actual object which instantiates it. The difference between possibilities and Forms in this respect is expressed when we say that possibilities are realised or actualised, while Forms are instantiated. In becoming actualised, possibilities lose their platonic status. But Forms by no means lose their platonic status in becoming instantiated. We could perhaps adopt an immanence view of the relationship between Forms and their instantiations, construing it so that the immanence of Forms in concreta, i.e. the participation of concreta in Forms, somehow degrades the Form from its pure platonic status to something more gross, more concrete. In this way we might be able to trace an analogy between

the fate of an actualised possible, viz its loss of platonic status, and the fate of instantiated Form. However I shall not pursue this argument here. I merely note that this objection may impose a certain qualification on my suggestion.

I also want to draw attention to the difference in the respective motivations for the Platonic Theory of Forms, and realism with respect to possibility. Plato's motive was partly epistemological - to provide nonrelative objects for seemingly nonrelative ideas, such as Beauty, Goodness, Equality, and so on, and partly to explain (in some sense) why the world is as it is: beautiful objects are made beautiful by the Form of Beauty, good objects by Goodness, pairs of equal objects by Equality, and so on.\* Realism with respect to possibility, on the other hand, is not intended to explain either our knowledge of, or the nature of, the actual world: our knowledge of possibilia is independent of our knowledge of actualia, and the existence of possibilia is independent of the existence of ~~possibilia is independent of the existence of~~ actualia (at least in the sense that possibilia do not in any sense inform, or determine, actualia - though according to some epistemologies e.g. natural realism (Chapter 3), they may interact with actualia.)

However this difference in motivation may not affect the ontological outcome - the ontology to which the disparate motivations lead. My suggestion was only that we have no means of distinguishing the ontology of Platonism<sub>2</sub> from that of basic modal realism.

---

\* See, for example, Phaedo, 100.

### Are Possibilia Abstract?

Having digressed to suggest this form which abstract modal realism may take, let me return to the central question, viz, are possibilia abstract? If we conclude that they are not, this settles the question whether they are Forms. For Forms are abstract, and cannot be identical with any nonabstract entities.

The realist with respect <sup>to possibility</sup> can of course consider abstractness an option only if a platonic view of abstracta is assumed. In the following discussion, then, abstracta will always be viewed platonistically.

My first answer to this question is that, if our epistemic access to possibilia - from the viewpoint of any epistemology - is at least partly via the (sensuous) imagination, then possibilia cannot be identified with abstracta. For abstracta cannot be (sensuously) imagined. We can picture in imagination, say, a triangle, with roughly determinate angles and lengths of sides, but we cannot picture a triangle in the abstract. Similarly with a universal such as redness. We can picture particular shades of redness in imagination, but we cannot picture the abstract entity, redness, itself. In short, we can imagine particular instances of a given universal, but not the universal itself. If possibilia are, as a matter of principle, <sup>then they cannot be identical with abstracta, which are, as a matter of principle, unimaginable.</sup> ~~unimaginable~~. If it is the imagination which affords epistemic access to possibilia, then since it is particulars which are represented in imagination, it would seem to follow that possibilia are particulars.

The view that possibilia are abstracta is thus incompatible with the view that imagination provides our epistemic access to possibilia.

Put we could still maintain that possibilia, qua abstract entities, are conceivable, or conceptualisable, in the sense of being describable, as opposed to imaginable. In this case it would be, not imagination, but our powers of conceptualisation, that provided our epistemic access to possibilia.

My answer to this view turns on the question of the degree of determinacy required, from the realist point of view, of a possible entity. Is a possible event as fully determinate as its concrete realisation would be? Is the possible event, in itself, as opposed to ~~in~~ our conceptualisation of it, as determinate<sup>as</sup>/its actualisation would be? Intuitively one would want to answer yes. Must not every aspect, every detail, of the concrete event have been possible, if that concrete event were to be realised? No qualitative detail is added to a possible event in the process of its being actualised - the actual event is merely the same event in a different mode.

If possibilia are identical with abstracta, or concepts, then they are only as determinate as concepts. Yet if possibilia are to be as determinate as their actualisations, we must suppose that concepts (can) have the same degree of determinacy as do actual, concrete particulars. To suppose this is to suppose that a concept can exhaustively represent (or describe) a particular. This is the question I want to consider. It must be carefully distinguished from the question whether a concept (or description) can uniquely fix a concrete reference, and also from the question of the Identity of Indiscernibles.

Ordinarily we suppose that definite descriptions enable us to refer uniquely ~~refer~~ to particular concrete individuals. The reason for

this is, I think, that such descriptions, of concrete individuals, directly or indirectly incorporate directions as to the spatio-temporal location of the individual in question. e.g. 'the first dog born at sea' identifies an object by relating it to the earliest event of a given kind (birth of a dog) within a given region (terrestrial seas): often the spatiotemporal directions can be understood only contextually e.g. 'the man next door', 'the actor who played Hamlet', etc. I do not wish to take up this issue here. I only wish to point out that the inclusion of the spacetime co-ordinates of an object in the description of that object is sufficient to enable that description to <sup>refer</sup> uniquely refer to the object in question. It is not however sufficient to ensure the exhaustiveness of that description, taken as a description of an actual particular. Furthermore, some descriptions or concepts may uniquely refer even without the inclusion of spacetime co-ordinates, if we suppose that some individuals have properties, or conjunctions of properties, uniquely peculiar to themselves. But the inclusion of such properties in a description of a particular would not guarantee the exhaustiveness of that description.

The principle of the Identity of Indiscernibles, taken as a thesis about qualitative properties (by which I mean all empirical properties save spacetime co-ordinates) affirms that every spatiotemporally distinct individual enjoys some distinctive property - some property or conjunction of properties uniquely peculiar to itself. The Identity of Indiscernibles, then, supports the view that descriptions, or concepts, can uniquely refer, even when they do not include the spacetime co-ordinates of their reference. But the

Identity of Indiscernibles has no direct bearing on the question of the degree of exhaustiveness attainable by descriptions. For the Identity of Indiscernibles does not require that the respective descriptions which bring to light the qualitative difference between two spatiotemporally distinct individuals must be exhaustive. The only degree of exhaustiveness required is that they do bring to light these differences. If exhaustive descriptions are possible, this in no way confirms or refutes <sup>the Identity of Indiscernibles. For it may turn out</sup> ~~out~~ that two spatiotemporally distinct particulars can satisfy the same exhaustive qualitative description, or it may not.

Our present question then is just whether or not exhaustive description is possible. The point of this question is that if a concept can, in principle, exhaustively represent a particular, then we can say that concepts are as determinate as particulars. Hence a possible event can be identified with an abstract entity (a concept), and yet be no less determinate than the concrete realisation of that event would be.

One's first reaction to this question of exhaustiveness might be that the very nature of the process of abstraction precludes such exhaustiveness in the concepts which are its products. Consider, for instance, Locke's theory of abstraction, which Mackie\* characterises as 'a theory of selective attention aided by resemblances and comparisons.'

Selective attention enables us to focus on a particular feature of a given object e.g. the whiteness of a piece of paper, ignoring

---

\* Mackie: Problems from Locke p. 110.

its other features; we then compare this object with other objects, and find that certain of them resemble the given object in respect of this particular feature. We then assign a term to this feature, and this term now expresses a universal.

This account presupposes that resemblances are objectively grounded, that they are already 'in' the world, and are not purely the work of the mind. We may or may not feel happy about this presupposition. For the purposes of this discussion however, this aspect of abstraction need not concern us. For there seems in principle no reason why selective attention should not be successively applied to every aspect, every feature or detail, of a concrete particular, until all the properties of that particular had been noted. If we assigned a term to every feature of the object as we selectively focussed it, then the conjunction of these germs would form an exhaustive description of the object.

<sup>however is, I think, misconceived. The problem</sup>  
 This way of approaching the problem of exhaustiveness <sup>is not,</sup> that any given particular has an indefinitely great number of properties - though when we consider the micro-description of concrete particulars a problem analogous to this does arise; it is rather that the precise nature of the properties of a particular cannot be represented by the method of abstraction. We might describe a concrete object as spherical and green. But no concrete object is perfectly spherical, since the concept of a sphere is an abstract geometrical ideal. When we try to describe the geometrical deviation from sphericity of the object, we shall face the same sort of limitation on our description: the shape of an object is only describable to a less than absolute degree of precision. Similarly in the case of its green-ness. We can identify the shade of green-ness it exhibits with only a limited precision.

Notice that this view of exhaustiveness does however take account of the second stage of Locke's theory of abstraction, viz comparison and resemblance. For if description and abstraction were explained in terms of selective attention alone, there would be no problem of precision. For as we focussed our attention on a selected feature of the given object, we would assign a term to it, and that term would signify precisely that feature i.e. that feature precisely exemplified in that object. But if this exhausted the procedure of abstraction, we should never obtain universal terms, for we should have to assign ~~a~~ distinct new terms to the properties of every distinct individual. In this case, language would clearly never evolve at all. Our descriptions of concrete particulars must be in terms of universals, but universality precludes precision. For in noting the resemblances amongst concrete<sup>a</sup>, we must not be too fussy about the degree to which they resemble one another in a given respect. All white objects are white in virtue of being ~~of~~ a particular shade of white within a range of shades of white. If we tried to assign a distinct term to every shade of white, we would never arrive at a colour vocabulary at all, for shades of whiteness form a continuum, as do the shades of all colours.

This limitation on the degree of precision attainable in description of concreta may be construed as a limitation on the degree of exhaustiveness attainable in description. This limitation is not contingent; it is inherent in the very nature of abstraction. In this sense then, concepts do underdetermine particulars, and hence, according to our earlier arguments, possibilia cannot be identical with concepts.



To this argument you might make the following objection. It may be that the properties of a particular such as its (seen) colour and its (heard) sound cannot be described with absolute precision. But if instead of a phenomenal description of the object we attempted the kind of description which a physicist would give of it, then each of its properties (the properties appearing in the physical description) would be measurable. We could give its precise spatial dimensions, its precise mass, density, and so on, and the precise wavelengths of the light reflected from its surface, and of the sound waves of which it was the source. This objection raises the question of the degree of precision attainable in such measurement. In practice, we do not have the technological capacity to make such measurements with absolute precision. But since we are assuming platonism with respect to concepts anyway, there is no reason why we should not allow that such precision is in principle possible - and that an absolutely precise description of a given concrete object is thus possible, and hence, from a platonist point of view, exists. Of course, in the light of the indeterminacy principle in Quantum Mechanics, we might want to dispute the absolute determinacy even of concrete objects.

<sup>quantum</sup> This postulate provides a short-cut to exhaustiveness. For now absolute precision is not required for exhaustiveness, since the values of the physical variables characterising the concrete particular which is the object of the description or concept in question are not themselves absolutely precise - in the sense that, say, the position and momentum of the object cannot in principle be simultaneously measured beyond a certain specified degree of precision.

It would seem, then, that in the case of physical description, exhaustiveness is in principle possible. Since physical descriptions therefore do not underdetermine concrete particulars, there is, according to our earlier argument, no obstacle to identifying possibilia with such descriptions or concepts.

Or is there? In Chapter 5 I consider the primary/secondary properties distinction in relation to possibilia. Is there a difference, from the viewpoint of realism with respect to possibility, between the way a possible entity is 'in itself', unideated, and the way it 'appears' to us when it is ideated? Is, say, a possible pumpkin - the real entity, as it is in itself - merely a possible system of particles, which becomes green and orange only when it is thought of by us? Or is it green and orange regardless of whether it is thought of by anyone? I do not want to go into this question of primary and secondary properties here, but only to anticipate my claim in Chapter 5, viz that the so-called secondary, or phenomenal, properties do characterise possibilia as they are 'in themselves'. If we accept this, then the exhaustiveness of physical description, from a platonist and/or quantum mechanical viewpoint, does not enable us to postulate the identity of possibilia with such descriptions. For now we are assuming that the 'phenomenal' properties of a possible object are not reducible to its strictly measurable properties - the properties that appear in a purely physical description of a concrete object. The absolute determinacy of such phenomenal properties in particular instantiations is not however in principle representable in the concepts of these <sup>phenomenal</sup> properties - as we saw in our earlier discussion of the method of abstraction. Hence the degree of

exhaustiveness attainable in the kind of ~~description~~ which is required for possibilia is, after all, limited. It might be thought that there is <sup>in any case a</sup> ~~another~~ restraint on the exhaustiveness of ~~description~~ even of physical description. This arises if we require that a description is exhaustive only if it describes the object in question in terms of its basic constituents. For modern developments in elementary particle physics suggest that there may be an infinite regress of ever more 'basic' particle levels of physical reality.\* Such a physical regress does not impose a limitation on the exhaustiveness of description for the platonist with respect to concepts however. Here he takes his cue from the mathematical platonist. The fact that we cannot subjectively entertain concepts of 'actual infinities', does not entail that such concepts may not exist.)

↳ We conclude that the existence of this regress does not impose a <sup>con</sup> ~~re~~straint on the exhaustiveness of description.

We could pursue this question of exhaustiveness further. We could, for instance, discuss whether description in terms of physical laws, together with initial and boundary conditions, secured exhaustiveness, and whether such description was appropriate for possibilia. I hope that I have already said enough however - in connection with the process of abstraction - to show that the exhaustiveness attainable by the kind of descriptions (concepts) with which possibilia could be considered identical is limited - and hence that such identification is not legitimate.

---

\* See D. Bohm: Causality and Chance in Modern Physics. Ch. 5.

With this result we can assert that possibilia are not abstracta.

This conclusion finally refutes the suggestion offered above, viz that possibilia are Forms. For Forms indisputably are universals, and hence abstract. Therefore, according to our present argument, they cannot be identical with possibilia.

#### Are Possibilia Substantial?

I want to move on now to the second question I asked at the beginning of this chapter. If possibilia are not abstract, then what is their ontological nature? Metaphysics traditionally countenances two types of realism: platonism, or realism with respect to abstract objects, and perceptual realism, or realism with respect to actual objects - the objects of perception. Here, in the shape of possibilia, we seem to have a kind of entity which cannot be subsumed under either of these metaphysical categories. Possibilia are real, but not abstract, nor are they perceived, as concreta are. Being nonabstract, nonuniversal, we can consider them to be a type of particular. But what type?

Let us try, as a provisional metaphysical compromise, the following suggestion. Possibilia are substantial entities, though the kind of substance in which they are grounded is of a different kind from that in which concreta are grounded. Let me clarify this suggestion by explicating the notion of substance I am employing here. It is not Aristotelian substance; Aristotle distinguishes different kinds of substance for different kinds of

concrete object - the kind of substance associated with a particular kind of object is determined by the real essence of that object. Here I am assuming, on the contrary, that all concrete objects are made of the same kind of substance. Hence I do not intend 'substance' to be understood in its modern sense, either; according to this modern usage, a substance, or a stuff, is that to which some mass term refers, e.g. gold, honey, wood.\* There will clearly be a plurality of such substances in the concrete world. Rather, the sense in which I wish 'substance' to be here understood is in the now very disreputable sense of substrate: that in which the phenomenal properties of objects inhere, and which ensures the reality of those objects. We shall call the substrate in which the phenomenal properties of concrete objects inhere, concrete substance, and the substrate in which the phenomenal properties of possibilia inhere, ethereal substance.\*\* Ethereal substance is supposed to be a shadowy, ethereal counterpart of concrete substance.

You may think that this proposal is going to be easy to shoot down, given the disastrous history of the notion of substrate. But we should notice that realism with respect to possibility throws up an analogous problem to that which confronted, and confounded, earlier realist metaphysicians in their attempt to elude the sceptic. The problem for the basic realist is, how to ground the presumed reality of possibilia (objects of imagination)? He has to try to show that

---

\* There may be disagreement as to which mass terms designate substances e.g. terms for chemical elements, as opposed to terms simply for solids, as opposed again to terms for fluids, or gases, and so on. This need not concern us here.

\*\* For further discussion of this proposal, see Ch. 5.

possibilia are not the creatures of the imagination, just as the perceptual realist had to try to show that actualia are not the creatures of perception. No solution to the latter problem has ever been found, and no proposed solution has improved on the substrate theory. After the failure of the substrate theory, philosophers have more or less wearied of the problem, and simply shelve<sup>d</sup> it. Whatever we think about this, we would surely not allow the realist with respect to possibility to shrug the problem off in this way. Intuitively, the reality of possibilia demands even more defense than<sup>does</sup> the reality of actualia. Even the 'phenomenal' nature of possibilia would be considered by the sceptic to be 'no<sup>u</sup>menal', since it is inaccessible to perception. The modal realist might counter that, though the phenomenal nature of possibilia is inaccessible to perception, it is accessible to imagination. But the 'given' of imagination is, the sceptic would reply, much more tenuous and shadowy than the 'given' of perception. Hence the realist with respect to possibility builds on even shakier foundations than does the realist with respect to the objects of perception.

We therefore provisionally give licence to the realist with respect to possibility to exploit whatever means are available to defend his realism. In particular, we allow him to ground possibilia in an ethereal substrate, thereby securing their reality. In order that this view should not prove a non-starter, we shall ignore the principal epistemological objection to substrate theories in general, viz that such a substrate must be epistemologically inaccessible. Let's assume at least the intelligibility of the

substrate hypothesis, and of the substantival view of possibilities in particular.

Before proceeding we ought to note that the substrate hypothesis is ill attuned to our present atomistic conception of material reality. It was evolved in response to the preatomistic conception of matter - as an infinitely divisible, continuous solid. The substrate was the solid, continuous base in which the phenomenal properties 'inherited'. Given an atomistic conception of matter however, according to which a material object is a system of discrete particles each with minute mass, and separated from one another by relatively vast distances, where is the substrate supposed to be? The only answer is that it is the solid base in which the properties of the micro-particles inhere.\* The reality of material objects is then conceived as being grounded in the substantivality of their micro-components.

This is the (admittedly dubious) manner in which we reconcile the substrate hypothesis with the atomistic conception of matter. The reality of concrete particles is grounded in a concrete substrate, and that of possible particles (the constituents of possibilities) in ethereal substance. However we saw reason, earlier in this chapter, to question the attribution of a microstructure to possibilities, such that possibilities, considered 'in themselves', unidealized, consist

---

\* This assumes that the mass of particles is a primitive physical property, not theoretically reducible to, say, wave interactions in an underlying field. We shall challenge this assumption in Ch. 5, and there pursue the question of substance in the light of this challenge.

only of this structure, and lack properties such as colour and sound. If we do think that possibilia are, in themselves, yellow and blue and so on, and are not merely systems of particles and photons, then our view of possibilia is analogous to the preatomistic, naive realist view of concrete<sup>a</sup>, and as such well attuned to the substrate hypothesis. Indeed, the substrate hypothesis saves from self-contradiction the view that properties such as colour - which are, in the case of concrete objects, mind-dependent - do really inhere in possibilia i.e. belong to possibilia mind-independently. For now possibilia can be construed as subjective ideas or images which have gained independent existence, by becoming grounded in a substrate.

As far-fetched as this substantival view of possibilia may seem as it stands, I can find no direct, prima facie objection to it, save the epistemological objection that applies to substrate theories in general, which I have promised to ignore. My objection to it only arises when it is made to service possible world semantics, as the metaphysical foundation of the possible world apparatus. For now the substantival view poses a problem in connection with the trans-world identity relation.



### Identity and the Substrate

The substrate hypothesis, as a general hypothesis, entails a particular conception of identity. I shall call it the substantival, or nonmenal, view of identity. According to this view, identity is a relation which is determined at the level of things-in-themselves, or chunks of substance, as opposed to the phenomenal level, the level of objects qua nexes of manifest properties. If an empirical object is said to have identity through time i.e. if it is said to be a persisting object, then this, according to the present view, implies that it is a persisting chunk of substance. The persistence of the particular nexus of manifest properties grounded in this chunk of substance is merely a consequence of the persistence of the chunk of substance - it is not what determines the identity through time of an object.

According to the substantival view, then, the identity of objects is an ontological matter; identity is not merely a relation which we impose on our experience. I shall be contesting this substantival theory of identity in Ch. 6. Here I shall content myself with a few general comments, followed by an argument concerning the consequences of this view of identity for possible world realism.

My general objection is simply that, because identity thus conceived is non<sup>a</sup>menal, we lack epistemic access to it. We can observe the persistence of particular nexes of properties; if we are substantivalists, we shall probably infer from such observations to the continuity of the underlying substance. But this inference is epistemologically indefensible. How can we tell whether a persisting chunk of substance, or an imperc<sup>e</sup>ptible succession of different

chunks of substance, underlie this persisting nexus of properties?

This discrepancy between the empirical and the <sup>u</sup>no~~x~~menal levels is not unimportant; if we do not get the identities right, we do not get the facts right. For instance, the sentence 'the object,  $\phi$ , will have property  $P$  at  $t_1$ ', implies, from the substantivalist viewpoint, that underlying a particular persisting nexus of properties there is a persisting chunk of substance;  $\phi$  is thought to persist to  $t_1$  in virtue of that chunk of substance persisting until  $t_1$ . If it is a quite different chunk of substance - not even one that has gradually, bit by bit, replaced the original chunk - underlying the same nexus of properties at  $t_1$ , then the object which exhibits these properties is not  $\phi$  and hence it is false to say that  $\phi$  will have  $P$  at  $t_1$ . The fact is that a different object will have  $P$  at  $t_1$ .

Let us now turn to the substantivalist version of possible world realism. On this view, to say that a particular individual,  $A$ , possibly exists, is to say that there exists an individual,  $A$ , whose properties are grounded in an ethereal substrate. To say that an actual individual,  $B$ , has a certain possible property,  $P$ , is to say that  $B$  is transworld identical with an ethereal individual,  $B'$ , who has  $P$ . Transworld identity is now <sup>u</sup>no~~x~~menal: the transworld identity of two individuals is determined at the substratal, not at the empirical, level. But even if we had a relatively uncontroversial epistemic criterion for discovering the transworld identity of individuals - such as we do for discovering the intra world identity-through-time of an individual (viz the spatiotemporal continuity of a particular nexus of empirical properties) - trans-

world identity would still, on this view, meet the same objection as did intraworld identity - through-time: we cannot legitimately infer nonmenal identity from empirical evidence.

Suppose we waive this objection, and allow that epistemic criteria may be sufficient for discovering substantival identity. In the intraworld context, we allow that the spatiotemporal continuity of a nexus of manifest properties is evidence of the persistence of a chunk of substance grounding them. What epistemic criteria can we then devise for transworld identity? In Chapter 2 I argued that empirical similarity is in some respects inadequate, and that qualitative indiscernibility is too strong, for semantical purposes. Can we then take a cue from the case of intraworld identity-through-time, and devise spatiotemporal criteria for transworld identity? For example, perhaps two individuals in different worlds are transworld identical if their trajectories coincide at certain points (where I assume that for each point in the spacetime framework of one world we can identify a uniquely corresponding point in the spacetime framework of the other world, and that we can identify these points as the 'same' point, without entering into the issue of the substantival vs. the relationist view of spacetime). But this suggestion cannot be acceptable, for the trajectory of a given chunk of substance in a given world will surely be intersected at many points by many different i.e. non-transworld-identical, chunks of substance in other worlds. For suppose I identify a sample chunk of substance in the actual world, and carry it from <sup>point</sup>/A to <sup>point</sup>/B; suppose you also identify a chunk of

substance, and carry it along a route CD parallel to AB; then surely it would be natural for us to suppose that you could have stepped across, if you had wished, and intersected my path. This means that in some possible world the trajectory of your chunk of substance intersects that of mine, yet it would not follow that your chunk of substance in that world is transworld identical with my chunk in this world, for we have already assumed that the former is the trans-substantiation of your chunk of substance rather than mine.

It would also be counterintuitive to suppose the criterion of the identity of chunks of substance across worlds to be coincidence along the entire length of the respective spatiotemporal trajectories. For imposing such a strict condition on transworld identity would, once again, render it effectively useless for semantical purposes.

But this exhausts the conditions for transworld identity that can be plausibly defined in terms of spatiotemporal co-ordinates. And this in turn leaves the possible world substantialist bankrupt of epistemic criteria for the transworld identify of individuals.

In conclusion, I have tried to show that there are objections to the view that possibilia are abstract entities, and also to the view that they are substantial entities. I think that the realist with respect to possibility is under some obligation to explicate the presumed mind-independent status of possibilia. Unless he can suggest a new form of nonconcrete realism - neither abstract nor substantial - I think he has not yet fulfilled this obligation.

## Chapter Five

### The Problem of Actuality

If possible worlds, or possible objects, are real, what is it that distinguishes them from the actual world, or actual objects? This problem I shall call the problem of actuality. It is, let it be noted, only a problem in connection with the realist view of possibility, for if possible worlds or objects are not real, then this distinguishes them from the actual world or objects; indeed, no confusion between the two sorts of world or object could in this case plausibly arise. But on the assumption of realism with respect to both, the problem of actuality is a formidable problem.

The onus is on the realist with respect to possibility to find a solution. For it is this realism which is placed in jeopardy by the problem; realism with respect to actuality is (comparatively) unassailable. If a means for distinguishing possibilia from actualia cannot be discovered, two options are open to us. Either we deny that there is such a distinction - a result which the realist would be as loath to accept as any one; or we jettison one of the realisms. There can be little doubt about which will be the one to go.

Let me now survey various suggestions as to what characteristic of actualia might serve to distinguish them from possibilia.

### The Concreteness of Actuality

Is it concreteness which distinguishes actualia from possibilia? Most certainly.\* But such a truth is hardly illuminating unless it is complemented with a positive, noncircular explication of the notion of concreteness. If we cannot explicate concreteness in positive terms, or can only explicate it in terms of actuality, then the claim that it is the concreteness of actualia which distinguishes them from possibilia in no way furthers our understanding of this distinction.

The intuition behind any appeal to concreteness as that which distinguishes actualia from possibilia is that the former are 'solid' or 'ponderable'. You can, as Dr. Johnson discovered in a different though relevantly similar context, kick them. Possibilia, on the other hand, are 'ethereal', 'imponderable'; you cannot kick them. This may be a philosophically naive intuition, but it is the commonsense point of departure for reflection on the distinction between possibilia and actualia.

On the grounds of this intuition, we might be led to suggest that the difference between actualia and possibilia is that the former have, and the latter lack, (certain) primary properties. Obviously properties such as size and shape, being empirically manifest, cannot be denied to possibilia. But certain primary properties are not empirically manifest, in any obvious sense e.g.

---

\* I want to here leave aside the mind/brain issue. A dualist would want to say that there are some actual entities, viz minds which are not concrete (\* given our present usage, according to which an entity may be said to be concrete iff it is both actual and physical). In order to avoid complications which are unnecessary for the present purpose, let me just set aside dualism, and describe the contents of the actual world, in contradistinction to those of possible worlds, as concrete.

mass.\* Mass is the theoretical notion which most closely corresponds to our intuitive notion of solidity; hence it is well adapted to underpin the notion of concreteness. Let us therefore take the basic property in terms of which concreteness may be characterised to be mass.

The realist with respect to possibility will immediately protest that just as possibilia have all the secondary properties that actualia do, so they have all the primary properties. Any properties which may be attributed to actualia may, for that very reason, be attributed to possibilia.

In order to answer this, let us remember the point - or at any rate, part of the point - of the primary/secondary properties distinction. A realist (with respect to actuality) normally draws a distinction between the way (actual) objects are 'in themselves', and the way they appear to perceivers. The proper way to characterise them as they are in themselves is in terms of their primary properties, while the proper way to characterise them as they appear to perceivers is in terms of their secondary properties. This as it stands is, of course, quite inaccurate, since many of the primary properties also 'appear' to perceivers. The important point about the distinction from our present point of view however is that not all the properties which appear in the percept of the objects are 'in' the object in itself.

Now we ask the realist with respect to possibility: what

---

\* In Problems from Locke, Ch. 1, Mackie argues that neither solidity nor mass qualify as primary properties according to Locke's conception of primary properties. But presumably they would do so on a revised definition of the primary/secondary qualities distinction, which emphasised the explanatory power of the primary property concepts.

properties do possibilia have in themselves i.e. independently of being apprehended by us? Since they are real entities, it is permissible, indeed mandatory, to observe this distinction between the way they are in themselves and the way they are as apprehended by us. Are they colourless, odourless, noiseless chunks of possible matter, which acquire their sensuous, secondary properties only in the process of being ideated? Or do they enjoy their secondary properties even while they are not being ideated?

I think that most realists with respect to possibility would construe, say, a possible pumpkin as being, in itself, yellow, and not as consisting of a colourless system of micro-particles. Yet to thus attribute secondary properties to an object-in-itself, entails a refusal to ground those properties in primary properties, i.e. a refusal to attribute the corresponding primary properties to the object. For if an object does have those primary properties, then the corresponding secondary properties only arise as the product of the interaction of those primary properties with the organ/s of perception and consciousness: the primary grounds of secondary properties, and the secondary properties thus grounded, cannot be conceived as co-obtaining in the object as it is in itself. Hence if the secondary properties inhere in possibilia mind-independently, the primary properties which would normally be thought to ground such properties must be absent. Hence only the kind of primary properties which are empirically manifest will belong to possibilia. Properties such as mass will not do so.

Here then we have an argument purporting to characterise the distinction between actualia and possibilia: actualia have mass whereas possibilia do not. To be concrete is to be massive.



There is an objection to this argument however. In the depth analysis - at present inconclusive - of matter being conducted in modern physics, mass is no longer unambiguously present at the most fundamental levels of physical reality: physics is in the process of dematerialising matter. Hence if the phenomenal world is supposed to be grounded in a concrete 'substratum' of mass, then modern physics has effectively pulled the substratum from under the feet of the phenomenal world. Substance has evanesced upon dissection. The concreteness of the actual world has dissolved: actuality has become ethereal.

Is 'ethereal' equivalent to 'unreal'? Is the concreteness of actuality not only what distinguish<sup>es</sup> it from possibility, but also what grounds the reality of actual objects? There are two questions to ask here. The first is, does the ethereality of actual matter imply its nonreality - its ideality? If it does, then the problem of actuality does not arise, since this is only a problem when possibilia and actualia are both assumed to be real. And if it does not, that is to say, if reality - in this case in the shape of actual objects - may be ethereal, what will distinguish (real) actualia from (real) possibilia, where the latter are presumably also ethereal?\*

On the question whether ethereality implies nonreality, opinion is divided, or more truthfully, bewildered. The philosophical

---

\* In Ch. 4 we introduced the notion of ethereal substance to characterise possibilia, having argued that possibilia are not abstract. I assume, for the sake of this argument, that if possibilia are real, they must be grounded in such ethereal substance.

consternation experienced by physicists in the face of the developments in elementary particle physics testify<sup>ies to the fact</sup> that there is no obvious answer. Most physicists still profess to be realists, but their realism is more a heritage from a philosophically less fraught tradition than a conviction wrested from the presently available theoretical and experimental data. This question then remains open.

If ethereality does imply ideality, and physics is therefore thought to confirm idealism e.g. positivism, then the question of the distinction between actuality and possibility will, as we have noted, not even arise, since the idealist can neither espouse realism with respect to possibility, nor ultimately define any satisfactory ontological distinction between actualia and possibilia.\*

If ethereality does not imply ideality, then it might be argued that it was mistaken to seek to characterise concreteness in terms of the primary property, mass. We can contrast ethereality with massiveness, but it may be that ethereality is compatible with concreteness. For it may be suggested that concreteness is properly characterised in terms of the substantival nature of spacetime. That is to say, if spacetime - though manifestly an 'ethereal' entity - may be construed as substantival, then there can be no objection to regarding the actual world as, though ethereal, substantival or concrete. This calls for an appraisal of the substantival<sup>ist</sup> view of spacetime.

---

\* See Note 1.

What then is the content of the substantival<sup>ist</sup> view of spacetime? It does not differ from the relationist view in its attribution of positive properties to spacetime - these properties are just the properties which belong to the geometry which the substantivalist claims is exemplified by actual (real) spacetime; that is to say, actual spacetime has no properties which are not shared by a purely mathematical object, viz a geometry. So what distinguishes spacetime from the geometry it exemplifies? Its reality? But mathematical platonists would claim that mathematical entities are real also. Its actuality? But it is the distinguishing characteristic of actuality that we are here seeking, hence it would be circular to invoke actuality as that which distinguishes spacetime from geometry. Its physical reality? But the only attributes available for its positive physical characterisation are geometrical - and hence shared by the relevant geometry, which is abstract.

You might think that what distinguishes actual spacetime from the mathematical entity, viz the geometry (understood platonistically) which it exemplifies, is obviously the fact that material bodies are embedded in the former, but not in the latter.

This response is doubly defective. In the first place, how can the substantivalist's view, on this reading, be made to differ from the relationist view of spacetime? For the motivation for the substantivalist view is the assumption of the epistemological antecedence of the actual physical reality of spacetime to that of matter, or at least of their epistemological parity. If we cannot explicate the actual physical reality of spacetime without appealing

to the actual physical reality of matter, then the realist view of spacetime becomes, not falsified, but epistemically redundant, since there is an alternative view based on the same premise with fewer ontological commitments, viz the relationist view.

Whether or not the relationist could justify the assumption of the concreteness of (actual) matter, given his view of the nature of spacetime as purely abstract, is another question. Leibniz, the proto-relationist, did not of course assume the concreteness of material bodies: they were rather, according to him, ideal entities, constructed out of the ideal interaction of ~~monads.~~  
~~mounds.~~ But it is not our task here to pursue the relationist's problem. At the beginning of this argument, I suggested that it would be defensible to regard matter as concrete, despite the etherealisation of its micro-structure incurred by modern physics, if we could succeed in sustaining a substantival<sup>ist</sup> view of spacetime - spacetime being the supremely 'ethereal' entity. We therefore cannot now permit the substantivalist to rest his case for the substantivality of spacetime on the assumption of the concreteness of matter (where this assumption was involved in the argument that spacetime is substantival because it is actual, and it is actual because concrete bodies are embedded in it.) Hence even as an ontologically superfluous, epistemically unmotivated, hypothesis, the substantivalist view of spacetime does not succeed in providing explication of the notion of substantivality which it invokes.

We conclude that the concreteness of actuality cannot be positively explicated in such a way as to justify the assumption of an ontological distinction between concrete actualia and ethereal possibilia.

It might be objected that we are not obliged to offer a positive explication of concreteness. We could merely interpret concreteness in terms of substance, or substrate, understood in the negative, Kantian sense as the <sup>u</sup>no~~u~~menal ground of phenomenal objects. However this move will not help to solve the problem of actuality, for it is difficult to see how <sup>u</sup>no~~u~~menality, which is uncharacterisable, unexplicable, could serve to distinguish one domain of real entities e.g. actualia, from another domain of real entities e.g. possibilia. For the definition of <sup>u</sup>no~~u~~menon is just 'what is real', as opposed to 'what is phenomenal, or mind-dependent'. A realist with respect to possibility regards possibilia as falling into the category of 'what is real'; hence he would be justified in considering them as grounded in <sup>u</sup>no~~u~~mena. <sup>u</sup>No~~u~~menality thus cannot serve to distinguish actualia from possibilia.

I conclude, <sup>c</sup>one more, that concreteness cannot usefully be invoked as the characteristic which distinguishes actualia from possibilia.

### Searching and Finding

Let me now suggest a quite different criterion for this distinction between actualia and possibilia: observability. An object is an actual, as opposed to a possible, physical object, if and only if it is observable.

An attractive variant of this thesis that the concept of actuality is to be explicated in terms of observability is

Hintikka's theory of Searching and Finding.\* He suggests that the logic of quantifiers is basically the same as that of the verbs 'to seek' and 'to find'. 'Finding' is not to be interpreted only in terms of literal confrontation with (observation) of an object: we find stars by measuring their radio emissions, and we find electrons by means of the paths they leave in cloud chambers. Nor is finding a purely passive affair, a matter of being confronted in perception with a particular state of affairs; finding presupposes searching, and searching is an activity, an operation on the world, which may involve an element of production. 'Direct observation', Hintikka writes, "is a "trivial case" of finding, and the discovery of an object by a complicated technical procedure may perhaps be considered as the issue of a test conducted by very special means." (p. 61). He also says, 'It is obvious that a great deal of idealisation is normally involved in the activities of seeking and finding here. All human limitations will have to be abstracted from. The searcher in question will have to be thought of, if not as omnipresent, than at least as "omnimbable", free of all those limitations of access that we humans are subject to.' (p. 103) He stipulates also that the field of search must be, somehow, however partially, defined in advance.

I take it that Hintikka intends this theory to be a theory of meaning, but the fact that the concept whose meaning is here being subjected to the theory is the concept of existence, implies that in this case, theory of meaning will entail an ontological theory i.e. if 'to exist' means 'to be findable', then it follows that a thing must be findable in order to be said to exist.

---

\* J. Hintikka: Logic, Language Games and Information.

Various interpretations of Searching and Finding suggest themselves. It is not clear whether Hintikka intends his theory to give a constructivist definition of the notion of actual existence, or indeed what is involved in the notion of a constructivist definition. I shall abstract from Hintikka's intentions for the moment, and simply examine what he says.

One interpretation of Searching and Finding that would be indisputably constructivist is the following: an object is actual if it is in fact found. This is a manifestly idealist view. Its effect would be to contract the world as we presently conceive it out of all recognition, perhaps thereby subverting the presuppositions of our conceptual framework. Hintikka's explicit assertions indicate that this is not the interpretation of Searching and Finding that he is expounding.

Hintikka's formulation of Searching and Finding is that an object is actual iff it is findable. This still has the appearance of a constructivist theory, but we shall have to examine it carefully in order to ascertain whether or not it is indeed one. This will involve exposing the presuppositions that are embodied in this crucial affix '-able'.

How then are we to analyse the statement that an object  $\phi$  is findable? The fact that this statement can certainly be translated into the following statement 'an act of finding  $\phi$  is possible,' instantly raises doubts. For the latter statement is ambiguous as to whether it is the act of finding which is possible, or the object which is possibly found which is possible. Put another way, is it

merely the acts of finding, but not the objects, which are missing from the actual world, or is it the objects themselves, and hence a fortiori, the acts of finding them, which are missing? Clearly, if 'findability' is to serve as a criterion (definitionally speaking) for actuality, the former reading must be adopted, since the latter reading explicitly affirms the nonactuality of the objects; but equally clearly, the former reading presupposes the very notion it is supposed to be defining, viz actuality.

It is worth trying to spell this point out even more clearly. The thesis that an object is actual iff it is findable is open for two interpretations.

(1) The 'property' that makes an object findable is its actuality.

Thus finding an object is proof that it is actual. Clearly this is not a definition, nor even an interpretation, of the notion of actuality, since it presupposes this notion. It is a purely epistemic thesis, concerning the verification of existential claims; it is not a verificationist thesis. Its viewpoint is realism.

(2) The properties that make an object findable are those properties which are, so to speak, transparent to our finding powers; in other words, those properties which are accessible to our perceptual faculties, viz empirical properties. These, and only these, properties are the properties the possession of which qualifies an object for actuality.

Two points need to be made concerning this reading of Searching and Finding, the first epistemic, the second ontological. The first is that no explanation is offered for this one - one correspondence between properties which are accessible to our



perceptual faculties and properties which characterise actual objects. We presumably cannot use evolutionary arguments, because according to such arguments, the actual world prescribes the properties that shall be available for being perceived, whereas the present theory requires that the nature of our perceptual powers prescribes the properties that shall characterise the actual world i.e. only those properties which are perceivable are available to the actual world. Or rather, the prescription is reciprocal, and constitutes a pre-established harmony. The second point is more serious. The thesis that an object is actual iff its properties are empirical dissolves the distinction between possible and actual empirical objects; it entails that there are no merely possible empirical objects. But the objects we typically conceive of as possibilities - and certainly the occupants of possible worlds - are empirical objects. This view of actuality therefore assimilates possibilities into the actual universe.

Another and more picturesque way of formulating (2) is as follows: the thesis that an object is actual iff it is findable, which can be translated as an object is actual iff an act of finding it is possible, can be analysed within the possible world framework as asserting that an object is actual iff it is found in some possible world. But clearly possible objects are found in possible worlds. Hence this definition renders all possible objects actual.

We can state our present conclusion even more strongly, for the effect of the preceding argument is to collapse modality altogether. That is, when we have

$$\Diamond p \supset p$$

we also have

$$p \supset \Box p$$

and then the modal calculus collapses into the propositional calculus.

But if we study (2) more closely, we find that it presupposes a domain of possible individuals,  $I_p$ . For if we take  $I_p$  to be the domain of all possible objects, and  $I_a$  to be the domain of all actual objects, then the thesis that an object is actual iff it is findable can be stated as follows:

(2) 'an object belonging to  $I_p$  belongs to  $I_a$  iff it is found by a searcher belonging to  $I_p$ ',

or 'a possible object is actual iff it is found by a possible searcher.' We do not presuppose the actuality of the searchers, since that would be to presuppose that  $I_a$  is nonempty. Yet we have seen that all the individuals belonging to  $I_p$  satisfy condition (2) - including the searchers, since they are empirical objects too. Hence  $I_p = I_a$ .

Hence the statement of (2) requires reference to a modal category which our argument has shown is ultimately nullified by the consequence of (2). I take this argument therefore to be a *reductio ad absurdum* of (2).

Yet this reductio is to a certain extent implicit in the primitive conception of the actuality/possibility distinction. We defined a state of affairs as being ontologically possible iff it is capable of being actual, where 'capacity' is intended to be understood in some absolute sense, rather than causally (where this would mean that the realisation of the capacity is contingent on the realisation of ~~the capacity is contingent on the realisation~~ on some set of initial conditions). But if a state of affairs is absolutely capable of being actual, why isn't it? The absolute possibility of a set of possibilia implies <sup>their</sup> ~~that~~ equipossibility. By what objective criterion is one of a set of equipossible states of affairs, or worlds, selected for actualisation? Obviously there can be no such criterion (theological criteria aside), since if there were, the states of affairs would not be equipossible. That is, if there were an objective selection criterion, then if one of the worlds satisfied this criterion, its selection would be inevitable; in this case it <sup>would</sup> no longer be true to say that the other worlds could really be actual. Hence they can no longer be said to be possible.

The dilemma thus appears to be impassable. Whatever qualifies for possibility thereby qualifies for actuality.

Nor can we take the dilemma by the horns and simply say, as the Searching and Finding theorist is forced to say, that all possibilia are in fact actualised. For this subtracts from the notion of ontological possibility a component which is fundamental even though not articulated in our primitive definition, viz the notion of alternativeness. Possibilia are conceived as alternatives to the

states of affairs which are actualised at particular points in spacetime. To each point in spacetime we can assign a set of alternative i.e. mutually exclusive, states of affairs. Possible worlds are likewise conceived of as exclusive (because maximal) alternatives to our world. Any theory which postulates that all possibilities are constantiable is simply doing violence to the notion of (ontological) possibility.

Retrospectively, it is evident that Hintikka would only be prepared to endorse (1). This is evidenced in his two qualifications of Searching and Finding.

(a) the field of search is to be presupposed, where a field of search may be delimited in either of two ways: it may be a class of objects, or a particular place at a particular time. In either case, the actuality of the field has to be presupposed if the objects which belong to it are to be actual. That is, we have to have some independent notion of actual existence - independent of the criterion of findability - in order to characterise the field.

(b) the searcher is to be 'omnible<sup>m</sup>'-in time, presumably, as well as in space. This qualification seems to me to totally nullify the point of Searching and Finding: the realist's entire spacetime, of which only an infinitesimal portion is in practice accessible to us, is here admitted through the back door; (a rather unfortunate metaphor!) Moreover, this 'omnibleness' clause is inexplicit concerning the distinction between places and times which are inaccessible to us in principle and those which are merely inaccessible in practice. That is, are we allowed, as a result of our nimbleness, to conduct our searches in the elsewhere region of our individual light-cones? Are we allowed, in thought, to probe

the interior of black holes with our search lamps? If so, then the analogy with the human activity of searching has been entirely lost, and the meaning of this new notion of searching escapes me, unless it is just a new terminological vessel for the old wine of realism.

In short, I think Hintikka wants to have his cake and eat it: he wants to 'naturalise', in the Quinean sense, the epistemology for the notion of actual existence, but on the other hand he does not want to sacrifice the extent of the world on the old, epistemologically recalcitrant, conception of it. The result is that his Searching and Finding asserts no more than (1) does, where (1) is not intended to be read in conjunction with any verificationist dogma (i.e. any blanket requirement that to be true is to be evidentially true.)

My general conclusion, then, is that there is no constructivist interpretation of the thesis that an object is actual iff it is findable; the only coherent theory that imposes the 'findability' requirement is (1), where (1) is an epistemic thesis concerning the verification of existential sentences. The only available constructivist theory of actuality is that which requires that to be actual is to be found.

### The Indexicality of Actuality

The main problem for Searching and Finding is that it presupposed realism with respect to possibility but then ignored the problem of actuality. I think this oversight on the part of Hintikka was due to a failure to recognise his commitment to realism with respect to possibility in his utilisation of the concept of possibility.

A view which has the appearance of being a variant of Searching and Finding, while at the same time being specifically addressed to the problem of actuality, is David Lewis' indexicality view of actuality.\* According to this view, the same ontological status attaches to possible worlds as attaches to our world. Actuality is not a privileged ontological status, enjoyed by one world only; it is just the status that a world has from the viewpoint of its own inhabitants; it is a relative, as opposed to absolute, status. On this view, then, it is not surprising that we have failed to produce any definition of the difference in ontological status between actualia and possibilia. There is no such difference.

The indexicality view adapts the observability criterion in the following manner: whatever is observable to you may be said by you to be actual. However the basic purpose of Searching and Finding was considerably different from that of the indexicality view. For Searching and Finding was attempting to provide an epistemological account - a psychogenesis - for the concept of existence, implicitly for the epistemology - defying concept of real i.e. mind-independent, existence.\*\* This is a deep problem, and one to which the indexicality theory is not addressed. <sup>the concept of real existence - it presupposes</sup> For this theory presupposes / the existence of a real, independently delimited manifold. It offers us no epistemological handle on this concept. It does not claim that

---

\* Counterfactuals, Ch. 4. Also 'Anselm and Actuality' Nous 4 1970 175-188

\*\* Hintikka's mistake was to assume that real existence is the same as actual existence. Although this may be in the end true, it cannot be assumed - especially when, as in Hintikka's case, a notion of real possibility is then covertly exploited.

the actual world is real because it can be observed by us; it claims only that it is actual for this reason; its reality is simply presupposed, and unexplicated. The problem to which it is addressed, then, is solely the problem of actuality. It does not require that the whole of our world must be observable to us in order for it to be claimed by us that it is, as a whole, actual. If we observe any given part of a world, then since it is ontologically determined to which world this part belongs, we can infer, from the actuality of the part, to the actuality of this world as a whole, where we take this whole to be independently delimited: no epistemic criterion for delimiting either our own, or any other, world, is demanded.

On this view then, the act of observing neither confers, nor is correlated with, any special ontological status; it merely confers an epistemic status on the object, viz the status of actuality- relative-to-the-observer-in-question.

The indexicality view however is, I think, the finest and most natural view of actuality available to the possible world realist. Absolute actuality is inevitably gratuitous, a detachable, inelegant, ad hoc accessory to the smooth machinery of the possible world apparatus. The axiom

$$Op \supset \Diamond p$$

where I introduce the symbols 'O' for an actuality operator, is true just because the actual world is already one of the possible worlds. And the axiom,

$$\Box p \supset Op$$

is true just because if  $p$  is necessarily true, then it is true in

all possible worlds, and hence, since the actual world is just one of the possible worlds, it is true in the actual world. In short, there is nothing in the formal possible world apparatus to distinguish, or to motivate the selection of, an actual world. It is on other, epistemological, grounds, that we insist on selecting such a world. Thus the ontology of possible worlds, while it does not preclude, in no way requires, the existence of a world with privileged ontological status, viz actuality.

In spite of its appeal, however, the indexicality theory ultimately fails. For consider the following argument. According to the indexicality view, every world is actual from the viewpoint of some world (itself) and possible but not actual from the viewpoint of other worlds. In order to fully understand this view, we have first to disambiguate the notion of a viewpoint. A particular viewpoint may be regarded as the point of view of an actual being who does in fact occupy a particular locus, or it can be regarded as the point of view that a being would have, were he to occupy that locus. Which notion of viewpoint is intended in the indexicality theorist's above claim? It cannot be the latter notion, according to which a viewpoint is understood as the viewpoint of a potential being. For in this case the viewpoint furnished by a world is the viewpoint of the potential inhabitant of that world - where that world may not in fact be inhabited. But a possible world analysis of the statement that there exists a potential inhabitant of a given possible world,  $\omega_1$ , is that there exists a distinct possible world,  $\omega_2$ , like  $\omega_1$  except that it has an inhabitant. But this gives us two worlds,  $\omega_1$  and  $\omega_2$ ; numerically distinct worlds must furnish numerically distinct viewpoints.



Yet according to this analysis, the inhabitants of  $\omega_2$  furnishes the viewpoint for both  $\omega_1$  and  $\omega_2$ ;  $\omega_1$  and  $\omega_2$  therefore both furnish the same 'viewpoint.' Clearly this result contradicts the indexicality thesis, viz that each world is actual from its own viewpoint only, and is possible from the viewpoints of all other worlds. For from the 'viewpoint' of  $\omega_1$ , both  $\omega_1$  and  $\omega_2$  are actual; and from the viewpoint of  $\omega_2$  both  $\omega_2$  and  $\omega_1$  are actual; this follows trivially from the fact that the 'viewpoint' furnished by  $\omega_1$  is identical with the viewpoint furnished by  $\omega_2$ .

In order to avoid this contradiction, the indexicality theorist will have to adopt the former notion of a viewpoint, according to which a viewpoint is the point of view afforded by an actual being. In this case, only inhabited worlds will furnish viewpoints. Hence the indexicality theorist can only admit inhabited worlds into the set of all possible worlds.

Such a requirement, that all worlds be inhabited by intelligences, is tantamount to an admission of idealism (with respect to all worlds, ours included). Since David Lewis is first and foremost a realist with respect to all worlds, he might prefer to sacrifice some part of the indexicality thesis in order to avoid the inhabitation requirement. He might concede that there are some worlds (those which are uninhabited) for which no viewpoint can be defined relative to which they are actual. But this will not do either. For the most fundamental tenet of the indexicality view - without which the indexicality view could not get started - is the view that actuality and possibility are relative modes. We can read this<sup>in</sup> either of two ways. An absolute ontological status may be definable for an entity

as a function of its relative modes. Take the analogy with Special Relativity: there is no unique absolute time at which a given event,  $\phi$ , occurs. But if we take a particular inertial frame as our rest frame, and record the time at which  $\phi$  occurs, relative to that reference frame, then it is determinate at which time  $\phi$  occurs in every other reference frame. This set of relative times can then be taken as absolutely temporally identifying  $\phi$ . In the modal case, we may postulate a metamode, which is an absolute ontological status (i.e. attaches to entities independently of particular points of view), and is defined in terms of a function which assigns to each possible world a set of relative modes, such that each possible world is actual relative to its own viewpoint, and possible from the viewpoint of all other possible worlds. Any world which cannot be mapped by this function onto an appropriate set of relative modes does not qualify for the metamodal status. A world which is not actual from any viewpoint will not satisfy this function. Hence it does not have absolute ontological status; in other words, it will not be real.

The other reading of the view that actuality and possibility are relative modes is that these are modes of real entities - entities whose reality has been presupposed, as the 'ground' for the modes. The analogy here is with Kantian phenomena and <sup>u</sup>no<sup>u</sup>mena. Possibility and actuality are the phenomenal modes of worlds, which are, in themselves, <sup>u</sup>no<sup>u</sup>menal entities. However, once we stake our realism on the existence of a <sup>u</sup>no<sup>u</sup>menal ground for the phenomena, which alone are epistemologically accessible, it is a short - but epistemologically inevitable - leap to idealism.

The end of the story is thus that the brave new realism of David Lewis is transformed into a classical idealism.

### Survey of Theories of Actuality

There are so few explicit discussions of the problem of actuality in the literature that one specifically addressed to this problem deserves comment. This is Robert Adams 'Theories of Actuality'.<sup>\*</sup>

Even Adams however fails to recognise that the so-called problem of actuality is only a problem for one who endorses the realist view of possibility. For the problem is to distinguish two realities - that of the actual world, and that of the merely possible worlds. If possible worlds are not real, then precisely this will distinguish them from the actual world; indeed it would then be inconceivable that we could confuse the actual and merely possible worlds in the first place.

However, even though Adams fails to make the crucial distinction between theories of actuality which presuppose realism with respect to possibility, and theories of actuality which presuppose the negation of this realist view, his article is useful for the survey of theories of actuality which it provides. He lists the following theories in this survey: a theory of the exhaustive and exclusive degerminacy of actuality in contradistinction to possibility; the divine choice/optimistic theory; the indexicality theory; the simple property theory; and the actualist theory.

Surprisingly, Adams scarcely comments on the first theory. In Chapter <sup>4</sup>6 however, we argued that realism with respect to possibilia

---

\* Nous VIII 3, 1974

is incompatible with the view that possibilia underdetermine their realisations. We then used this argument to argue that if possibilia are real, they cannot be abstract, since concepts cannot exhaustively represent particulars. Hence according to our conclusions there, any theory of possibility which asserted the indeterminateness of possibilia in comparison with actualia could not be a realist theory of possibility. We have already contended in the present chapter that there is no problem of actuality for nonrealist theories of possibility. Hence this first theory cited, but not discussed, by Adams, does not solve, because it is not relevant to, the problem of actuality.

The indexicality theory, which we have recently discussed, of course does presuppose a realist view of possibility, and hence is genuinely addressed to the problem of actuality. Adams offers some interesting objections to this theory; I endorse them - with the exception of the charge that the indexicality view is counterintuitive. But I shall not report them here, because I have already offered my own arguments seeking to show that the indexicality theory does not solve the problem of actuality. The problem of actuality arises when we assume the reality of both actualia and possibilia. According to my arguments, the indexicality theory fails to secure the reality of either.

The fourth theory of actuality listed by Adams is the simple property theory, which regards actuality as a simple, unanalysable property peculiar to the actual world, and serving to distinguish it from possible worlds.

Adam's own objection to this theory is as follows: possible worlds are possibly actual i.e. they have the property of actuality possibly. The actual world is actually actual i.e. it has the property of actuality actually. But to have a property actually is to have it in the actual world. Hence we cannot understand which world has this property (of actuality) actually without already knowing which is the actual world. But it was having the property of actuality which was supposed to distinguish the actual world. Since we cannot discover which world has this property actually without already knowing which is the actual world, this property is not what enables us to distinguish the actual from the merely possible worlds.

I disagree with this objection, since it already presupposes the indexicality of actuality, as opposed to the absoluteness of actuality - where it is its absoluteness that the simple property theorist seeks to affirm. That is, the simple property theorist would deny that a possible world is possibly actual, if this is understood to mean that it is actual in some possible world, namely itself. He would admit that a possible world is capable of being actual, but he would not explicate this as its actuality in some possible world. For him, there is just one actual world, and it is this world which is actual from the viewpoint both of itself and of other possible worlds. Thus possible worlds are not possibly actual; they are possible, and this may be defined as being capable of being actual. But being capable of being actual is not like being capable of being green: to be capable of being green is, perhaps, to be green in some possible world; but to be capable of

being actual is just to be in some possible world; it is not to be actual in some possible world - unless, that is, we are assuming the indexicality of actuality. To say that an individual is actual in some merely possible world is, for the simple property theorist - or indeed for anyone who takes an absolutist view of actuality - merely a contradiction.

Adams' own proposed solution to the problem of actuality is embodied in what he calls the actualist theory of actuality - as opposed to the previous views, which he considers possibilist. Possibilist theories presuppose a system of possible worlds, to which the actual world belongs. Actualism, in contrast, considers that whatever exists (i.e. is real) is actual. Adams writes, 'Actualism, with respect to possible worlds, is the view that if there are any true statements in which there are said to be non-actual possible worlds, they must be reducible to statements in which the only things there are said to be are things which there are in the actual world and which are not identical with non-actual possibles.' (p. 224)

Adams distinguishes between hard actualism, which simply rejects the language of possible worlds altogether, and soft actualism, which admits possible worlds as logical constructs - logically constructed out of the furniture of the actual world (where this requires that that furniture be rich enough for the logical construction of <sup>a</sup> plurality of completely determinate possible worlds.) One example of soft actualism that Adams cites is the theory which reduces statements about possible worlds to statements ascribing dispositional properties to actual objects e.g. Goodman's theory, in *Fact, Fiction and Forecast*.

Adams' own version of soft actualism reduces possible worlds to propositions: a world story is a maximal consistent set of propositions i.e. has as its members one member of every pair of mutually contradictory propositions, and is such that all its members may be true together. He then analyses the assertion that the actual world differs from other possible worlds (i.e. the statement of the problem of actuality) as follows: all the members of the world - story of the actual world are true, whereas all the other world-stories have false propositions among their members.

It is obvious from the very start that Adams' view of possibility is not a realistic one - he asserts that only actualia are real. There is therefore no need for me to criticise the details of his theory. For as I have repeatedly remarked in this chapter, the problem of actuality is only a problem from the viewpoint of realism with respect to possibility. Admittedly, Adams procures his particular constructivist theory of possibility by cashing in on an alternative realism - as is wont to be the way of constructivist theories in general, as we have observed. In his case the 'surrogate' realism is realism with respect to propositions. Shifting the burden of realism around the board is not going to ease the problem. Adams has simply posed a new problem of actuality - the problem of distinguishing actual states of affairs from real propositions. He does not tackle this problem.

I set out, in this chapter, to discover a non-circular means for characterising the ontological distinction between (real) actualia and (real) possibilia. Having failed in the attempt, I

have two options. Either I can deny that there is such a distinction. Or I can deny the reality of one category of entity or the other. I decline the former option, since it would render the radical difference in the kind of epistemic access we have to the two types of entity entirely inexplicable. I also decline to reject realism with respect to the actual world. Hence my only option is to reject realism with respect to possibility.



Note 1

It is a problem for the idealist (i.e. the idealist with respect to the external world) to define the actual/possible distinction. How can he distinguish between actual and possible objects when both are merely mental constructs; indeed, the notion of an actual object is even sometimes analysed by the idealist in terms of permanent possibilities of being perceived. If actualia are thus defined in terms of possibilia, how are we to draw the line between actualia and possibilia? Even if the idealist does manage to characterise actualia and possibilia as different kinds of mental construct, he can clearly establish no ontological distinction between them, and will be hard pressed to deal satisfactorily with the borderline cases - where the experiences of dreaming and vivid imagination verge on the experience of perception.

According to this argument then, reality is at least a necessary condition for actuality, and the contents of the idealist's world will have to be considered modally undifferentiated.

## Chapter 6

### OUTLINE FOR A NONREALIST THEORY OF POSSIBILITY

I have now reviewed a number of objections to realism with respect to possibility. If realism is false, are all our modal statements likewise false? In Chapter 1 I claimed that our ordinary notion of possibility was a realist one. But I also mentioned a distinct notion, of epistemic possibility, postponing proper discussion of it. Let me now return to a comparison of these two notions.

#### Ontological and Epistemic Possibility

To say that a particular event, A, is ontologically possible, is to make an unqualified assertion that it is, as a matter of ontological fact, the case that A could occur, or could have occurred, irrespective of whether it will, or did, actually occur. To say that A is epistemically possible, is, on the other hand, to make a qualified assertion that A did, or will, actually occur. If someone says that A is epistemically possible, he believes that A is ontologically possible. But the truth of 'A is epistemically possible according to person M', does not entail that 'A is in fact ontologically impossible', is false, though it is incompatible with 'M believes A to be ontologically impossible', and with 'M believes that A will, or did, not actually occur'.

The distinction between ontological and epistemic possibility may be expressed by describing the former as a *de re* modality, a status attaching to objects themselves, and the latter as a *de dicto*

modality, a status attaching to objects themselves, and the latter as a de dicto modality, a sentence modifier. The sentence in the scope of such a modifier is understood as being asserted subject to a certain qualification, viz that the utterer does not have sufficient grounds for believing the sentence to be true, though nor does he have sufficient grounds for believing it to be false; he has necessary grounds for its truth, and lacks necessary grounds <sup>for its falsehood.</sup> <sub>The sentence within the scope</sub> of an epistemic possibility operator is typically one which asserts something to be actually the case. It may be an assertion of ontological possibility, but then the entire sentence - the epistemic possibility operator together with the sentence in its scope - will involve a (mixed) iterated modality, and hence will be distinguishable from the above, typical case.

Counterfactual sentences express judgements of ontological possibility. However, we cannot always tell whether a sentence is a counterfactual by its form, and most forms of modal sentence in fact admit both ontological and epistemic interpretations. We can claim that counterfactual sentences express judgments of ontological possibility because in describing a sentence as a counterfactual we assume that the utterer believes that it concerns a counterfact - an occurrence which did or will not take place. But this is not always discernible from the form of the sentence itself. For example, the sentence 'Event A could have occurred at spacetime point  $(x, t)$ ', might be interpreted as a qualified assertion, in the sense indicated above, that A actually did occur, or it might be taken as implying that A did not actually occur, but that as a matter of ontological fact it could have occurred. In the sentence 'If condition C had obtained at  $(x_1, t_1)$ , event A would

have occurred at  $(x_1, t_2)$ , the form of the antecedent does imply that C did not actually obtain; but the very similar sentence 'If condition C obtained at  $(x_1, t_1)$ , event A would have occurred' may be taken as expressing a conditional judgment of epistemic possibility: it is not known that C did not obtain, nor that it did; hence C is epistemically possible; if C did obtain, then it is inductively inferable that A occurred.

I will not provide such alternative interpretations for all forms of modal sentences here, however, because the initial distinction on which the supposed alternativeness of these interpretations rests is itself suspect. For does not the notion of epistemic possibility, as here outlined, presuppose certain ontological principles? It assumes that there are necessary conditions for the truth of any sentence purporting to refer to an actual event, and certain necessary conditions for its falsehood, i.e. conditions such that, if the sentence violates them, it cannot be true. But do not these necessary conditions express minimal conditions which events or objects have to satisfy in order to be actual: if they fail to satisfy them, they cannot be actual. Are not such conditions ontological conditions - conditions, in fact, for ontological possibility and impossibility? For according to our definition in Chapter 1, to be ontologically possible is to be capable of being actual. If an object satisfies the necessary, or minimal, conditions for actuality, can it not then be said to be capable of being actual? In short, in employing the notion of epistemic possibility, we tacitly assume that actual objects have to have certain specific features, and cannot have certain others. This is to assume that certain aspects of actuality are ontologically necessary. Once we

have accepted this, there is no reason, given the interdefinability of possibility and necessity, for objecting to the notion of ontological possibility: to be ontologically possible is to have these ontologically necessary features, the features which anything must have in order to be actual i.e. to be capable of being actual.

Hence epistemic possibility, as here explicated, is not free from at least some of the metaphysical commitments of ontological possibility. If one rejects these metaphysical commitments, then, unless one can discover or devise a metaphysically neutral notion of possibility, all modal sentences will have to be treated as false, or even meaningless.\*

#### A Metaphysically Neutral Notion of Possibility

We can view our conceptual apparatus as resting on certain fundamental principles whereby our experience is ordered. 'Ordering' our experience is here conceived as putting our experience into a form such that it can be subjected to the further conceptual operations which characterise our conceptual apparatus. These principles, or rules, thus prescribe how our raw sense experience has to be initially processed in order to be susceptible to further conceptual processing. We could say that they prescribe the form in which sense experience has to be presented to the mind in order to be intelligible to the mind. This function, here being ascribed to these fundamental principles, must be carefully distinguished from a quite

---

\*Which? This depends, of course, on whether we consider the metaphysical thesis embodied in the notion of ontological possibility as false or meaningless. I will not try to decide this here.

different function, viz prescribing how ontology has, as a matter of ontological fact, to be. I deny that the principles I am about to present have this latter function; rather, they are principles solely for the ordering of experience. They determine what it is for an experience to be intelligible. In determining<sup>ing</sup> what the mind finds intelligible, they are also determining what the mind can conceive (in the sense of intelligibly conceive). In dictating how experience must be ordered, then, these principles simultaneously dictate what is and is not conceivable. My proposal for a nonrealist theory of possibility is to take the form that possibility is exclusively a mode of concepts, and that a concept may be said to be possible iff it is intelligible.

The two minimal fundamental ordering principles, or conditions, for intelligibility, which I have here been invoking, are the following:

- (P<sub>1</sub>) One object cannot occupy two different places at the same time.
- (P<sub>2</sub>) Two objects cannot occupy the same place at the same time.

(R<sub>1</sub>) and (P<sub>2</sub>) may be regarded as rules either for the identity and individuation of objects, or for the construction of spatio-temporal relations. That is, we may consider that the ordering of experience consists either in differentiating the sense data so as to individuate objects, or in the construction of a system of spatio-temporal relations amongst the individuals presented in the data. If we take the former view, we presuppose that the spacetime framework is already given in experience, for it is by means of the spacetime relations that we individuate the objects (in accordance with (P<sub>1</sub>), (P<sub>2</sub>)).

This is tantamount to a presupposition of a realist, or substantivalist, view of spacetime. If we take the view that the ordering of experience consists of constructing a spacetime framework, then we do not of course presuppose that that spacetime is given, but we do presuppose that the identity of objects is. That is, we have to presuppose the antecedent individuation of objects, in order to construct a system of spatiotemporal relations, in accordance with  $(P_1)$ ,  $(P_2)$ . This is tantamount to adopting a relationist view of spacetime together with a realist view of identity. Leibniz affords an example of this viewpoint: as we saw in Chapter 2, he had to presuppose the Identity of Indiscernibles in order to realise his relationist view of spacetime. But in presupposing the Identity of Indiscernibles, he was, of course, presupposing that the identity of objects is given independently of their spatiotemporal relations.\*

I propose here to construe  $(P_1)$ ,  $(P_2)$  as rules for identity rather than for spacetime. I want to take spacetime as ontologically given, independently of us, and I want to take physical reality as spatiotemporal; we perceive this spatiotemporal reality. My reason for this interpreting  $(P_1)$ ,  $(P_2)$  as rules for identity rather than for the construction of spacetime is that, as the latter, they implicitly presuppose realism with respect to possibility, which I have rejected, and to which I am here trying to propose an alternative. The argument showing this presupposition of a realist notion of possibility occurs later in this chapter (on p.223-6); I do not wish to present it here, as it would constitute a digression from my main purpose.

---

\*We shall consider the Leibnizian position in more depth in a later section of this chapter.

Let me now spell out the implications of the view that identity is conceptual - that individuation is a purely mental operation exercised on the mind's experience of a physical, spatiotemporal reality. Let me emphasise that, on this view, the reality which the mind experiences as spatiotemporal and physical is indeed, 'in itself', spatiotemporal and physical. But in order to make its experience of this spatiotemporal reality intelligible to itself, the mind imposes a certain order on it. This order consists of the differentiation of what is experienced into individuals, or objects, which are then conceived as in interaction. This conceptual process of individuation is conducted in accordance with  $(P_1)$ ,  $(P_2)$ . These principles make no assertion about physical reality - they do not assert that certain objects can and certain objects cannot be found in physical reality. Objects do not exist in physical reality - as it is in itself - at all, because objects, qua the results of the operation of individuation, are the creation of the mind. Thus, there is no risk that  $(P_1)$ ,  $(P_2)$  may be interpreted as asserting ontological necessities; since objects, or individuals, are the creatures of the ordering mind in the first place, the mind has every right to pronounce how they have to be. There is thus no need to reformulate  $(P_1)$ ,  $(P_2)$ , in order to bring out their purely epistemic intention, as statements that one object cannot be experienced as occupying two places at the same time, and that two objects cannot be experienced as occupying one place at the same time. We can assert, without qualification, that one object can occupy only one place at one time, without thereby asserting an ontological necessity when it is understood that objects - as opposed to the spatiotemporal physical manifold - only exist as part of the experience of that manifold by the mind, and that the above assertion is definitive of what it is to be an object.



The mind individuates objects by drawing imaginary boundaries around particular regions of spacetime. It then stipulates, in accordance with  $(P_1)$ ,  $(P_2)$ , that whatever occupies that region is one individual. It does not dictate what can exist within any such boundary i.e. the nature of physical reality therein. All it dictates is that, whatever the nature of physical reality within that boundary, it qualifies as a single individual. (We shall consider a little later the question of where the mind chooses to draw such boundaries, and why). Hence when we say that, for example, roundsquare objects are 'impossible', we mean, on my view, not that there are metaphysical constraints on physical reality such that it cannot include roundsquare objects, but that roundness and squareness define two different kinds of boundaries; hence, to individuate a roundsquare object, the mind would have to identity the physical reality within two different boundaries as one individual, and this violates  $(P_1)$ . So, when we say that roundsquare objects are impossible, we are not saying what reality has to be like, but only what we, or our minds, can do. For, in the first place, physical reality, in itself, does not include objects in any case, and in the second place, the mind does not presume to prescribe for reality. But we can say that whatever physical reality was like, we should not order it so as to represent it as including a roundsquare object.

It may be objected that it is in no sense arbitrary that the mind draws its boundaries where it does. And if it is not arbitrary, does this not imply that such boundaries are objectively grounded, and hence that objects, or individuals, qua individuals, have a certain objective status. Here our argument converges with the hoary issue of natural kinds of/(and implicitly, of natural individuals)

On this question I would say that certainly physical reality lends itself to individuation into objects; but it does not lend itself to individuation into any one, unique set of individuals, but rather to indefinitely many such sets, and within any such set, the ontological grounds for the boundaries are only approximate, not precise. It is the nature of our particular perceptual apparatus which determines which aspects or features of reality are 'relevated' - to borrow a word from D. Bohm\* - in perception. Bohm notes that the word 'relevant' is derived from an obsolete verb 'to relevate' which means 'to lift up'; to relevate a certain feature of reality is thus to 'lift it into attention so that it stands out 'in relief'' (p. 443). The features of reality which our perceptual apparatus relevates are those that are relevant to our interests and purposes as organisms. It is the distribution of these features in space which guides our conceptual boundary - drawing. But, as I have stressed, these features do not exhaust the nature of physical reality. The investigations of physicists, which have brought into existence, and in turn employed, new modes of 'perception', or new perceptual apparatuses, have proved this by continually revealing new aspects, or features, of physical reality, which in turn suggest new patterns of individuation of reality into objects.

If identity, or individuality, were ontological, then there would be just one division of reality into a set of individuals, and only one correct representation of this pattern of individuation, i.e. this set of individuals, in perception or conception. From the fact that many alternative patterns of individuation seem to 'fit' reality equally well, depending on which features of reality are being

---

\*D. Bohm: 'Quantum Theory as an Indication of a New Order in Physics' In Foundations of Quantum Mechanics.

releveled, we may conclude that identity is not ontological.

Closely connected with this question is the question why our ordering principles are effective, if physical reality does not itself consist of individuals i.e. if identity is not ontological. By 'effective' I mean that in so ordering our experience of reality, we seem to equip ourselves for acting on reality relatively successfully - where the promotion of our own ends serves as the standard for success. To this question we may give an evolutionary answer: our minds have evolved under the exigencies of natural selection. They are thus well adapted to their local environment, in the sense that the features of that environment that are releveled by the perceiving mind are relevant to our interests as organisms, and that these features lend themselves to the operation of individuation. This brings me to an important point. We are incapable of experiencing, or conceiving, in the sense of finding intelligible, violations of  $(P_1)$ ,  $(P_2)$ , not because  $(P_1)$ ,  $(P_2)$  state ontological necessities, but because they state the principles whereby we order, and hence makes intelligible to ourselves, our experience of reality.

However, we can perhaps conceive of remote physical environments in which  $(P_1)$ ,  $(P_2)$  would not be useful, either because reality there was too complex, or not complex enough, to be ordered in that manner i.e. to 'lend' itself to individuation into a set of objects. I might add however that all that is in principle required of physical reality for the applicability - as opposed to the usefulness (in the sense of nonarbitrariness) - of  $(P_1)$ ,  $(P_2)$  is that boundaries ~~to~~ be drawable in space. This requires that space be continuous. Where spacetime is subject to gross topological deformations, as in the interiors of black holes, we may not be able to draw boundaries in the normal manner.

Although my proposal has a faintly Kantian aspect, it does not, as has been indicated, have Kantian implications for space and time. Although I characterise  $(P_1)$ ,  $(P_2)$  as 'necessary', in the sense of imposed by the mind on its own experience, and hence as, in Kantian terms, synthetic a priori, in the manner of the categories, it does not follow, nor is it presupposed, that space and time are ideal. The contribution of the constitution of the mind to the nature of experience is merely, on my view, that it relevates certain aspects of spatiotemporal reality at the expense of others, and draws imaginary boundaries around certain regions of reality, construing the physical content within these boundaries as objects, or individuals. In this way, the mind orders its experience of that reality. This does not imply that reality is in itself not, in its spatiotemporal aspect, just as it appears to be in perception. It may be in itself spatiotemporal, and physical; but it is not a set of individuals. The boundaries the mind imposes are unreal.

There are certain objections to this view. Does not the formulation of  $(P_1)$ ,  $(P_2)$  imply that places and times have identity? If this is so, then  $(P_1)$ ,  $(P_2)$ , far from furnishing rules for identity, presuppose it. Furthermore, if  $(P_1)$ ,  $(P_2)$  are necessary, then does this not imply that it is necessary that the mind <sup>be</sup> ~~is~~ constituted so as to impose this particular principle of order on its experience, where this necessity is an instance of ontological necessity? In this case,  $(P_1)$ ,  $(P_2)$  cannot serve as the basis for a nonrealist theory of possibility/necessity. I shall come to these objections in a while. First I want to set out clearly the points at which my proposal has affinities with Kant and the points at which it is opposed to Kant. To do this, I shall outline first the skeleton of my nonrealist theory of possibility, and then the skeleton of the relevant <sup>a</sup> aspects of the Kantian view.

My view: (1) The world is, as a matter of ontological fact, physical and spatiotemporal.

(2) We perceive this physical, spatiotemporal world.

(3) The mind imposes an order on this experience (both at the level of perception and of conceptualisation), which is constitutive of the intelligibility of this experience. This order consists in the differentiation of the physical manifold into individuals, in accordance with  $(P_1)$ ,  $(P_2)$ .

(4) Hence  $(P_1)$ ,  $(P_2)$  are the (minimal) conditions for the intelligibility of (empirical) concepts. They are conceptually necessary. Possibility is to be analysed in terms of the intelligibility of concepts; a concept is possible iff it is intelligible, and it is intelligible iff it does not violate the mind-imposed ('synthetic a priori') conditions for individuation.

(5) I make no explicit comment on whether or not it is necessary that experience be of a spatiotemporal manifold; I claim only that it is of such. My evolutionary explanation of the mind's constitution implies that the mind was built in accordance with the demands of its actual physical environment, and hence it is adapted, exclusively, to that environment. No adaptive value would attach to its being capable of experiencing a nonspatiotemporal reality. It is thus evolutionarily necessary that experience be of spatiotemporal manifold. Evolutionary necessity is a species of causal necessity, consideration of which I shall postpone to the next chapter, in which I seek to develop a theory of natural laws consonant with a nonrealist theory of possibility.

~~Kant's view:~~

- V:201 (1) Space and time are, according to the Aesthetic, the intuitions of the sensibility - time the intuition of the inner sense (awareness of subjective states), space the intuition of outer sense (awareness of the objective world). Space and time are thus ideal<sup>1.2.</sup>mind-imposed. Kant's argument for this ideality thesis devolves on the character of geometrical truths. He takes the truths of Euclidean geometry to be necessary, but not analytic. Since they are not analytic, and since necessary truths cannot be known, or, more accurately, known to be necessary, a posteriori, Kant concludes they are synthetic a priori, which he explains as mind-imposed.
- (2) Since experience of an outer world is, (Kant argues in the Refutation of Idealism), necessary for self-consciousness, or experience of inner states as inner states, spatiotemporality (the intuition of outer sense) is a necessary condition for experience in general, or rather for the intelligibility of experience.
- (3) Since we perceive reality through our sensibility, which imposes spatiotemporality on this experience we do not perceive reality as it is in itself - and cannot know what it is like in itself.
- (4) Further necessary conditions for the intelligibility of experience, or of empirical concepts, are imposed by the understanding. These conditions are embodied in the categories (the theory of which is expounded throughout the Analytic.) Kant wants to derive the categories from the requirements of the understanding in abstraction from sensibility. Hence the requirement (for intelligibility) of spatiotemporality does not in itself entail or prescribe, nor is it entailed by, the categories (as requirements for intelligibility). The categories are, like space and time, synthetic a priori - mind-

imposed necessary features of experience. But as I have already said, qua necessary conditions for intelligibility, they are effectively independent of the requirement of spatiotemporality.\*

(5) Possibility consists, for Kant, in the nonviolation of the synthetic a priori conditions for experience - where these include both the requirement of spatiotemporality and the requirements of the categories. In the Postulates of Empirical Thought, Kant explains the concept of possibility in its empirical employment as the concept of consistency with the 'formal conditions of experience' and the concept of necessity in its empirical employment as the concept of being entailed by 'the universal conditions of experience', where these conditions are those general truths about intuition and thought that Kant has set out to prove in Aesthetic and Analytic. As Bennet\*\* puts it, 'a proposition is "necessary"...if it is synthetic and a priori, and it is "possible" if it is not in conflict with anything synthetic and a priori.'

Kant offers no overall explanation for the fact that the mind is constituted as it is. He proposes his transcendental psychology to account for the actual nature of experience, but does not - except by enigmatic references to ineffable nonmena - explain this nature.

---

\* Strawson, in the Bounds of Sense, claims that the argument from geometry is the only serious argument that Kant offers for the thesis of the ideality of space and time. Hence this thesis is effectively detachable from the theses included in the Analytic. Moreover, the argument from geometry is one of the Kantian arguments that history has conclusively refuted, with the discovery of non-Euclidean geometries.

\*\* J. Bennet: Kant's Analytic. p. 166.

My proposal, then, amounts to the postulation of an analogue to a Kantian category, namely identity, construed as mind-imposed, and hence as synthetic a priori, in his sense. In the case of my proposal, however, this category-type theory is superimposed on a theory of perceptual realism with respect to spacetime. This is a permissible move if we accept the relative independence of Kant's theory of space and time and his theory of the categories. Thus Kant and I agree on the ideality, or nonreality, of possibility and necessity, analysing them in terms of, respectively, the nonviolation of, and entailment by, the mind-imposed conditions for the intelligibility of concepts. But whereas Kant includes spatiotemporality among these mind-imposed conditions, I do not; on my view, spacetime, or spatiotemporal reality, is what is perceived, not a condition for perception.

It would be natural to object, at this point, that whatever role  $(P_1)$ ,  $(P_2)$  play in determining the intelligibility of concepts, or propositions, the Law of Non Contradiction (LNC) must surely play a more fundamental role. It is easily seen, however, that LNC is inadequate as a criterion for the intelligibility of concepts, or propositions. It in no way excludes concepts of roundsquares, or of objects which are red and green all over. Indeed, LNC is not even true of empirical <sup>sences</sup> propositions without certain implicit qualifications of those sentences. For example, according to LNC, the sentences 'Object A is red all over', and 'It is not the case that object A is red all over', cannot both be true. But this assumes, what is not stated, viz that both sentences refer to A at the same moment in its history. There is clearly no reason why A should not be red all over at one moment, and no longer red all over



at another. You might object that LNC says that a sentence and its negation cannot both be true, where it is the first sentence itself which is negated, and the negation is then conjoined with the un-negated sentence. In this case, whatever is implied in, or intended by, the original sentence, is equally implied in, or intended by, its negation. Hence even if no spatiotemporal co-ordinates appear in the original sentence, if any such co-ordinates are intended or implied, then the very same ones will be intended or implied in the negated sentence.

However, if we took this objection seriously, we should have to introduce a new notation of qualifiers of propositional variables and constants into logic. For suppose that  $a$  is a name of a sentence, where by a sentence we mean a particular grammatically ordered string of words. Then the formula, ' $\sim(a \& \sim a)$ ' would not exemplify LNC. For suppose ' $a$ ' names the string of words, 'it is raining'. 'It is not the case that both it is raining and it is not the case that it is raining' is not, as it stands, logically true, for as we have seen, it may be raining in Tibet and not raining in California, and thus both raining and not raining. Hence in order to make ' $\sim(a \& \sim a)$ ' logically true, we shall have to add an indexical indicator to  $a$ . Suppose we do this by affixing a pair of spatiotemporal co-ordinates to ' $a$ ', as a subscript: ' $a_{(x,t)}$ '. Then ' $\sim(a_{(x,t)} \& \sim a_{(x,t)})$ ' will be logically true. This qualification of sentences is of course only necessary when the sentences in question are indexical, in the sense that the location of the object or event to which they refer is contextually determined, not explicit. But the fact that it is necessary shows that the truth of LNC is not independent of  $(P_1)$   $(P_2)$ . (I do not claim to have made a reduction of LNC to  $(P_1)$ ,  $(P_2)$ ; I want to

demonstrate only their interdependence.\*)

Why is LNC, thus qualified, true, for empirical sentences? Why can it not be the case that, say, an individual, A, occupies a spacetime location,  $(x, t)$ , and also that A does not occupy  $(x, t)$ ? The reason may be that if A does not occupy  $(x, t)$ , then we can infer from  $(P_1)$ ,  $(P_2)$  that  $(x, t)$  is free to be occupied by a different individual. Suppose, then, that  $(x, t)$  is occupied by a different individual, B. This is now, according to  $(P_2)$ , incompatible with the former conjunct, viz that  $(x, t)$  is occupied by A. Hence, by  $(P_1)$   $(P_2)$ , these two sentences cannot both be true.

It might be objected that, even if I have shown that  $LNC^N$  to some extent presupposes  $(P_1)$ ,  $(P_2)$  in the case of empirical sentences, this obviously cannot be argued in the case of nonempirical sentences e.g. mathematical sentences. In these cases LNC is true without qualifications.

*may be merely a generalization of LNC for empirical sentences.*  
I would reply that LNC for nonempirical sentences! After all, we only insist on bivalence in logical and mathematical systems to the extent that we want our logical inferences to be empirically interpretable; that is, logical inferences in many-valued systems would not in general, when empirically interpreted (i.e. when empirical sentences are substituted for the wffs), yield true conclusions from true premises. To the extent that we are indifferent to the empirical applicability of our formal systems, LNC has no privileged status. I would thus suggest that the truth of LNC is, quite generally, connected with the way we order our sense experience i.e. with  $(P_1)$   $(P_2)$ .

---

\* LNC is, after all, explicative of negation, and negation is involved in  $(P_1)$ ,  $(P_2)$ .

I have argued that LNC does not provide the basic criterion for the intelligibility of concepts, since it does not exclude concepts of roundsquares and so on (and since its truth for empirical statements presupposes certain spatiotemporal qualifications defined by  $(P_1)$ ,  $(P_2)$ ). But do  $(P_1)$ ,  $(P_2)$  exclude concepts of roundsquares and objects which are red and green all over? We have already looked at the case of the roundsquare, but let us now take a closer look.

Squareness is a geometrical concept: a square is defined as a figure with a certain kind of boundary i.e. a boundary with certain

properties e.g. closed, four-sided, four right angles, and so on. Roundness, or for precision we shall say circularity, is likewise a geometrical concept; a circle is defined as a figure with a certain different kind of boundary e.g. all its points equidistant from a given point, the origin. To be a round object is thus to have a different boundary to a square object; this follows analytically from the definition of circles and squares in terms of the natures of their respective boundaries. Hence a round object and a square object cannot (in an analytic sense) share a common boundary. But boundaries define places: a given place is the space within a given boundary. Hence a round object and a square object occupy different places. By  $(P_1)$ , then, they cannot be one object. Ergo, no roundsquares.

The case of objects which are red and green all over is not so clear-cut. The reason is, I think, that while shape is a primary property, colour is secondary; shape is directly relevant in determining how an object occupies space i.e. the 'place' it occupies, but colour, conceived only phenomenally, is not. Thus while  $(P_1)$ ,  $(P_2)$  are directly applicable when the objects in question are characterised by their shape, <sup>are</sup> they is not so when those objects are characterised by their colour. That is, the colour of an object makes no difference to the place that object occupies. To make colour relevant to the determination of the place occupied by an object, we have to conceive colour not merely phenomenally, but physically, in terms of light waves. Then we can say that if all the light waves reflected off a particular surface are of a given wavelength, and hence seen by a given observer as, say, red, then they cannot also be of a different wavelength, so as to be seen, as say, green, by that observer. For wavelength, like shape, is a

place-determining property. We can conceive wave-length in analogy with boundary, so that differences in wave-length are analogous with differences in boundary, where differences in boundary define different places. Objects with different boundaries occupy different places, hence, by  $(P_1)$ , cannot be identical; by analogy, waves with different wave-lengths cannot be identical. (This point must not of course be taken as denying that two waves with different wave-lengths can combine to form a new wave with a new wave-length.)

The nonrealist theory of possibility which emerges out of all the considerations presented thus far is as follows: possibility is a mode of concepts, where I intend concepts to be understood as subjective, not platonistic, entities, and 'concept' to serve as a generic term covering propositions and theories as well as predicates. A concept is intelligible if it involves no violation of the principles  $(P_1)$ ,  $(P_2)$ . If a concept is intelligible, we can describe it as possible - its intelligibility is equivalent to its possibility. In short, possibility is the mode enjoyed by concepts which do not violate the fundamental conceptual rules for the identity and individuation of objects.

The question arises whether possibility thus understood is de dicto or de re. The answer must surely be that it is both. Intelligibility may be considered a property of concepts (broadly understood, so as to include propositions). Since we have set possibility equivalent to intelligibility, the same may be said for possibility. As a property of concepts, or propositions, it must be considered de dicto; but as a property of concepts, or propositions, it must be considered de re. Plantinga, in 'the Nature of Necessity'

(p. 28.), makes a similar point when defending de re modality; even if all sentences containing de re modalities can be translated into sentences containing only de dicto modalities, he says, we shall still have to admit that those de dicto modalities are properties of the sentences they modify, and are hence de re with respect to those sentences.

### The Identity of Places and Times

Earlier, I cited several objections to my proposed explication of a nonrealist notion of possibility. One of these objections was that the formulation of  $(P_1)$ ,  $(P_2)$  includes reference to 'places' and 'times', and hence presupposes the identity and individuation of these. It would follow from this objection that  $(P_1)$ ,  $(P_2)$  cannot be made to serve as conditions for identity.

We have seen that interpreting  $(P_1)$ ,  $(P_2)$  as rules for the identity of objects rather than for the construction of spacetime entails a realist, or substantivalist, view of spacetime. It is therefore not open to us to explain the identity of places and times, as invoked in  $(P_1)$ ,  $(P_2)$ , by appealing to ostensive methods of individuation. Ostension utilises a body. Places individuated ostensively are individuated relative to the hand which is pointing - where the antecedent identity of the hand is assumed. This is a relationist view of location. The substantivalist, if he wishes to account for (or countenance) the identity of different parts of spacetime, must do so independently of any appeal to objects.

It might be thought that the fact that we can visualise empty space, and can individuate different parts of it simply by looking

(in imagination), is sufficient grounds for the substantivalist to admit that space has different parts. For it seems to show that the presence of objects is not necessary for our concept of the different parts of space. However I think this is merely another, more subtle, instance of individuation by ostension. We visualise things with the 'mind's eye'. The mind's eye is not an abstract window onto images; it behaves just like an imaginary physical eye. For instance, it moves - it exercises imaginary muscles; it is an imaginary organ. When we visualise empty space, we individuate different parts of it by moving our imaginary eyes - from one side to the other, or up, or down. We have no other means for individuating different parts of an empty visual field than this movement of the eyes, which serves to 'mark', as it were, different locations. The fact that this movement of an organ is required for the individuation of these locations indicates that in this thought experiment a subtle form of ostensive individuation has been performed.

The dilemma facing the substantivalist (with respect to spacetime)/nonrealist (with respect to identity, and possibility) is that he both needs the identity of places and times in order to put his rules for identity,  $(P_1)$ ,  $(P_2)$ , into effect, and yet he cannot admit that they do have identity, since this would render circular his claim that  $\{P_1\}$ ,  $(P_2)$  are rules for identity.

The resolution of this dilemma lies, I think, in the following line of argument.\* The substantivalist affirms that space is

---

\*I shall be concentrating on the problem of the identity of places throughout this section, in the hope that analogous treatment may be extended to that of the identity of placetimes, or event locations.

extended. In order to promote the nonrealist view of identity, he must deny that the notion of extension can be defined, or analysed, in terms of a sum of distinct, individual parts, or places, or regions; he asserts instead that the notion of place, or region, itself, is underpinned by, and understandably<sup>e</sup> only in terms of, that of extension. Admittedly this claim effectively makes the notion of extension primitive. Elsewhere in this thesis I have eschewed appeals, in philosophy, to primitiveness, but I can say in my defense here at least that this is a relatively special case, in that the proposed notion of extension is a notion whose resistance to analysis is specifically a part of its meaning - if we take 'analysis' in physics to mean, basically, the operation of conceptually carrying out a physical division of the object under investigation into its components, and studying them and their relations. The notion of extension, on the present view, is precisely one entailing physical nondivisibility into distinct parts or components. It is natural to suppose that this resistance to analysis will be tied up with resistance to definition, or at any rate to analytical definition - where it is difficult to imagine space as the object of any alternative form of definition e.g. functional definition.

Supposing then that space is extended, but not composed of distinct individual parts, it is now open to us to individuate places, by drawing imaginary closed boundaries in space, and then identifying the enclosed space as an individual place. The identity of places, thus individuated, is conceptual, not ontological.



However it might be asked how the various closed boundaries come to be, and to be recognised by us as, distinct, unless they enclose different parts of space. To answer this we have to appeal once more to the primitive concept of extension. Space is extended. By this we understand that space has different parts but that these parts do not have an identity of their own. They are not distinct individual components - they do not, in themselves, have boundaries. Yet we can understand what it is to draw a closed boundary in one part of space and then another in a different part, so that it can be seen that there are two distinct boundaries, rather than one boundary superimposed on the other. We can do this, I claim, without presupposing that the different parts of space in which the distinct boundaries are drawn are in reality individuated, and have an antecedent identity. On this view of the spatial continuum, space cannot be represented accurately by the mathematical concept of a continuum, according to which a continuum is a set of points serially ordered in a particular manner.\*

Though the parts of space, on this view, do not have identity, we can, as I remarked, allow that we can individuate places, by drawing (imaginary) closed boundaries in space. Places can thus be considered as having identity, though this identity is strictly

---

\*Certain mathematicians, e.g. Bernays, have questioned the set theoretical, granular interpretation of the continuum, but no clear, general alternative theory has been provided. I have not been able to suggest such a theory here either, but instead have appealed to the primitiveness of the notion of extension.

conceptual. Relative to these places, we can now implement our rules for the identity of objects. Drawing a closed boundary in space individuates a place, and we stipulate that whatever occupies that place is an individual object. We shall in practice of course have further criteria for where to draw our individuating boundaries. We do not draw them just anywhere. We accept certain features of physical reality as indicating the edges of objects. It might be objected, once again, that if we admit that the selection of these features is not arbitrary, then there is no reason not to allow that these features in fact determine directly the ontological identity of objects. This objection can, as we have seen, be parried to a certain extent by the fact that there is no uniquely nonarbitrary selection of such features, and hence there is no uniquely nonarbitrary pattern of individuation. But we shall not conclusively eliminate this objection until we acknowledge - as we shall shortly do - the commitment of the nonrealist, or conceptualist, view of identity to a <sup>0</sup>holistic view of physical reality.

I have claimed that places, as individuated by us, have identity, in that they are defined by boundaries drawn by us. In that sense, their identity, or individuality, is on a par with that of objects. But there is nonetheless a very important difference between the identity of places and that of objects. For there is a further requirement that has to be met to ensure the full identity of objects, namely, continuity through time and in space. The full notion of identity is not mere instantaneous identity, but identity through time. The rules  $(P_1)$ ,  $(P_2)$  are necessary but not sufficient conditions for this; for sufficiency,  $(P_1)$ ,  $(P_2)$  have to be taken in conjunction with the requirement of spatiotemporal

continuity. The identity of objects is transportable: objects may remain the same objects as they travel from place to place. The parts of a given object (i.e. an object already individuated) have identity in this sense: they can be dislodged from the object in which they are found, and then reassembled into new (composite) wholes. We can individuate these parts however we please i.e. we can draw closed boundaries within a solid object wherever we please, and they will still have this property of identity. However, places, in contrast, cannot be so dislodged from their surroundings, and transported elsewhere to be reassembled in a new order. That is, a place could not retain its identity through such transformations (though we ordinarily think that places do retain their identity through time, provided we do not attempt to transport them). Hence, in this full sense, places lack identity. It is in this strong sense that we understand even more clearly the claim that space is not a set of individuals, not a composite of distinct parts. For from no point of view could its 'parts' be held to have identity in this sense.

There is a danger here that my argument will be construed as saying that the parts of space do not have (full) identity, but that material objects, and their parts do. It must be remembered that I am advocating a nonrealist view of identity in general - not a nonrealist view of the identity of places as opposed to a realist view of the identity of objects. Just as the identity determined according to  $(P_1)$ ,  $(P_2)$  is purely conceptual, so the identity determined in accordance with the spatiotemporal continuity



requirement is purely conceptual. Yet I am not denying that the motion, which we conceptualise as the motion of a persisting object, is real; the physical manifold which we conceptually subject to a pattern of individuation is, I have assumed, itself real, likewise the change or motion occurring within it. Yet how can we allow that motion is real if the identity of its 'bearer' is mind-imposed? Our ordinary concept of motion requires either that there be some individual bearer of the motion i.e. that which moves, or that the motion in question be motion propagated in a field. In the latter case, nothing, or no material thing, really moves, but rather different parts of the field are subjected to a series of continuous changes - creating an appearance of motion, of a wave moving through the field. But in reality, the wave is nothing but the motion, and the motion is nothing but a series of continuous changes suffered by different parts of the field. Since my view of identity precludes that real motion is the motion of a real individual i.e. that there is a real individual bearer of the motion, it follows that this nonrealist view of identity is committed to the latter, field-theoretical view of motion. In the final analysis then, the identity of objects is, on this view, no more real than is the identity of places: physical reality is not really divisible into distinct parts any more than space is. We have replaced the particle ontology of the realist with respect to identity with a field ontology.

I do not wish to try to justify this choice of ontology here. I shall be discussing it again at greater length in the following chapter. I have merely tried to show in this section that the

nonrealist theory of identity is not tacitly presupposing real identity; it avoids this circularity by espousing a holistic ontology.

### The Modal Status of Mind-Imposed Rules

Certain objections, or queries, might arise in connection with the modal status of the principles ( $P_1$ ), ( $P_2$ ) themselves.

It might be charged, firstly, that either the ordering principles which actually inform thought are the only possible ones, or there are alternatives. If the former, then these principles are necessary, if the latter, then there are merely possible, as well as actual, such principles; furthermore, at least one set of such principles is possible, namely the actual one. In short, either the mind has to be constituted so as to order its experience in this way, or it could be constituted otherwise. Either way, this must be a case of ontological possibility/necessity, since the mind itself is an item of reality.\*

My reply is that since I have rejected ontological possibility/necessity, this disjunction - that the mind either has to be constituted as it is, or it does not - simply has no truth value, if the notion of necessity it involves is ontological necessity. For to assign falsity to 'the mind necessarily has the constitution it has' would imply the falsity, in this particular instance, of an assertion of ontological

---

\* In Ch. 1 I characterised the concept 'real' in terms of mind-independence. The mind itself is mind-independent in the sense that it is not its own creation or product, nor does it choose the principles whereby it orders its experience. (Its reality in this sense is independent of any question of physicalism.)

necessity, rather than the falsity of assertions of ontological necessity in general. To assign falsity, in a particular instance, to an assertion of ontological necessity, implicitly affirms the general applicability of the notion of ontological possibility, and furthermore, entails the truth of the negation of this particular assertion, so that the above disjunction would be true. This point holds for all disjunctions of the form ' $\Box p \vee \sim \Box p$ ' or ' $\Diamond p \vee \sim \Diamond p$ ' when  $\Box$  and  $\Diamond$  are understood realistically. This explains why the rejection of realism with respect to possibility does not entail affirmation of the (real) necessity of all that is actual.

If the notion of necessity involved in the above disjunction is interpreted nonrealistically however, then this disjunction must be understood as saying that either our concept of the constitution of the actual mind is the only such concept which, while preserving the definitive functions of the mind e.g. thought, consciousness, is intelligible, or there are other such concepts which are also intelligible. This disjunction will, I think, be true. However, in order to assess the intelligibility of these concepts by means of  $(P_1)$ ,  $(P_2)$ , we have to assume that the constitution of the mind is physical. That is, we are committed at least to the view that there is a correspondence between brain mechanisms and conceptual ordering principles. Then if we find that any alternative ordering principles that we can conceive involve superpositions of brain mechanisms, or neurological components, we can say that the concepts of these alternative brain-constitutions violate  $(P_1)$ ,  $(P_2)$  and hence are not intelligible. If we can conceive of such

alternative ordering principles, without finding that they involve such superpositions of brain components, then we can say that we have intelligible concepts of alternative ordering principles or constitutions of the mind.

One sense, which I mentioned earlier, in which the constitution of the mind may be necessary, is an evolutionary one - the mind, as it is actually constituted, may be uniquely well-adapted to its local environment, in the sense that no alternative ordering principles would fit the mind-bearing organism for survival. Such evolutionary necessity is a variant of, or supervenes on, causal necessity. Is causal necessity ontological, or can it be interpreted nonrealistically? Chapter Seven is devoted to this problem, and attempts to provide a nonrealist interpretation of causal necessity. If we accept the argument of that Chapter, then we can admit the present argument from evolution, without thereby becoming committed to the ontological necessity of the actual constitution of the mind.

If we reject ontological possibility in general, then of course we do not allow that the fact that a certain mind-constitution is actual entails that at least one such constitution is ontologically possible, namely the actual one. For we reject possibility as a mode of reality; implicitly, we reject actuality as a mode of reality too. For to be actual is, on our view, equivalent to being real: actuality is coextensive with reality. Reality is thus unmode-fied.

A second objection arising in connection with the modal status of mind-imposed rules is that even if it is accepted that  $(P_1)$ ,  $(P_2)$  are conditions for intelligibility, I may believe  $(P_1)$ ,  $(P_2)$ , and



thus take them to state metaphysical necessities. I have already anticipated this objection earlier in this chapter, in explicating my nonrealist view of possibility. I explained there that the modality involved in the formulation of  $(P_1)$   $(P_2)$  was unobjectionable, because  $(P_1)$ ,  $(P_2)$  were rules for the identity of objects; they define objecthood. Therefore they have the authority - the analytic necessity - of a definition. It is in this sense that they are necessary; they are not asserting metaphysical necessities. So it is wrong to suppose that we can believe  $(P_1)$ ,  $(P_2)$  - in the sense that we can think them true of reality. We accept them as rules, in a similar spirit to that in which we accept definitions.

A third objection concerns the exhaustiveness of the principles  $(P_1)$ ,  $(P_2)$  as the minimal mind-imposed conditions for the intelligibility of concepts. To claim that they were exhaustive would be to claim that all conditions for intelligibility could be derived from them.

As rules for identity they are, as we have already seen in the previous section, not exhaustive - they are necessary but not sufficient.. For sufficiency, the condition of spatiotemporal continuity is also required. So let me direct this question of exhaustiveness at both the necessary and sufficient conditions for identity taken together. I do not claim that these conditions are exhaustive, in the present sense, of all conditions for intelligibility. I have argued, earlier in this chapter, that the Law of Non Contradiction is not true of empirical statements unless it is appropriately qualified by  $(P_1)$ ,  $(P_2)$ . But it appeared that LNC could not be reduced to  $(P_1)$ ,  $(P_2)$ , if only because we need to understand 'it is not the case that...' in order to understand  $(P_1)$ ,  $(P_2)$ .

where we can state the latter as 'It is not the case that one object can occupy two places at the same time', and 'It is not the case that two objects can occupy the same place at the same time', respectively. This assumes that we take LNC as the law which defines the operation of negation. But perhaps LNC could be reduced to  $(P_1)$ ,  $(P_2)$ , at least for empirical statements, if we were prepared to substitute  $(P_1)$ ,  $(P_2)$  as the laws defining the operation of the negation. This move would imply that negation is inextricably connected with identity, so that to give the rules for identity we have to give the rules for negation, and conversely. Such a view effectively reverses the assumed epistemic order of propositional logic and quantificational theory. It is normally assumed that the former is epistemically antecedent to the latter, in that propositional logic is the base on which first-order logic is constructed. But on the view I am here suggesting, the primordial form of cognition or apprehension is the predication form. On this view, some of our fundamental logical operators, such as negation and presumably also conjunction and alternation, have their genesis not in our operations on propositions, but in our construction of, and our operations on, the concept of an individual. From this point of view, LNC, as it is formulated in propositional logic, is a generalisation from certain rules for identity and negation which can themselves be formulated only in the framework of quantificational theory. Quantification theory is itself already a generalisation from the primordial epistemic operations, e.g. individuation, involved in the ordering of sense experience, since the domains over which the quantifiers range are not restricted to that of empirical

individuals. But we can view LNC, as formulated in the propositional calculus, as being the final generalisation of the rules  $(P_1)$ ,  $(P_2)$ , where the latter govern only empirical statements. Because LNC has abstracted from the specifically spatiotemporal requirements involved in  $(P_1)$ ,  $(P_2)$ , its jurisdiction is not restricted to empirical statements, but extends to all statements; hence its formulation in the propositional calculus. But as I have tried to indicate, generality or universality may not here indicate epistemic fundamentality or primacy. In this epistemic sense,  $(P_1)$ ,  $(P_2)$  may be more fundamental, more 'minimal', as conditions for intelligibility, than is LNC.

However, this is speculation, and I do not want to insist on it - or take the time to justify it. I do not in principle object to adding LNC, or rather, logical self-consistency, to our list of minimal conditions for intelligibility - provided that it is understood that LNC, like  $(P_1)$ ,  $(P_2)$ , states not a metaphysical necessity, but a mind-imposed rule for thought. But I think that to show that it is such a rule will involve demonstrating its origins in  $(P_1)$ ,  $(P_2)$ .

A further condition for the intelligibility of statements is that they be grammatically sound. This does not of course mean that sentences are required to be grammatically perfect - much intelligible conversation and journalism is far from that; but it means that have to be observed. I shall not try to identify these basic principles here - basic grammatical principles - that is the lifework of linguistics. But I shall take it that we can intuitively distinguish a sentence whose grammar is sufficiently sound for it to serve as a vehicle for sense from a sentence whose grammar is not.

Yet a  
With further condition for intelligibility is analytic consistency - consistency with analytic rules. For example, 'The

whale stranded on the beach this morning was not a mammal' is false and, I think, unintelligible, if we understand 'whale' in the conventional zoological sense. Substituting the conventional definition of 'whale' for 'whale' in the above sentence will yield a contradiction. We can then say either that any contradiction, being a violation of LNC, is unintelligible, or that, since the sentence in question is an empirical one, it is unintelligible because it violates  $(P_1)$ ,  $(P_2)$ .

How does it do this? By ascribing incompatible physical (structural) properties to a given individual. We unpack this notion of incompatibility as we did earlier in the case of the roundsquare and the red/green object. The properties suspected of being incompatible are (conceptually) broken down into their spatiotemporal aspect i.e. their purely physical aspect; if it is found that <sup>the ascription of</sup> one of the properties <sup>in question</sup> ascribed entails that the constituents of the individual, or of a part of the individual, be spatiotemporally organised in one way, and <sup>the ascription of</sup> <sup>in question</sup> the other ascribed property entails that they be organised in another way, it can be concluded that the simultaneous ascription of those properties to that individual will result, at the level of its constituents, in a violation of  $(P_1)$ ,  $(P_2)$ . Take for example, the properties of warm-bloodedness and cold-bloodedness simultaneously being ascribed to a given animal in the above sentence. Warm-bloodedness indicates that the motion of the molecules comprising the animal's blood is of a certain nature, while cold-bloodedness indicates that it is of a different nature. But any given molecule travelling at velocity  $U_1$  and  $U_2$  simultaneously, where  $U_1$  and  $U_2$  have different values, will have to be at two different points, relative to its starting point, at the same time. This constitutes a violation of  $(P_1)$ .

Is consistency with physical laws a condition for intelligibility? Obviously not, since we talked intelligibly long before we learned any physics. Violation of very familiar physical laws may sometimes produce absurd statements, but not, I think, unintelligible ones. But violation of physical laws may be conjoined with violation of analytical rules in a given sentence, so as to produce <sup>in</sup>unintelligibility. An example of a sentence which violates physical laws in a very obvious way is 'That man eats mountains.' An example of a sentence which violates analytical rules as well is 'That man drinks mountains'. The first sentence is not unintelligible; indeed in the context of a fairy tale, that man might be a giant or have a miraculous power which enables him to eat mountains. But even in a fairy tale, no-one could drink mountains, because drinking is defined as the biological method whereby we consume fluids.

One further condition for intelligibility, even more difficult to articulate than the previous ones, is what I shall call the condition of categorial consistency - though it has nothing to do with the Kantian categories mentioned earlier. I am taking it that we recognise various mutually exclusive categories of concepts; ~~as~~, firstly, the category of physical, or empirical, objects (strictly speaking, of the notions of physical, or empirical objects, but we can take this as understood), then the category of abstract entities, and perhaps thirdly that of mental <sup>or</sup> ~~of~~ psychological entities. The objects belonging to the first category are conceived as being in space and time; those of the second as being in neither space nor time, and those of the third as being in time, but not in space. To attribute to an entity belonging to one

category a property which properly applies only to entities which belong to a different category produces nonsense, or unintelligibility e.g. 'Find the square root of a goose', or 'Dreams are quadrupedal'. However, is it an ontological or a purely conceptual matter which properties 'properly' characterise the members of which categories? I have already noted that the general conditions for membership of a given category are spatiotemporal. For example, empirical objects are those we construct out of our experience of the spatiotemporal world - they occur in our experience (duly ordered) of the real world. Abstract entities do not. It is not a question of empirical objects having to be spatiotemporal, in any ontological sense, or of abstract entities having to be nonspatiotemporal, in that sense. Rather, objects only qualify as empirical if they are in space and time, and they only qualify as abstract if they are not. Hence this categorial consistency is really a case of analyticity of a very general order.

It has not been my aim in this section to set out an exhaustive account of the conditions for intelligibility, and of their interrelations. To do so would perhaps be to attempt a Kant-style architectonic, and evidently such a full-scale offensive cannot be launched here. My overall aim in this chapter is to offer an outline for a nonrealist theory of possibility. The basic tenets of this theory are that possibility is a mode of concepts, not of objects, and that it is equivalent to intelligibility. Furthermore, the conditions for intelligibility are mind-determined - though we must always remember that the mind is a physical instrument, a

biological organ shaped under the pressures of natural selection to enable organisms to influence, to a certain extent, the course of external events, to their own advantage. I proposed, as such conditions for intelligibility, certain rules for the identity of objects. Much of this chapter has been devoted to the elaboration of these rules, at the expense, perhaps, of other conditions for intelligibility mentioned in this section. The reason for this selective attention is that I think the importance, and fundamentality, of these identity rules in this role has been in general underestimated.

#### The Uses of the NonRealist Notion of Possibility

What are the justifiable applications of the nonrealist notion of possibility? I shall consider three uses of the realist notion, and discuss whether the nonrealist notion can serve a substitute function in each case.

(1) Can the nonrealist employ counterfactual sentences? Insofar as these are intentionally counterfactual, and imply that the event or state of affairs in question did not occur, then they unequivocally express judgments of ontological possibility. The nonrealist has no~~x~~ motivation to employ such sentences. There is no point in exclaiming, 'If I had stepped off the pavement two seconds earlier, I would have been killed!', if I do not believe that I really could have stepped off the pavement two seconds earlier. From the nonrealist's viewpoint, it is never justified to assert that the world could have been otherwise. Counterfactuals are therefore closed to him. We all suffer a sense of futility in delivering counterfactual judgments in any case, so perhaps it is

better to submit to this prohibition on them. (However we shall see, in the next section on the psychogenesis of counterfactuals, that some adaptive/psychological value attaches to counterfactualising, even though the resultant judgments are not true. However, in order for them to have this value for us, we have to subscribe to realism with respect to possibility. They lose this value for the nonrealist).

(2) Excluding counterfactuals from our discourse is a relatively painless measure, with few consequences for other areas of our discourse. But to try to eliminate judgments of epistemic possibility would be a measure which would entirely change the face of our discourse, since a large portion of our judgmental effort results in qualified judgments - judgments as to what might (actually) be the case, as opposed to judgments as to what definitely is the case. We need to reinterpret the notion of epistemic possibility so as to retain its important function while making it compatible with nonrealism.

In order to arrive at this reinterpretation of epistemic possibility, we proceed in two stages.



- (a) We subject all concepts which are relevant\* to the judgment we are seeking to make, to the intelligibility test. If they pass this test, they are possible, in the nonrealist sense.
- (b) We then check whether we know that any of these concepts are or are not instantiated at the location relative to which we are making the judgment. Those concepts which are not known not to be instantiated then furnish us with judgments as to which events are epistemically possible relative to the location in question.

To illustrate this procedure, consider the following judgment of epistemic possibility: 'Event A might occur at  $(x, t)$ '. How do we legitimately (i.e. nonrealistically) arrive at this judgment? First we consider the intelligibility of the concept of the kind of

---

\* How do we decide which concepts are relevant? Suppose we are considering what event occurred at a given location,  $(x, t)$ . Depending on the size of the spacetime region defined by  $(x, t)$ , we shall know whether the event in question is macro or micro. This narrows the range. Then the context of the event i.e. the events in its spatiotemporal neighbourhood, further narrow the range, e.g.  $(x, t)$  might be occupied by a human body. The event in question will then be one which happens to, or in, a human body. Analytic considerations greatly restrict the range of events which may be said to happen to a human body. Thus we have effective criteria of 'relevance' even before we introduce causal or inductive criteria. We can introduce the latter, without circularity, i.e. without presupposing ontological possibility/necessity, only if we have a nonrealist theory of laws. (see Ch. 7) However, in the final analysis, determining the 'relevance' of concepts, relative to a judgment of which events are epistemically possible at a given spacetime location, may be indistinguishable from the process of determining which concepts are indistinguishable from the process of determining which concepts are nonrealistically possible, relative to our information concerning the context and content of  $(x, t)$ .

event of which A is an instance - the concept of A-like-events.\* We find it to be intelligible - not like the concept of, say, round-square objects. If we do not know that an instantiation of this concept of A-like-events does not occur at  $(x, t)$ , then we can say that it is epistemically possible that A occurs at  $(x, t)$ .

In order that a judgment of epistemic possibility should have, in addition to legitimacy, plausibility, the event A should be thought to be probable, not merely epistemically possible. Its probability can only be assessed by means of inductive procedures. As I have remarked, before we can admit inductive procedures into the nonrealist analysis of judgments of epistemic possibility, we have to have secured a nonrealist analysis of laws. In Chapter 7, I present such an analysis. Hence I believe that not only judgments of epistemic possibility, but also those of epistemic probability, can be interpreted consistently with nonrealism with respect to possibility. However I shall not pursue this question here. I merely wish to show that the notion of epistemic possibility can be retained, on this doubly epistemic interpretation, by the nonrealist. This interpretation is doubly epistemic in that, in the first stage, a concept is judged to be intelligible, rather than an event to be ontologically possible, while the second stage proceeds as before: if we do not know that this concept is uninstantiated, an instantiation of it may be said to be epistemically possible.

When understood thus nonrealistically, judgments of epistemic possibility are not judgments about the actual world, or even about

---

\* I am here taking 'A' as a name i.e. it denotes a particular. Its particularity is tied to its purported location,  $(x, t)$  A is thus the instantiation of the concept of A like-events which occurs at  $(x, t)$

reality in a wider sense. They are judgments in the first place about what is experienceable in general, and in the second place about what is experienceable given what we have already experienced. Of course, we hope that there is a correspondence between what is experienceable and what is actual. We have no a priori grounds for believing this to be so, but we do have evolutionary grounds for believing it, for evolutionary theory tells us that our experiential capacities have evolved in response to the way the actual world is. However evolutionary theory also tells us that natural selection adapts organisms only to their local environment. Transportation of the organism to an alien environment, or radical changes imposed on its native environment from an external source, can find the organism lacking in responsive equipment. So <sup>we</sup> way may suppose that the ordering principles which we impose on our experience, rendering it intelligible, are only adequate for our experience of the local world. In quite different and remote environments our experience might become intractable to these principles, and hence unintelligible to us. We can speculate that such an environment may exist, for example, in the interior of black holes; gravitation theory predicts 'spacetime' distortions' in this environment, which would threaten the applicability of principles  $(P_1)$ ,  $(P_2)$ .

(3) Certain forms of scientific argument e.g. cosmological arguments, invoke possible worlds; is this form of argument still available to the cosmologist who adopts nonrealism with respect to possibility? Typical examples of such arguments include speculations concerning the behaviour of a test system in a universe

otherwise devoid of mass-energy, or the solutions of a given field equation in a zero mass-energy universe, or the effect on a test particle of the rotation of the rest of the mass of the universe around it, and so on. Such arguments date (at least) from the time of Newton and Leibniz, and are in constant use today, either in the form which invokes possible universes, or in the form of (nonglobal) thought experiments.

We can distinguish two different uses of the notion of possible world in this context.

(1) The physicist defines a set of 'possible' initial and boundary conditions, then discovers what kind of universe a given hypothetical set of physical laws predicts relative to these conditions. If he considers the resulting universe 'possible' this helps to confirm the laws - helps to establish that they are the laws of the actual universe (i.e. that if we knew the initial and boundary conditions of our universe, we could predict its present state, or at least the kind of universe it is, from the laws in question). If the prediction from the hypothetical initial and boundary conditions yields an 'impossible' world, then, given the 'possibility' of those conditions, this result helps to disconfirm the laws - as laws of the actual world.

Clearly, in this type of argument, independent criteria for the 'possibility' of the hypothetical conditions and worlds are presupposed.

(2) The physicist takes a set of laws which he believes to be true i.e. to obtain in the actual world, and a set of initial and boundary conditions which he considers 'possible', and predicts a particular world. This form of argument is taken to establish the 'possibility' of the predicted world. In this case, independent

criteria for the 'possibility' of the initial and boundary conditions - and, of course, for the truth of the laws - are required.

In practice these two kinds of arguments may be conflated, and arguments from possible initial and boundary conditions and possible laws to possible universes occur. In order to avoid circularity however, the two types should be distinguished. Scientists are not in general setting out to prove the possibility of hypothetical, nonactual worlds; rather they are setting out to discover the laws which hold in the actual world. Hence their appeals to possible worlds occur mainly in arguments of the first type. Is this type of argument permissible from the viewpoint of nonrealism with respect to possibility? There are two questions to answer here. Firstly, do we have adequate criteria for determining the intelligibility of concepts of radically different universes or initial and boundary conditions? Secondly, is the intelligibility of laws (or of the concepts of the universes in which they hold) evidence of their truth?

On the first question, I think that our criteria of intelligibility are not adequate for assessing the intelligibility of radically different universes. Consider the case of an entirely empty universe. This satisfies principles  $(P_1)$ ,  $(P_2)$ , but only by default - there are no objects in this world for us to differentiate. Can such trivial satisfaction of  $(P_1)$ ,  $(P_2)$  be considered as positively confirming the intelligibility of such a universe? I leave this question open. At its most general it is the question, are (certain) concepts which are mathematically intelligible, or intelligible as mathematical concepts, intelligible

when physically interpreted. For example, the mathematical concept of 'spaces' with dimensionality greater than three is no less intelligible than the mathematical concept of a three dimensional 'space'. But it is not clear/whether we have, even in principle, any criteria for deciding whether the concept of an n-dimensional physical space, for  $n > 3$ , is intelligible. Though I leave this question open, I can at least say that the practising cosmologist, who has given little thought to this purely conceptual question of the fundamental criteria for the intelligibility of concepts, is not in a good position to assess the intelligibility of the concepts of radically different worlds, which he might wish to invoke. On this question, then, I sympathise with Mach, who banned outright physical arguments which appealed to radically different kinds of worlds.

The second question, whether the intelligibility of laws is evidence of their truth, raises some of the issues discussed earlier, concerning the 'correspondence' between what is conceivable and what is actual. To the extent that the theory of evolution gives us some grounds for believing that there is a certain degree of such correspondence, we can risk saying that laws which we find intelligible are more likely to be true than laws which we find unintelligible. But in any case, in arguments which have to presuppose the intelligibility of radically different universes and initial and boundary conditions in order to demonstrate the intelligibility of laws, we have the problem stated, but not resolved, above: do we have any adequate criteria for determining the intelligibility of such concepts.

In short, the nonrealist view of possibility does not accord unqualified assent to the type of scientific argument outlined in (1) above, though nor have I shown that it excludes it.

### The Psychogenesis of Counterfactuals

If realism with respect to possibility is false, and the counterfactual form of sentence thus incapable of expressing any truth, when ~~is~~<sup>it</sup> is understood as an assertion of ontological possibility (and I have claimed it is ordinarily so understood), what accounts for the persistence of this form of utterance in our speech? For we can assume that some mechanism of natural selection operates on natural language, such that normally only sentence forms which are capable of conveying truths, or information, are preserved.

I want to offer a (speculative) account of the psychogenesis of counterfactuals, to explain why this form of sentence has been preserved in common discourse in spite of its inability to convey truth. 'Psychogenesis' is a vague and ambiguous term. Under it we could subsume both the sort of accounts which show how a concept developed, and also those which show the use or value of the concept, the function it serves. Consider the concept of God, for instance - and let us suppose that no real individual falls under it. The question of the psychogenesis of this concept then arises. In answer to this question we can both explain the root of this concept - in Freudian terms, for instance, or in the manner of Feuerbach; and we can also give the reason for its genesis - explain the political, cultural or psychological needs which it satisfied - its adaptive value for the believers in it. The latter sort of account explains the persistence<sup>e</sup> of this uninstantiated idea in our discourse, and it is of this sort that my account of counterfactuals will be. We should note however that it is normally necessary to believe in the concept in question

in order to receive the adaptive benefits that it confers. You ~~have to believe in God in order to receive the adaptive benefits that it confers.~~ You have to believe in God in order for your prayers and so on to have any psychological value for you. Similarly, you have to believe in ontological possibility in order to derive any benefit from counterfactualising.

Before considering the psychogenesis of counterfactual ideas specifically, let us consider the psychogenesis of uninstantiated ideas in general. I shall take an empiricist, 'jumble theory'\* line on this question: we obtain our basic stock of ideas, of objects and properties, from the world, via perception. The mind is then capable of reorganising these ideas, forming novel configurations, constrained only by such principles as  $(P_1)$ ,  $(P_2)$ , and by analytic rules, and by the purpose of the exercise in particular cases. You might object that this analysis does not cover cases in which the mind conceives of some idea which is not a composite of elements given in perception, but is, as it were, cut from whole cloth. But are there any such cases? You might suggest as an example that we can conceive of four-dimensional space, and hence of four-dimensional objects, even though we have not experienced such objects, nor can we visualise them. I would reply that such an idea will be a composite of elements of our perceptual experience to the extent that it is coloured, solid, has a certain shape, and so on. It is only its four-dimensionality which we have not sensuously encountered. But, as I remarked

---

\* The locus classicus of this theory is in David Hume: A Treatise of Human Nature, Book 1, Part 1, Section III, p. 8-10.



earlier, it is not clear whether we have criteria for determining the intelligibility of the notion of four-dimensional physical - as opposed to mathematical-space; hence it is open to question whether we have a (possible) concept of a four-dimensional object in any case. Even if we did have such a concept, the concept of dimensionality is one which we originally derived from our experience of actual, physical space; it is this experience which informs the intuitions which motivated the formulation of the original, Euclidean geometrical theories, and dimension theory. Thus the notion of four-dimensional space can be construed as a reorganisation of ideas originally acquired through empirical experience.

I do not wish to argue this issue in any depth here, but will rather simply assume the jumble theory of imagination, or of uninstantiated ideas. Let me now proceed to the psychogenesis of counterfactual sentences.

Counterfactual judgments are, I think, traceable to judgments of epistemic possibility. Since epistemic possibility - as ordinarily understood, presupposes ontological possibility in any case, this does not, as it stands, further our inquiry into the psychogenesis of counterfactuals as vehicles for judgments of ontological possibility. In order to avoid a regress, then, we need to invoke our new, nonrealist notion of epistemic possibility. Counterfactual judgments are then traceable to judgments of epistemic possibility in this sense. A present counterfactual claim is a claim which can be seen to have <sup>once</sup> been in non-counterfactual form, epistemically possible. Take a counterfactual such as, 'Event E could have occurred at location  $(x, t)$ ' Suppose

that I was in the neighbourhood of ( , ) and observed the non-occurrence of E. Suppose too that I now realise that the occurrence of E was epistemically possible from my point of view prior to - although this does not imply that I realised, at that time, that it was epistemically possible. It is my present recognition that E was then epistemically possible which is, I claim, expressed in my present counterfactual judgment. The motivation for its expression is, I think, retrospective preparation for, or adjustment to, E. We need to distinguish two different situations which exemplify this.

In the first, we suppose that at some earlier time an event E, was known by us to be epistemically possible (from our point of view), and that since we were aware of its epistemic possibility, we made preparations for the advent of E. If E then failed to occur at the expected time and place, we can, at a later time, report our preparations, by means of the counterfactual form, e.g. 'If Hitler had conquered England, I would have swallowed sleeping pills.'

The latter sentence can also serve to articulate retrospective preparation, if we were unaware at the previous time of the epistemic possibility of the antecedent, but realise now that it was epistemically possible then, and that, had we been aware of this, we would have taken the precautions or made the preparations which we now retrospectively prescribe.

In the second situation, the counterfactual sentence does not report, even retrospectively, our reaction to, or preparation for, a particular circumstance. Rather, we take once again an event which was at some earlier time epistemically possible, and which

did not, at its due date and place, eventuate, and then we apply inductive reasoning to this occurrence, in just the same way as we do in relation to actual occurrences, thereby deriving 'predictions' of the consequences of such an occurrence, which we finally report in a counterfactual conditional e.g. 'If there had been an even lower rainfall in Britain in the winter of '75, there would have been standpipes in the streets of London in the summer of '76'.

Again, the interest of the unrealised circumstance described in the antecedent is not its metaphysical status, but its hypothetical consequences for us i.e. we are interested in these hypothetical consequences not from a metaphysical, but from a pragmatic, point of view: they afford us an opportunity for retrospective reaction and preparation.

In short, my claim is that the point of counterfactuals is not to spell out unrealised ontological possibilities - where these would in any case be without significance or implications for our knowledge of the actual world, and hence without consequences for our actual destinies; nor is it to express, circuitously, our knowledge of causal laws. Their point is psychological. When I exclaim, 'If you had dislodged that boulder three seconds earlier, it would have fallen on me', I am giving myself a reflective frisson, retrospectively preparing myself for a fatal eventuality which was epistemically possible at an earlier time, and was hence a candidate for actual preparations. A favourite example in English textbooks is, 'If Hitler had won the war,.....', which speaks for itself.

Retrospective preparation, even if it amounts to nothing more than emotional acknowledgement of, and adjustment to, the eventuality in question, does have adaptive value. In retrospectively preparing myself for an unrealised past event, I am to some extent preparing myself for that sort of event should it ever occur in the future, where we assume such a future event to be epistemically possible. The effect on a person's conduct and attitude to life of an unrealised event can be considerable, even dramatic, as anyone who has had a close 'brush with death', even if only retrospectively recognised, may be able to testify. The energies invested in counterfactual retrospection thus may not be wasted.

It might be objected that this analysis rules out counterfactuals concerning events in the distant, pre-human past, or at any rate, counterfactuals concerning events which, if realised, would not have affected the genesis or progress of our species. For example, geologists might claim that there could have been - though they know there in fact was not - an ice age ten million years before the advent of man, and that it would have been of short duration, and without long-term climatic consequences.

My reply is that the subject matter of geology is not, except in special circumstances, counterfactual. It is not the purpose of geologists to discover how terrestrial conditions might have been; if this were their concern, then the geological counterfactuals would vastly outnumber the geological facts, and geology would no longer be a manageable science. Counterfactual claims within geology require special prompting. This would, I suggest, be provided when a geological event which would have been epistemically possible prior to its nonrealisation would, had it been realised, have had consequences for us.

### The Fluidity of Life-Events

Our strongest sense that things could have been otherwise undoubtedly occurs in the context of our own lives - our actions, utterances, etc. After all the academic argument is said and done, I am unlikely to have lost my feeling that, say, I could have trained harder for my driving test, and so have passed.

I do not think that this use of counterfactual sentences can always be adequately explained in terms of retrospective adjustment and preparation.

Traditionally, we 'explain' our extreme readiness to counterfactualise with respect to our own lives in terms of our special faculty, freewill. Freewill is ordinarily understood realistically - that is, it is understood to implicate ontological possibility: a free choice is one to which there are real alternatives. But freewill has proved rather intractable to analysis. It cannot be explicated adequately, or indeed even at all, in terms of causal indeterminism (undetermined behaviour would be more likely to get us run over, or locked up, than to advance us toward our goals). Yet an indeterminist analysis would legitimise our proclivity to counterfactualising: if our behaviour is not causally determined, then we do not have to act thus, hence we can act otherwise. According to the compatibilist analysis of freewill, on the other hand, an action is free if it is the action which we most desire to perform; this assumes the determination of desire, and analyses freedom as freedom from external obstacles. But this analysis does not authorise counterfactualising: we are caused to desire what we desire, and hence, given freedom from external obstacles, to choose as we choose. The actual world may provide

alternatives, in the sense of providing an array of objects, or persons, or circumstances, for us to select from, but in so far as our selection can be called a choice, it is made in accordance with our desires, and hence in accordance with causally determined priorities. Thus when I say 'I could have chosen the left box rather than the right', where I am assuming that this was a choice i.e. was made in accordance with desire, and free from external obstacle, the only fact which I am truly reporting is that there were two boxes there for me to choose from. Given my desires, and my freedom from external obstacle, I cannot truly say that I could have chosen the box that I did not choose. On the other hand, the claim that I could have chosen the left box rather than the right might express the following fact, viz that I most desired to choose the left box, but external circumstances did not permit me to, so I chose, as second best, the right. Here we have two 'interpretations' of counterfactuals, from a compatibilist viewpoint:

- (1) The world offered a set of alternatives for me to choose from (but my choice of a particular one of these was desire-determined and hence, despite freedom from external obstacle, my choice could not have been otherwise).
- (2) The world did not offer the alternative(s) I most desired (hence, despite my desire for a different alternative, external obstacles prevented this alternative from being realised).

On both these 'interpretations', a fact about the actual world is implicitly reported in the counterfactual sentence, but still the use of this form of sentence is not justified, for in neither case could things really have been different. Yet the fact that the counterfactual form can convey information about the actual world in this manner explains, to some extent, its

persistence in discourse.

I want to offer a complementary account of our readiness to counterfactualise with respect to our lives. This strong feeling that we could have done otherwise, that things could have turned out otherwise, is connected with the peculiar fluidity of life-events. By their fluidity, I mean the following. To us, events with a subjective, psychological component are comparatively inscrutable. We cannot describe them as we can the events of mechanics, for instance. Rather, they have to be interpreted - via some psychological, or psychoanalytic, language. Nor is this just a descriptive problem. Our experience of psychological, e.g. emotional events occurs at various 'levels' of consciousness, so that even when we ourselves are the subject of such an event, we may not know exactly what we have experienced, or felt. In the interpretation of such events, both past and future events have an influence. We would, for example, interpret the childhood psychological experiences of two men, who both suffered similar deprived early conditions, in very different terms, if one grew up to be the President of the United States, and the other grew up into a derelict. They themselves would have differing views of their respective experiences - not just because of their different temperaments, etc., but because of the different ways things turned out for them. The President would view his trials and traumas as the challenges which made him; the derelict would view his similar misfortunes as the burdens which crushed him.

Throughout our life, then, we are unable to arrive at a final interpretation of our past, since the unknown future may always hold events which will alter our present interpretations of past events. This 'fluidity' of life-events consists in the fact that

earlier life-events consists in the fact that earlier life-events can always be undone by later ones; betrayals, surrenders, misfortunes, sufferings, wrongs - as well as their positive counterparts - can all, in principle, be effectively undone, so long as the parties concerned remain alive. A betrayal can later be undone by a reconciliation, a surrender by a victory, misfortune by good fortune, suffering by happiness, wrongs by compensations.

In what way is this fluidity of life-events connected with our disposition to make counterfactual judgments with respect to such events?

To see this we have first to take account of another point, which is that it is largely our present desires and goals which motivate, and influence, our counterfactual judgments concerning past life-events. (This point must be seen as complementing the point we noted in connection with the compatibilist view of counterfactuals: a counterfactual may be used to report a desire which I actually had but which circumstances prevented me from realising.) One of the principal incentives to counterfactualising is a present desire that things should have been otherwise. <sup>- that I should have acted otherwise,</sup> But to believe that one could have acted otherwise, one has to believe, in accordance with the compatibilist analysis above, that one wanted to act otherwise. The fluidity, or relative indeterminateness, of life-events, as characterised above, enables us to be genuinely indefinite with regard to our past: to a certain extent we genuinely do not know what we experienced, how we felt. This indeterminacy enables us to believe, under the influence of later desires or goals, that we had certain unmanifested desires. We may then translate



these supposed past desires into counterfactuals - that we could have acted in such and such a fashion, had circumstances permitted, or favoured, such action. Here again it is a case of later events shedding an interpretive light on earlier events, for it is those later events which help to shape the desires which motivate the counterfactual judgments concerning the earlier events. Let me give an example to illustrate the various strands of my suggestion. Suppose that at time  $t_0$ , a woman is having a conversation with her current suitor, A, and makes a hostile remark, say p, which terminates her relationship with A. At  $t_1$  she thinks to herself that she could have said something nice, say q, instead of p, at  $t_0$ , and thereby saved the relationship, which at  $t_1$ , now feeling lonely, she wishes she had saved. Then, at  $t_2$ , she meets B, and no longer regrets terminating her relationship with A. Now she believes that she did mean what she said at  $t_0$ , and so she is no longer inclined to think that she could have said q instead. Thus, meeting B at  $t_2$  has changed the view she held at  $t_1$  as to what she could have done at  $t_0$ . Events at times later than might eventually make her change her mind again as to what she could have done at  $t_0$ .

If this is not merely an example of self-deception, it can be explained only on the supposition that at  $t_0$  the woman really did not know exactly how she felt about A, or what she wanted. Later events help to clarify this experience. For example, if a woman breaks with a suitor, but then never marries afterwards, we might be led to suppose that she did not really want to break with that man, and that she still loves him, whereas if we found her happily married soon after the break, we would be less inclined to doubt

that she had really wanted it. She herself can gain insight into her earlier feelings by such later evidence in just the same manner. At the same time, however, later events may generate new, or nullify old, desires, making us wish that we had acted differently in the past, that things had turned out otherwise. The indeterminacy, or fluidity, of the past then enables us to retroject our present desires, tendencies, goals, into our past experience, so as to justify (in a sense) counterfactual claims that we could have behaved in ways that we now wish we had.

The fluidity of life-events is finally checked by death. Death is the one life-event which cannot be undone. After death, there can be no further 'evidence' to provide fresh interpretations of earlier events; final interpretations can thus be reached, and life-events lose their appearance of fluidity and indeterminacy. We tend to view the life-events of a dead person as all of a piece, with early events explaining later events, and later events determining the significance of earlier ones. We view them as cohering. This significantly reduces our inclination to make counterfactual judgments concerning them. At the same time, the extinction of that person's desires and goals spells the extinction of one incentive (his) for counterfactualising with respect to his life-events. Other people, of course, may have desires which make them wish that the events of the dead person's life had been different in certain respects, and this will motivate them to make counterfactual judgments concerning those events, even after that person's death. But the closure of that person's life, and the consequent fixing of his life-events, make those events relatively resistant to

counterfactualising. I think that in general, when a person dies, we, as disinterested adjudicators, are far less disposed to say that his life could have been different than we are while he is still alive; and I think that this fact helps to confirm the suggestions as to the role of counterfactual judgments concerning life-events that I have offered in this section.

### Fictions

One use of uninstantiated ideas - ideas which are known to be uninstantiated - is, as we have seen, in counterfactual judgments. Another use of such ideas is in fictional contexts. Fictional claims are, I think, quite different from counterfactual ones. <sup>In my opinion</sup> Fictional claims do not, ~~I think~~, presuppose realism with respect to possibility: fictional objects are not, or need not be, intended to be understood as ontologically possible objects. If this is so, rejection of realism with respect to possibility need not entail nullification of the value of fiction.

The primary difference between counterfactual and fictional sentences lies, I think, in their respective intents to refer. Take a counterfactual sentence of the form, 'E could have occurred at spacetime point ( , )', where 'E' is a description of a particular event. Whoever asserts this sentence believes that a particular event satisfying this description did not occur, ~~but if he were shown that such an event did not occur,~~ but if he were shown that such an event did occur after all, then he would agree that it was to this event that his sentence intended to refer - and he would amend his counterfactual claim to a factual one, of the form, 'E did occur at (x,t)'. Contrast this case with that of a fictional sentence, say a sentence concerning Othello.

Suppose an actual person in fact happened to exist whose biography and character corresponded with that of the literary Othello in every respect - even in respect of his name. Suppose too that Shakespeare had never heard the faintest rumour of this man's existence, and this man had antedated Shakespeare, and so had not read, hence could not have imitated, Othello. Would we conclude that this man was the subject of Shakespeare's play? Certainly not. Shakespeare invented Othello. He was not offering an extended definite description, in the hope that some actual man would fall under it. If that had been his purpose, his work would have been a kind of absurd armchair reportage, rather than literature i.e. fiction, where we shall examine the peculiar purpose of the latter in a moment.

We can view this point from a slightly different angle. For whereas it is unlikely that any actual person would wholly satisfy a detailed literary characterisation such as that of Othello, the sentences a novelist uses to describe some incidental character in the plot might very well be used by somebody else, in ignorance of the novelist's pre-emption, to describe, and denote, an actual person. This shows that the difference between fictional and nonfictional, i.e. factual, ideas is intentional, not formal. But the difference can ultimately be detected, or indicated, by a formal difference: the novelist would not in principle be prepared to include spacetime co-ordinates (in some actual frame of reference) in his description of a fictional individual, whereas the reporter, armchair or on-the-spot, would, in principle, be prepared to do so, in his description of what he intends to be an actual individual. This point is illustrated by the traditional disclaimer that prefaces 'works of fiction', to the effect that any resemblance of characters in the work to real

persons alive or dead is coincidental.

We can distinguish two different categories of fictions: on the one hand, there are 'naturalistic' fictions, such as Othello, and in general the human characters in naturalistic literature; on the other hand, there are fantastical fictions, such as may occur in myths, legends, fairy tales e.g. unicorns, satyrs, philosopher's stones.

Fictional and fantastical ideas have at least one function in common - the opportunity for sport they afford the mind, the chance for it to exercise its architectonic latitude for sheer fun.

The entertainment value alone of fiction would suffice to confer a high adaptive value on it, and assure it a place, from an evolutionary viewpoint, in our discourse. But 'serious' fiction, or literature, has a further, didactic function. Its creations are models (or in the case of fantasy, symbols) for human characters and destinies. These models are designed to exemplify personality types, and life patterns, thereby assisting us to analyse our own psychological experience.

For the author of fictions, there are no truth-conditions for his fictional sentences - there are only more or less 'faithful' or representative fictions - fictions which exemplify more or less important or universal human attributes. For the recipient of fictions, on the other hand, we can lay down some qualified truth-conditions: a fictional sentence is true iff it is identical with, or inferrable from, some sentence(s) in the text or report of the relevant fictional narrative as written or related by the recognised author. However, the truth of fictional sentences which satisfy this condition is not unqualified truth, but 'truth-in-fiction'. I feel this qualification of the

truth predicate is justified in view of the important role of literature, or fiction, in our cultural life.

There is a great deal of interplay and overlap amongst fictions, fantasies, counterfactuals and facts. For instance, we permit fictional counterfactuals, such as 'If Juliet had awoken from her drugged trance earlier, she and Romeo would not have died'.

But according to my present view of fictions, we would not allow such counterfactuals as 'If Romeo and Juliet had been an actual boy and girl,....'\* Within the fictional framework, Romeo and Juliet are an actual boy and girl - not ghosts, or hallucinations of one of the other characters in the play (such as Banquo was, at one stage, in 'Macbeth') Outside that framework, Romeo and Juliet are model-concepts. Model-concepts are not intended to be instantiated by actual individuals, though actual individuals may resemble them. Again, it is not to the point to pursue in any depth here the inter-relations amongst fictions and counterfactuals and facts. I hope merely to have shown, in these sketchy remarks, that the nonrealist can account for the presence of fictions in our discourse. Moreover, on my account, he can permit the continued creation and employment of fictions.

### Possibility, Identity and Spacetime

Throughout this thesis we have noted various connections between theories of possibility, identity and spacetime. I now want to draw these insights together to some extent.

I have claimed that the principles  $(P_1)$ ,  $(P_2)$ , taken as mind-imposed rules, may be interpreted either as rules for identity

\*We are assuming for present purposes that they were not - that Shakespeare's play was not based upon a true anecdote.

or for spacetime. That is, either the existence of a spacetime framework is presupposed, and individual objects are conceptually individuated in accordance with certain spatiotemporal conditions, or the existence, and identity, of individual objects is presupposed, and the spacetime relations are constructed, by the mind, in accordance with  $(P_1)$ ,  $(P_2)$ . On the former interpretation, a substantivalist view of spacetime must be assumed, on the latter, a relationist view. But it should be pointed out that such a constructivist, or idealist, version of the relationist theory is not, *prima facie* at any rate, the only version. An alternative version of the relationist view would take the spacetime relations holding between objects as objectively given, not constructed by us. Such an interpretation would of course require a realist view of relations in general. The difference between such a version of the relationist view and the substantivalist view is not a straightforward realist/constructivist difference, but can rather only be adequately brought out by the different answers the two views provide to the question of empty spacetime. The substantivalist countenances the notion of an empty universe while the realist relationist does not.

However the version of the relationist theory which is of interest to us here is the constructivist version, since this is the version which is, initially, open to the nonrealist with respect to possibility, via his interpretation of the minimal conditions for intelligibility (and hence possibility), viz  $(P_1)$ ,  $(P_2)$ . I now want to show that, despite this initial freedom of choice in the interpretation of  $(P_1)$ ,  $(P_2)$ , it is to

the choice which affirms the nonreality of identity and the reality or substantivality of spacetime that the nonrealist with respect to possibility is finally committed.

I take Leibniz, at any rate in the context of his wider metaphysics, to have propounded a constructivist relationist theory of space and time. Given the close inter-relations and interdependence between his relationist theory of space and time and his principle of the Identity of Indiscernibles,\* I construe Leibniz's account of space and time as taking approximately the following form. The identity of objects is given independently of the<sup>ir</sup> spatiotemporal relations. This independent identity is determined by the qualitative properties of the objects - where 'qualitative properties' are understood to be all the empirical properties exclusive of the spatiotemporal ones. <sup>properties of an object — its spatiotemporal</sup> The spatiotemporal/relations with other objects - are then somehow constructed by the perceiving mind out of the qualitative properties of that object. Any two objects which were purported to share the same set of qualitative properties would subtend the same set of spatiotemporal relations i.e. would occupy the same point in space and time, and would hence be perceived as identical. This then guarantees the Identity of Indiscernibles.

Of course, this interpretation of the relationist theory renders the Identity of Indiscernibles ambiguous. For while it guarantees the spatiotemporal (and hence perceptual) identity of qualitative indiscernibles, it does nothing to secure

---

\* One aspect of this interdependence was outlined in Ch. 2, p. 54-56



the choice in the interpretation of (P), (P) n

the antecedent ontological identity of qualitative indiscernibles. At this pre-perceptual level then, the Identity of Indiscernibles remains as ad hoc as ever. I don't think it has plausibility at all from any but an idealist, Rationalist viewpoint, since it implies that we have a priori knowledge of the contents of the world - that we know, or can know, the qualitative identity of the objects in our world independently of their situation in spacetime and prior to our perception of them. Leibniz was, of course, an idealist and a Rationalist, with a penchant for plenitude: he posited the manifold of possible worlds, and conceived each possible world, including our own, as comprising the <sup>in</sup>constantiation of a maximal set of compossibles. From such a Rationalistic assumption of plenitude, the identity of the objects of any given world could indeed be antecedently established, by simply positing, as a basis, a small set of compossible objects, and then discovering the maximal set(s) of objects compossible with the members of the base set. Each such maximal set comprises the domain of a world. We have in this way worked out what there is in a given world without having had to inspect.\* We can then construct the system of spacetime relations for each such world

---

\*This is an overstatement. We cannot in this way discover which of the worlds we have constructed is a particular given world, e.g. our world, unless we already know the total membership of that world. If we know only a proper portion of the membership of the world in question, before we construct the set of all possible worlds, then there may be other worlds, constructed from the same base set as our world, which include all the objects which belong to that portion of the membership of our world with which we are already acquainted.

by following some Leibnizian handbook of instructions as to how different nexes of qualitative properties are made to subtend different sets of spacetime relations.

An empiricist who adheres to a realist view of the actual world however has no grounds for supposing the actual world to be the coinstantiation of a maximal set of compossibles. Therefore he cannot discover what there is in a world without experiencing it. But he experiences it as a spacetime manifold, and he identifies objects by their spacetime locations and trajectories. He has no reason to suppose that he could not find two spatiotemporally distinct objects which are otherwise (or qualitatively) indiscernible. Identity is thus understood by him as spatiotemporal identity, so that the Leibnizian relationist theory, with its assumption of an extra-spatiotemporal, qualitative identity, cannot be realised by him.

One objection to the Leibnizian relationism, from the point of view of its utility for the nonrealist theory of possibility, is that it presupposes possibility. According to Leibniz, the spacetime framework is the system consisting of the spatiotemporal relations holding amongst all actual and possible objects. 'I hold space to be something merely relative, as time is; that is, I hold it to be an order of coexistences, as time is an order of successions. For space denotes, in terms of possibility, an order of things which exist at the same time, considered as existing together, without inquiring into their manner of existing.'\*

---

\*from The Leibniz-Clarke Correspondence. Editor, H.G. Alexander. Manchester 1956 p.p. 25-26.

If possible objects were not included in this scheme, the relationist theory could not permit regions of unoccupied space and time, for where there are no<sup>/</sup> qualitatively discernible objects (actual or possible), there can be no sets of space-time relations. If it is the realist notion of possibility which is presupposed by the relationist theory, then that theory cannot, of course, be used to ground the nonrealist theory of possibility. But equally, the nonrealist theory of possibility cannot without circularity, be grounded on a view which presupposes the non <sup>relationist</sup> ~~realist~~ notion of possibility. It follows that the ~~realist~~ theory of space and time, insofar as it presupposes identity, cannot serve to ground the nonrealist theory of possibility.

There is a further, general objection connected with this fact that possible as well as actual objects are required for the construction of a spacetime framework. As we have seen, Leibniz, being a rationalist and a proponent of plenitude, construes possible worlds as maximal sets of compossibles. But we might consider that, in any given world, only those objects which are compossible with the contents of that world may be said to be possible relative to that world. In this case, Leibniz's plenitudinous view of possible worlds would entail that, within any given world, no object not already in that world will be possible relative to that world, since the world itself is already a maximal set of compossibles. Even if it is denied that an object, in order to be possible relative to a given world, must be compossible with the contents of that world, the Leibnizian

relationist could not allow the spacetime of that world to be constructed out of the distribution of qualitative properties over objects not in that world - objects which are supposedly possible relative to it. For on the Leibnizian view, each qualitatively discernible object subtends a unique set of spatiotemporal relations. This may work moderately well in the case of actual objects. But we ordinarily suppose that, at any spatiotemporal location we can define, many different, or qualitatively discernible, possible objects could occur. Yet each such object should, according to the Leibnizian relationist, subtend a unique set of spatiotemporal relations. In order to construct a consistent system of spacetime relations, then, the Leibnizian has to relinquish this ordinary assumption, and take the counterintuitive view that there is only one possible object which could occupy any spacetime location we can define.

This, as I said at the outset, is a quite general objection to the kind of Leibnizian relationism here under consideration, but it reinforces our present rejection of that position.

My last argument in this section is that, from a consideration of spacetime arises an objection to possible worlds, whether realistically or nonrealistically understood.

Historically, the possible world apparatus provided the solution to an objection to possibilities voiced long ago, in 1953, by Quine:<sup>\*</sup> how do we individuate possibilities? How do we, for instance, differentiate the various possible fat men standing

---

<sup>On</sup>  
\* in 'What There Is' in *From a Logical Point of View*, Harper Torchbooks edition 1963 p. 4.

in that doorway?

Since they all occupy the same place at the same time, they violate  $(P_2)$ , our criterion for the identity of individuals. From the viewpoint of possible world theory, we can assign identity to possibilities in the normal way, i.e. in accordance with  $(P_1) \wedge (P_2)$ , by requiring that the possible fat men in that doorway are each located in a different world, or spacetime framework. Then we can distinguish possibilities which occupy the same spacetime locations in different worlds, or frameworks, just by the distinctness of the worlds or frameworks. To affirm this distinctness of the frameworks is however to deny, what some people e.g. Kaplan, <sup>\*\*</sup> affirm, namely that all worlds share a single spacetime framework. If we take a substantivalist view of spacetime, we shall want to deny this anyway, since on this view space is a form of substance, and there is an ontological difference, from the viewpoint of modal realism, between possible substance and actual substance - just as there is between possible matter and actual matter. But in Chapter 3 I offered arguments for this distinctness of spacetime frameworks which were independent of the substantivalist assumption. These arguments concerned the geometry of spacetime, and claimed that, from the viewpoint of relativistic spacetime theories, there is no reason not to ascribe diverse geometries to the spacetimes of different possible worlds. Furthermore, this distinctness of the frameworks cannot be held to be determined by the

---

<sup>\*\*</sup> in lectures

distinctness of their contents, if we wish <sup>the</sup> to distinctness of the contents to be guaranteed by that of the frameworks. To justify this, we have to assume that there exist empty possible spacetimes which are nonetheless distinct. This naturally requires a substantivalist view of spacetime. Thus the distinctness of frameworks does require a substantivalist view of spacetime after all - but this distinctness does not, I have suggested, rest solely on this substantivalist assumption.

But even given a substantivalist view, can we distinguish different spacetimes - are spacetimes capable of being individuated? What sorts of things are in principle capable of individuation? We can distinguish numerically distinct individuals, and we can distinguish qualitatively different stuffs e.g. gold, silver, honey. But according to our present view of identity, spacetime is not an individual; an individual is defined as that which alone occupies just one place at a given time. It is therefore something which is defined relative to a spacetime framework. Is spacetime then a stuff? If it is, we should have to regard different spacetimes as qualitatively different stuffs. This could be feasible, in the case of actual spacetime and <sup>a</sup> possible spacetime, given our distinction between concrete and ethereal substance, in Chapter 5. But it could never be feasible in the case of different possible spacetimes, for they would surely be the same kind of stuff. In the intraworld context, we can distinguish different portions, or regions, of the same material stuff. But we do so by defining the spatial boundaries of particular regions occupied by that stuff. So again, such differentiation is effected relative to a spacetime framework. Thus, without assuming a 'super-spacetime; in which

the spacetime frameworks of all the possible worlds are located, I see no means of distinguishing, and hence differentiating, these frameworks. If this is so, then the identity of these frameworks cannot be presupposed, and hence the distinctness of the spacetime frameworks cannot be invoked for the purpose of individuating possibilia. In short, the semantical need for a substantival<sup>ist</sup> view of possible spacetimes conflicts with the assumption that there are distinct possible spacetimes.

### Realist vs. Constructivist Theories of Existence

As we have noted, the relationist theory of spacetime affords another example of an allegedly 'constructivist' theory which is premised on realism with respect to possibility. Can we make an inductive inference, from the examples presented in this thesis, that the constructivist approach to any question of existence presupposes an underlying metaphysical realism - typically realism with respect to possibility? Such a conclusion would not be in my own interests, since it would jeopardise my nonrealist theory of possibility. Not that I consider my theory to be a constructivist theory. According to it, there are no possible objects e.g. possible fat men; hence there are no concepts of possible fat men; there can thus be no constructivist equivalence between (in the old, realist theory) possible fat men and (in the new, constructivist theory) concepts of possible fat men. Rather, there are just concepts of fat men, and some of these concepts satisfy our predetermined criteria~~of~~ of intelligibility, and are hence said to be possible. Yet concepts may only satisfy criteria if they exist. Does my theory thus assume platonism with respect to concepts, and hence an underlying realism after all?



No. My theory asserts only that concepts may be subjected to the test of intelligibility as they arise i.e. as they are conceived of, or ideated. Once the concept is given, it is predetermined whether or not it is intelligible, since we already have the criteria it must satisfy in order to be so. But predetermination in this sense does not require platonism. I shall spell this out more fully below.

What general conclusions then are we to arrive at concerning the constructivist approach to questions of existence? I would make the following distinction between different categories of existential questions: questions of actual existence and questions of platonic existence. Under the former category would fall all questions of the contents of the actual world e.g. physical objects, fields, spacetime, and also minds; under the latter category would fall questions of possibility, of mathematical existence and the existence of concepts and propositions in general. My own position would then be to affirm realism in the case of the questions in the former category,\* and reject it in the case of the questions in the latter category. Hence I would affirm realism with respect to material objects, and the realist, or substantival<sup>ist</sup>, view of spacetime, while rejecting realism with respect to possibility, mathematics, concepts in general, and so on. Or, to put it the other way around, I would

---

\*Some qualifications are required here: physicists can multiply theoretical entities to fit the empirical data almost at will. Clearly I would not want to affirm realism across the board for such entities. This question needs a great deal more discussion, which I shall not enter into here.

disapprove of 'constructivist' (idealist) theories of material objects and spacetime, while approving of constructivist, or at any rate, nonrealist, theories of possibility, mathematics, concepts, etc.

However, I have claimed elsewhere in this thesis\* that certain constructivist theories in the latter category e.g. mathematical constructivism, rest on realism with respect to possibility. Since I wish to reject realism with respect to possibility, my present affirmation of mathematical constructivism appears to involve an inconsistency. Let me try to resolve this.

I think that mathematical constructivism, as understood by most of its exponents, does tacitly assume and rely on realism with respect to possibility, in order to secure the objectivity of mathematical results. But we can ask whether this realism is required - whether objectivity can be reconciled with non-realism. I think it can, as follows. We say that it is predetermined whether any concept which arises i.e. is conceived of, will be, say, the solution to a given mathematical problem. It is predetermined not in the sense that the concept exists whether or not it is ideated, but in the sense that we already have the criteria - the set of rules - which any concept must satisfy in order to qualify as the solution to this particular problem. For in formulating the problem, we are formulating these rules or criteria. We can say in advance that any concept which is conceived will either satisfy them or not. But we cannot say in advance what the concept which satisfies them will be - we

---

\* e.g. Ch. 5.

cannot say that that concept, which will be the solution, already exists, prior to being conceived of. Only the rules already exist. If the rules did not yet exist - if they had not been conceived of, formulated - then the mathematical problem in question would not yet exist, and its solution could not yet be said to be predetermined. According to this view then, large areas of mathematics at present nonexistence<sup>r</sup> may in the future come to exist, come to be developed. To the extent that these developments will represent applications of rules or procedures which already exist (have already been formulated), they may be said to be at present mathematically predetermined, though not yet existent. To the extent, if at all, that they will be the result of the application of rules or procedures not yet formulated, they are not only not yet existent, but they are not yet predetermined.

Mathematical results may thus be considered objective, in the sense that they are predetermined by sets of rules which are antecedently formulated; that is, they are objective relative to given sets of rules. But they are also mind-dependent, insofar as a particular mathematical result may be said to have come into existence only when a concept satisfying the relevant set of rules has been conceived of.

We can generalise this argument reconciling objectiv<sup>ity</sup> and nonrealism to the case of the intelligibility of concepts (propositions, theories, etc.). It is predetermined whether any<sup>given</sup> concept which arises will be intelligible, since we already have the criteria, e.g.  $(P_1)$ ,  $(P_2)$ , which define intelligibility. But concepts do not exist, and hence cannot be said to be either intelligible or unintelligible, until they are thought of.

It might be objected that if we can make these constructivist theories of the second category consistent with a nonrealist theory of possibility - where I had previously argued that they presupposed realism with respect to possibility - then perhaps we can do the same for constructivist theories of the first category e.g. the relationist theory of spacetime, and anti-realist theories of the actual world.

I have already argued, in the previous section, that the relationist view of spacetime cannot be interpreted consistently with the nonrealist theory of possibility. But what about antirealist theories of the actual world (e.g. Hintikka's theory of searching and finding)? Such theories, like the relationist theory of spacetime, have to include possible percepts, in order to construct the actual world. But if we admit at once that such theories are subjective idealist theories, we may be able to interpret this presupposition of possibility nonrealistically, and still obtain a theory which reconciles the objectivity of the actual world, as constructed, with its mind-dependence.

However, I think that the appeal to possible percepts that occur in such theories causes their downfall in a different way. For consider the phenomenalist program. The seeming persistence of objects which are not the immediate object of perception is explained in terms of their being a 'permanent possibility of perception', e.g. the unseen chair in the next room is the possibility of certain sense data being presented to some properly placed observer. But regardless of whether we are realists or nonrealists with respect to possibility, this is surely not the only possible percept for such an observer. Practically any

object of suitable proportions which is judged to be possible (where I am speaking here in unrevised, realist language, on the understanding that these remarks can be translated into non-realist terms), can be considered a possible percept for that observer. That is, if it is merely a matter of what is possible, then that observer might see a pink hippopotamus, or a sack of gold, and so on. We have to have a special reason for claiming that the only percept possible for such an observer is a percept of a chair. The only reason which would justify this claim would be that there in fact exists a chair in the next room. The observer can only perceive what exists; hence he can only perceive the chair. This is not to say that there could not have existed a pink hippopotamus or a sack of gold in that room (again, speaking realistically); in that case the observer would have perceived a pink hippopotamus or a sack of gold. But given that it is actually the case that a chair exists in that room, the observer, who can only perceive what exists (this being the nature of perception), can only perceive a chair.

In conclusion, I think that constructivist theories of actual existence and of spacetime fail, because of their dependence on possible percepts or objects. This failure is not, as we have seen, entirely connected with a presupposition of realism with respect to possibility; it may be (though it would require further discussion to show this) that the appeal to possibility in constructivist theories of the actual world, at least, could be interpreted nonrealistically, without destroying the objectivity of the constructs permitted by the theory. The failure of such theories is due, partly, to other objections arising from the

appeal to possibility. On the other hand, I think that constructivist theories of mathematics, and of concepts in general, can be interpreted consistently with the nonrealist view of possibility. Although these theories are indeed subjective idealist theories, they reconcile mind-dependence with the requisite objectivity of mathematical, and other conceptual, results.

Chapter Seven

THE PROBLEM OF NATURAL LAWS

One of the principal applications of the notion of necessity is in the case of natural, or physical, laws. I want to consider the problem of natural laws from the viewpoint of nonrealism with respect to possibility. Can we give an account of the supposed special lawlike status of certain aspects of nature, without invoking a realist notion of necessity?

The Necessity of Laws

From a commonsensical, nonsceptical (e.g. non-Humean) point of view, laws are understood to be necessary. Wherever laws obtain, events conform to their 'prescriptions'. This appears, intuitively, to be a matter of ontological, or de re, necessity: it is the events themselves which are necessitated, which fall under the laws, and hence have to occur in the prescribed manner.

I wish to distinguish two different questions concerning the necessity of laws.

(1) Is a particular set of laws necessary? If so, then this set of laws will of course be instantiated in the actual world, since actualia must conform to what is necessary; it will also be the set of laws instantiated in all possible worlds - which is to say that all possible worlds will conform to the same laws.

(2) Is the general property of lawlikeness necessary? Are all possible worlds lawlike - though not all subject to the same laws as our world?

It would appear that the truth of (1) is dependent on the truth of (2), but not conversely. However, on the other hand, in order to

ask whether lawlikeness is necessary, we need to have antecedently established what lawlikeness is. It is to this problem - the problem of showing what it is to be a law - that question (1) was addressed. Let us then reformulate our questions, substituting 'regularities in the order of physical events' for 'laws'. The first question is, then, is a particular set of such regularities necessary, and the second is, is such regularity, in general, necessary for worldhood? Now the truth of the second proposal is a (logically) necessary but not sufficient condition for the truth of the first: if the second is not true, then there will be a possible world in which there is no regularity in the order of events, and this will clearly be a world in which any given set of regularities does not obtain.

We shall therefore approach this question of the necessity of laws by considering firstly whether or not regularity has to obtain in the order of events - whether or not chaos is possible. These two questions, as they stand, with their appeals to necessity, and to possible worlds, appear to presuppose ontological necessity and possibility. I hope to show, eventually, that we can both explicate, and affirm, a nonrealist view of the necessity of laws.

#### The Two Traditional Views of Causation

What, we ask, would comprise evidence for the ontological necessity of a set of physical regularities? As a first step, we must articulate the role of causation in the laws of physics. The formal role of lawlike statements in physics is merely to express relations of functional dependence, not between observable physical changes or events, but between mathematically conceptualised states of a system - relations which are, typically, time-symmetric.

However, insofar as the laws of physics express not merely identities between simultaneous states of systems, but also dynamic relations between successive states, thus enabling us to predict or



retrodict the evolution of systems, these laws, or at any rate those of classical physics, are ordinarily interpreted as being underpinned by a principle of causality. What this principle adds to the mathematical laws is the recognition that it is not merely fortuitous that systems evolve in the manner prescribed by the laws, but that they have to do so, there being some intrinsic necessity in this process which renders explicable its regularity. Processes imbued with such intrinsic necessity are said to be causal processes, and the laws which describe them are said to be causal laws.

There are two polar views on this question of the necessity of causal laws. According to the first, which I shall call the agency view of causation, objects or events have certain powers to affect other objects or events in specific ways. These powers are substantive properties of objects or events. Within the framework of physics, with its laws of functional dependence, it is the various forces which are the vehicles of causal power or agency - it is forces which 'propel', or necessitate, the evolution of systems. I shall consider in a moment the question, brought out by Mackie,\* whether this conception of the necessity of causal processes permits a priori inference from cause to effect or not.

The second traditional view of causation, in polar opposition to the agency view, is the Humean view - the view that denies any ontologically necessary connection between the event we identify as a cause and the event we identify as its effect. According to this view, the so-called 'laws' of physics are, ontologically, contingent.

Between these two views - the literal and the sceptical - others have of course been developed. I shall not pause to survey

\* J. Mackie, *The Cement of the Universe*, Ch. 1, p. 11-12.

these; I merely want to expose the inadequacies of these two seminal viewpoints which have constituted the framework for the debate.

In connection with the agency view, it is well-recognised that the notions of power and agency are resistant to definition. The charge of animism against this view is also familiar: we experience ourselves as having the power to affect the course of events in certain ways - to act on the world; we take this experience to be evidence of a corresponding objective faculty possessed by us e.g. the will; we then project this supposed faculty into the natures of external nonconscious objects. The fallacy of animism is that it attributes psychological states for nonconscious objects. By a psychological state, I mean an experience (by the mind) of the mind, as opposed to an experience (by the mind) of the body. For example, anger is a psychological state, because it is not a result of a state of the body (excluding the brain) - we do not discover that we are angry by being apprised of, or becoming aware of, our clenched fists and bristling hair. These bodily states are rather results of the psychological state of anger. We discover that we feel hot, on the other hand, by becoming aware of a certain aspect of our bodily state; similarly, we discover that we are seeing red by being apprised of a certain kind of stimulation of our optic nerves. These, then, are not psychological experiences. The experience of acting on the world, as opposed to that of involuntary movement, is the experience of directing our limbs to move in accordance with our will. The <sup>experience of a movement of the limbs is an</sup> experience of a bodily state, but the experience of acting is a psychological one. Nonconscious objects can, of course, enjoy

bodily states, because such states need not be experienced by the object in order to obtain in it; but psychological states only occur by virtue of being experienced. Hence they cannot be enjoyed by nonconscious objects.

The agency view in the naive form in which I have here presented it, is, I think, animistic, and hence untenable. But this view can be recast in a less ostensibly animistic form, by adopting energy as the vehicle for agency. Like the will, and powers in the objects, energy itself is nowhere directly physically manifested, or at least is nowhere visible. According to the laws of physics, its 'effects' are manifest in the interactions and structures of all physical entities. It is thought of ~~as~~ <sup>as</sup> informing everything, while in itself being a sort of substrate, nowhere nakedly observable. Students of elementary physics instinctively ask the Humean question, 'But what is energy, apart from all its effects?', to which there is no answer. In this respect then, the notion of energy resembles that of causality as a power informing all interactions. The concept of energy could thus be regarded as the quantification of the concept of causality within physical theory. It should be noted that this literal interpretation of locally conserved energy as a stuff is by no means unanimously discouraged within physics.

The agency view does not explain the direction of causation, in the sense that there is no reason, in principle, why powers to affect the course of events may not be exercised on the past (not, of course, to change the past, but to make it what it was). In the case of the energetic version of the agency theory, the third law of the thermodynamics - the principle of entropy - defines the direction of

physical processes, but we may think that the intuitive concept of energy, which the energetic agency theory invokes, is independent of this principle. This question need not concern us here, however, for the purpose of the agency view is to affirm, and explicate, the necessity of causal processes; it would serve to explicate the necessity of future-to-past regularities, too, if such regularities were discovered.

The Humean view, in contrast of course denies this necessity. According to Hume,\* cause and effect are distinct existences, and there can be no necessary connections between distinct existences. The causal relation, in the objects, is merely a relation of regular succession and contiguity; having observed this relation, we come to associate, in imagination, the appropriate effect with any given cause; the necessity of the connection between them is thus merely psychological, not ontological.

There are many objections to this view, particularly as it is stated, as opposed to (presumably) intended, by Hume, which I do not want to enter into here. By the 'Humean view', I shall understand merely the position which denies that causal processes, and hence natural laws, are ontologically necessary. I shall take it that such a view does not permit 'regularity' to do the job of necessity, in the sense of admitting that we can justifiably assert that an observed regularity obtains in unobserved sequences of events.

#### The Explanatory Power of the Two Views

Now, with the two views before us, let us consider what light, if any, either of them sheds on the necessity that is supposed to attach to laws.

\* A Treatise of Human Nature, Book 1, Part III

Needless to say, the Humean view fails to justify any attribution of necessity to the regularities encoded in the 'laws'. This view, thus unqualified, therefore provides no grounds for attributing truly lawlike status to the statements of these regularities - there is no support for the universal, much less counterfactual, validity of these statements. The problem of induction is thus left monumentally intact. Strictly speaking, the Humean view yields only simulated laws i.e. universal statements lacking the necessity which would bind their universality.

The agency view, in contrast, makes a deceptive show of explaining everything: the observable physical order expressed in the system of physical laws is maintained in the world because the world is invested with a substantive power which simply makes things happen in accordance with the mathematical prescriptions of physics; the lawlike status of these prescriptions is thereby justified.

The thesis that physical processes are propelled by such a power does not, I think, imply that the effects of this power are a priori inferrable. We discover, a posteriori, the effect that a given cause produces by means of its causal power - we cannot, despite the necessity of the effect, infer it a priori from a knowledge of the cause alone. The agency view is intended to explain why the observed regularities occur - it is an ontological thesis, not directed primarily at the problem of our concept, or knowledge, of causation.

The sweeping explanation that the agency theory offers in connection with this ontological question however turns out to be empty. Our immediate reaction to it is to ask whether it is the

particular (indirect) manifestations in our world of this power i.e. its 'effects' in our world, which are ontologically necessary, or rather the existence of such a power, conceived independently of its particular actual effects, or both.

If we are to conceive the power as a substantive addition to the sum of its empirical manifestations or effects, as the agency theorist does, (in contrast to the Humean, who admits only the sum of the empirical manifestations), then this would seem already to entail abstracting the notion of the power from that of its particular empirical manifestations. The agency view thus appears to offer no reason for not conceiving the power as being such that it could have had different empirical effects from those it actually has. It

would necessitate these effects in the worlds in which it has them, *This answers the question whether or not it is, on the agency view, the particular effects of the just as it necessitates its effects in the actual world, which are power in the actual world which are* ontologically necessary. It is not. It must therefore be the

presence of such a power - conceived independently of its particular effects - which the agency view asserts to be ontologically necessary. This claim, if verified, would establish that some degree of lawlikeness obtains in every world, but not that the same set of laws obtains in each world.

But I can see, and so far as I know the agency view provides, no support for this claim. Even if such a power does exist in the actual world, I do not see that its existence in any way guarantees that there could not be a world which duplicated every empirical detail of our world, but which was not imbr<sup>u</sup>ed with this power. i.e. a world in which the laws of our world are simulated. It might be thought that a very low probability would attach to this world - why should things arrange themselves just so if they did not for some

reason have to? But probabilities relate to the realisation of states of affairs; they do not attach to possibilities qua possibilities. In order to be possible a state of affairs need only have a nonzero probability. (We normally construe this conversely: the minimal condition for a state of affairs to be assigned a nonzero probability is for it to be possible, as opposed to impossible.) The purported low probability attaching to the world we have described is precisely what alienates people from the Humean view, according to which our world is this world just described, in which likeness is merely simulated. The alleged low probability attaching to such a world motivates the continued search for necessary connections or powers. But this objection certainly cannot be raised against such a world considered merely as an unrealised possible world. Hence I cannot see that the claim that a causal power is present in all possible worlds is defensible. It follows that such a power, if it exists at all, is not ontologically necessary.

All that remains of the agency view therefore is that if a causal power does exist in a particular world, then within that world it necessitates its 'effects' i.e. its empirical manifestations. But in what sense does it thus necessitate? We have seen that both the presense of such a power in a world, and its particular manifestations within that world, are contingent; the power might not have existed, and even given that it does, it might have manifested itself in a different manner. It cannot therefore be said to ontologically necessitate its effects. The only sense of

necessity that remains available to the agency view is a trivial one: given that the power is identified as the power that manifests itself in a certain set of regularities in the order of events in a given world, it follows with analytic necessity that this power does manifest itself thus. This trivialisation marks the end of the road for the agency view. After starting out explaining everything, the agency view, with its appeal to a substantive power inhering in the world, ends up explaining nothing.

At first sight, the energetic version of the agency theory is open to similar objections: could the effects, or manifestations, of energy be different? Is the presence of energy - in a generalised sense, allowing for variations in different worlds - in a world ontologically necessary, or are there worlds in which the regularities amongst observables persist, but where the energy which in our world shapes and informs them is absent? Although at first sight we might answer yes to both these questions, as we did in the case of the animistic power, I think we have to be cautious. It may well be that energy must be present in a world, and even that it must manifest itself in the specific manner that it does in our world. But if this is so, the reason is not, I think, that energy is in any sense a power, an agency, but that energy informs space, and determines, in this noncausal sense, the nature, and existence, of space. If we assume that all ~~the~~ worlds are spatiotemporal, it follows, on this view, that energy is present in all worlds. But in this case, the necessity of energy is not a consequence of considering energy as a vehicle for agency. We shall be examining later in this chapter a view that closely resembles this view that energy is necessary in consequence of its relation to space, and we



shall explicate there the notion of necessity that such a view involves.

I conclude that the net explanatory power of the agency view is nil - it provides no final answer to the question why there are the regularities we observe in our world. It does not solve the problem of induction.

The Humean view, on the other hand, makes no pretence of explaining anything, and in fact does not. The existence of regularities in the order of events remains a puzzle on this view - Hume set out, not to explain, but to expose the fallacies of the received explanations. The Humean view is compatible both with realism with respect to possible worlds, allowing worlds in which different regularities, or no regularity at all, in the order of events, obtain, and with nonrealism with respect to possible worlds. In short, this view does not vindicate the law-like status of the purported laws of physics, and does not require that worlds must exhibit order if they are to be considered possible.

The traditional dialectic on the subject of the necessity of causal laws therefore achieves little or no progress towards a positive conclusion. I therefore want to propose an alternative view - one which explicates and affirms a nonrealist conception of the necessity of laws.

### Is Chaos Possible?

I shall launch my argument with the question whether (some degree of) physical order is a necessary condition for worldhood.

The obvious approach to this question is to consider whether a world exemplifying zero degrees of order is possible: is chaos possible? In the following argument 'possibility' will be understood nonrealistically, as applying to concepts, and being equivalent to intelligibility.

Given that we have a particulate concept of material reality, our picture of physical chaos will presumably portray a set of particles, understood simply as the elementary physical units, in irregular, unpredictable motion - appearing and disappearing arbitrarily, their trajectories discontinuous, their accelerations arbitrary, their behaviour upon collision unpredictable, and in all their behaviour generally failing to obey any rational laws of motion.

As a portrait of absolute chaos, this is not even prima facie plausible. The fact that particles, in this picture, exist - which is to say, persist for long enough to be identifiable as particles - indicates that order in some degree obtains. For any kind of particle must exhibit some structure, in order for it to be what it is i.e. an identifiable entity, and not some other thing. One structural property which we must ascribe to any kind of material particle, however minimal, is mass. (of course, physics does posit nonmaterial particles, which have zero rest mass. These are a special case, which we shall be examining shortly).

Before proceeding with the argument for my view of laws, let me just state the intuition behind this view. Above we spoke of laws 'breaking down'. This is now regarded as highly misleading. Laws should not be construed as 'governing' or 'being imposed on'

or 'constraining' physical situations, nor should physical situations be construed as 'obeying' them. This kind of talk takes the legal metaphor too far, too literally. A physical situation is not somehow independent of the laws it exhibits (or which we abstract from our observations of it); it is not identifiable independently of the behaviour which its components exhibit - in the way that citizens are identifiable as the same citizens whether they obey the (legal) laws or not, or behave in <sup>one</sup> our way rather than another. The motion of a particle is inseparable, from an ontological point of view, from its structure: both motion and structure are integral aspects of the kind of thing a particle is.

But now let me proceed with the argument which is required to vindicate this intuition. The point we had reached above was that our picture of chaos was at most a picture of a limited order, since the presence of particles, with their structure (mass), already constituted a degree of order. But I want to argue now that even this state of affairs - of limited order but consequently also of a degree of disorder, is not possible.

Consider first a particle with nonzero rest mass. Given the principle of the equivalence of mass and energy, and the fact that energy is manifested as motion, of one kind or another, it follows that the rest mass of a particle may be construed as the result of the 'inward movements' occurring in the particle, these inward movements being the manifestation of the rest energy of the particle. To put it another way, the reason we attribute these inward movements - which may be the movements of molecules, atoms, or more

elementary components, characteristically oscillating, to and fro movements which cancel out on the larger scale - to particles is that energy is measured in terms of motion, and from the equivalence of mass and energy it follows that a particle with rest mass is the subject of internal motion.

Only material particles i.e. particles with non zero rest mass, may be thought of as exhibiting structure. The type of internal movements occurring in a particle will be of utmost importance in determining the structure of that particle e.g. the structure of macro-objects is affected in an obvious way by the degree of molecular motion occurring in them - at high degrees of molecular motion most objects liquidify (melt), and at low degrees of molecular<sup>motion</sup> most solidify (freeze). When we consider that all the constituents of a particle, i.e. its subparticles (e.g. molecules, atoms, nucleons, and so on), which we regard as the things that move in these processes of internal movement, are themselves particles with nonzero rest mass, then we realise that the elements of the structure of the initial particle owe their various structures to their own internal movements; hence the structure of a particle must ultimately be analysed in terms of nothing but movements which are internal relative to that particle.

The distinction between outward and inward movements (where outward movements are movements which are visible on the larger scale - such as the displacement of a particle in space, -or a change in its orientation) is not an ontological distinction (except in the case of zero rest mass particles, which we shall consider below). This is to say that there is, from an ontological viewpoint, no non arbitrary point at which the inner movements become the outer movements.

\* For a fuller discussion of the meaning of the principle of equivalence mass and energy in terms of inward and outward movements, see D Bohm, The Special Theory of Relativity, Chs. 19, 23.

This statement is at first sight open to two interpretations: the inner and outer movements of the particle may both belong to a wider system of motion, and hence form a continuum; or the manifestation, at a 'higher' level, of the inner movements e.g. a stable particle i.e. one whose inner movements are in equilibrium, is at rest, or in inertial motion; while an unstable particle has an irregular, non inertial motion.

I shall for the present select the second interpretation: the inner movements of a particle are manifested in its outer movements; inner and outer motion are identical. But as we have seen, the structure of a particle is, according to Bohm, a manifestation of its inner motions. Hence structure and external motion are both manifestations of the same system of motion. If we assume that identity is a logically necessary relation, it follows that it is logically necessary that a particle moves according to its actual laws of motion. We can postulate this logical relation between a particle and its behaviour, or its laws of motion, because under the present interpretation, these are not, in Hume's phrase, 'distinct existences', where it is normally denied that logical relations can hold between distinct existences.

But can we regard this identity as a necessary one? Of course, we may not admit contingent identities in the first place, but even if we do, I think we shall regard the present instance as a necessary identity. For compare it with Kripke's example of the relation between heat and molecular motion.\* The argument, opposed by Kripke,

---

\* Naming and Necessity Lecture 3

that this is a contingent identity, rested on the fact that we discovered, a posteriori, that heat is molecular motion, and that heat is a secondary property, while molecular motion is primary, so that an idealist can admit heat while rejecting that there exists any molecular motion. (Kripke does not put it quite like this, but I think this is one of the intuitions that motivate the contingent identity claim in this sort of case, and also in the case of the mind/brain identity). In the present case, however, it cannot be said that we discover the particle and its motion independently: every particle that we discover is in motion, until we intervene.\* We may not discover its laws of motion immediately, but we do discover that it has a motion, in the very process of discovering the particle. In connection with the primary/secondary distinction, the motion of a particle and its structure are both primary properties; there is thus no opportunity for the idealist to admit the existence of the one while denying the existence of the other.

On the assumption of a necessary identity obtaining between the structure of a particle and its external motion, it follows that a change in the external motion entails a change in the structure, and conversely.

Let us now consider, from the point of view of our new 'identity theory', the case of the zero rest mass particle. Such a particle must be devoid of internal structure, and hence of internal movements. This means that its entire energy is manifested in outward movements only - it travels with the velocity

---

\* In Quantum mechanics, of course, our discovery of a particle itself affects the motion of that particle. But I will not consider this special problem here.

of light. The laws of motion pertaining to this kind of particle could not 'break down', for a zero rest mass particle only exists, as that sort of particle, insofar as it travels with velocity  $C$ ; if it travelled any slower (and we shall accept that it cannot travel any faster), its velocity would lose its invariance under the Lorentz transformation, and in that case there would be some reference frame in which the particle was at rest. But a particle at rest has rest mass and rest energy, and this means inward movements, and hence a structure. A particle with nonzero rest mass and a structure is precisely not the kind of particle we started out with.

We conclude, then, that we cannot, in the case of the zero rest mass particle, separate its property of having zero rest mass from the peculiar form of outward movement that it exhibits (i.e. its motion in vacuo), and that we cannot, in the case of non zero rest mass particles, separate structure from outward movements i.e. so long as these particles maintain the structures by means of which we identify them as particles of a given type, they will continue to move according to the laws that we have learned by observation to associate with particles of that type. If the outward movement of a particle deviates from the norm prescribed by the law for that kind of particle, then, given the necessary identity of structure and external motion, it follows that this change will be accompanied by a change in the structure of the particle in question, and that the new motion will be in accordance with the laws of motion for the new kind of particle. Such a 'deviation' therefore will not constitute a 'breakdown' in the original law, but will merely signal a lawlike change.

However this 'identity theory', which promises to secure the necessity of laws, is open to objection. In the first place, it can be invoked only in connection with Newton's first law of motion, or the behaviour of individual particles considered as closed systems. It does not explain the lawfulness of the behaviour of interacting particles, where it is the interactions of particles which are ostensibly the more obviously causal processes, (though the behaviour of an isolated particle in fact has just as much claim to be considered causal as does that of interacting particles). In the second place, if the inner movements of a particle are the movements of its subparticles, then these movements are the product of the interaction of these subparticles. If we find these motions to be regular, this requires explanation not provided by the 'identity theory'. However, it cannot be objected that the lawlike behaviour of interacting particles must be explained before the 'identity theory' may be invoked to explain the lawlike behaviour of an isolated particle, because the 'identity theory' does not presuppose that the internal motions of a particle are regular. All it says is that the nature of that <sup>internal</sup> motion - whatever it is <sup>like</sup>, regular or irregular - is manifested in the structure and external motion of the particle to which it is internal.

Our problem, then is to extend the 'identity theory' so as to explain the lawlike behaviour of two particles upon collision. To do this we have to return to a view I mentioned earlier as a suggested interpretation of the statement that 'there is, from an ontological viewpoint, non nonarbitrary point at which the inner movements become the outer movements.' This suggestion was that



inner movements and outer movements belong to a wider system of motion. My present suggestion is that a particle in motion is a system of movement which is a part of such a wider system of movement. Two particles in motion are both parts of the same wider system, and their behaviour upon collision is determined by (in the sense of being a manifestation of) the nature of this wider system.

The purpose of this suggestion is, ultimately, to once again eliminate 'distinct existences', and so reduce the causal relation to the identity relation. But let us begin by considering what the nature of such a wider system of motion would be. We can distinguish (at least) three views concerning the ontology that is implicit in physical theory.

- (A) Matter has ontological priority; fields, if they are real at all, are generated by matter, and are hence derivative.
- (B) Fields have ontological priority; matter is considered as, metaphorically, the precipitation of the field; it may for instance be a result, or manifestation, of (nonlinear) wave interactions in the field. It is therefore derivative.\*
- (C) Matter and fields are mutually autonomous; neither is derived from the other, though each interacts with the other.

---

\*This plenum view may take the form of asserting the ontological priority not of fields, but of space itself - as, for instance, in the geometrodynamics program of <sup>me</sup>physicist J.A. Wheeler. On this view, matter is curved spacetime, and spacetime itself is dynamic

The wider system of motion for which we are presently seeking cannot be a system of particles in motion, since it is the motion of (interacting) particles that we intend to explain by invoking it. Hence of the above physical ontologies, only (B) will serve our purpose. (B) is the view which motivates the search for unified field theories in physics, where this search is still an open, viable program. I shall not try to defend (B), but shall assume it, and be content to let my subsequent conclusions be contingent on its truth.

The general picture yielded by (B) is of space occupied by a (unified) field, with mass as the manifestation of complex, non-linear interactions of waves in this field. Alternatively, it is of space itself as a dynamic, elastic entity, with mass as the manifestation of high local curvature ('matter without matter', <sup>as Wheeler puts it.</sup>)  
<sup>Again, in a more speculative</sup>  
 ive vein, it may be the 'holomovement' proposed by Bohm.\* The holomovement, as I understand it, is an infinitely complex system of motion of which our universe of apparently discrete and autonomous objects, or entities e.g. particles or light rays, is merely an aspect, <sup>an</sup> ~~a way of~~ <sup>on</sup> ~~'explicating'~~ <sup>of an aspect of</sup> the 'implicate' order in the holo<sup>mo</sup>ovement, brought about by the intersection of one implicate order (the process of perceiving or measuring) with another (what is perceived or measured in a given region of the holomovement). In introducing the notion of the holomovement, Bohm says, 'To generalise so as to emphasise <sup>u</sup>ndivided wholeness, we shall say that what 'carries' an implicate order is the holomovement, which is an unbroken and undivided totality. In certain cases we can abstract

---

\*D. Bohm: 'Quantum Theory as an Indication of a New Order in Physics', in Foundations of Quantum Mechanics II Corso, 1971.

particular aspects of the holomovement (e.g. light, electrons, sound, etc.). But more generally, all forms of the holomovement merge and are inseparable. Thus, in its totality, the holomovement is not limited in any specifiable way at all. It is not required to conform to any particular order, or to be bound by any particular measure.\* Moreover the whole implicate order of the holomovements is supposed to be contained, to some degree of detail, in every region of the holomovement. In analogy with this, Bohm cites the hologram, an instrument which takes three-dimensional pictures of objects, and is such that the whole image of the object is contained, to some degree of detail, in every part of the photographic plate.

#### Identity in a Plenum

If we accept the general physical ontology expressed in (B), we have effectively eliminated discrete, autonomous individuals from physical reality. But we have not yet demonstrated that we have explained lawlikeness. For if the behaviour of (apparent) particles and other physical entities is lawlike, and these entities, and their motions, are the manifestations of movements in a field, or the holomovement, or space itself, then does this not imply that these latter movements are lawlike? If this is so, have we not merely pushed the problem of lawlikeness back one stage, so that our problem is now to explain the lawlikeness that obtains at this new level.

This brings me to the most important question in this Chapter, on the answer to which the outcome of my argument concerning the

---

\* ~~op. cit.~~ p. 447

necessity of laws rests. The question, already raised briefly in Chapter 6, is, do the parts of a plenum, of a physical continuum, have identity? Or, to put it another way, could one part of such a plenum be different without this affecting any or all of the other parts; are these parts 'distinct existences', such that we can conceive of a change in one without a change in the others?

If we can claim that the metaphysical nature of a plenum is such that its parts do not have identity, that they are not 'distinct existences', then although we can place no constraints on the physical nature or contents of the plenum as a whole, we can say that, given its physical nature, it is necessary that all its parts behave in the way they do. It is important that we do not confuse this point with a trivial logical point. For consider the following case. We are given a plenum with a particular physical nature; it is named  $\phi$ , where ' $\phi$ ' is acting as a disguised description of the particular physical nature of that plenum. Then it follows that no part of that plenum can suffer a change - or at any rate a change which contradicts some aspect of the plenum's nature included in the disguised description - without that plenum ceasing to be  $\phi$ . Hence it is analytically necessary that the movement in  $\phi$  takes the form it does.

This trivial argument is not my above argument. My argument is that, if the metaphysical nature of a plenum, qua plenum, is such that its parts are not distinct existences, then a change cannot (be conceived to) occur in one part alone of a plenum.

Suppose we take a given plenum, with a particular physical nature, and name it  $\phi$ , where ' $\phi$ ' is not this time acting as a disguised description but as a logically proper name. Suppose we take a part

of  $\phi$ , and call it A (for convenience, though naming a part of a plenum is in principle at odds with the thesis that its parts do not have identity). We call the present state of motion in A, M, we then propose a change in this state of motion,  $\overset{m'}{M}$ , while denying any corresponding changes in the other parts of  $\phi$ . Then, if we assume that the parts of a plenum are not 'distinct existences', it follows that  $\overset{m'}{M}$  is impossible in  $\phi$ . Given the present state of  $\phi$ ,  $\phi$  cannot (immediately) become the plenum which would be in the same overall state as its present state save for a change from  $\overset{m}{M}$  to  $\overset{m'}{M}$  in A. Since there are no external constraints on the physical nature or contents of a plenum, we cannot say that there could not be a plenum which was, at some time, in this particular state; but we can say that it could not have reached this state from the state presently exhibited by  $\phi$ . If we name this alternative plenum  $\psi$ , and take  $\phi$  to be the actual plenum, or world, we can say, in the language of modal realism, that  $\phi$  could have been  $\psi$  but that  $\phi$  cannot become  $\psi$ ; that is,  $\psi$  could have been the actual world, but the actual world, given its particular physical nature, cannot become  $\psi$  or cannot exhibit the state, described above, that  $\psi$  exhibits. (I have used this realist, counterfactual language to sharpen the point, but I shall shortly present it in its proper, nonrealist form).

In short, regardless of what particular form of motion occurs in a plenum, it will be systematic, or lawlike, in the sense that there will be no isolated changes in motion, but all changes will be holistic. It may be that any particular instantaneous overall state of motion can be reached, by some evolution, in some plenum, but certain transitions from one state to the next are impossible

in any plenum. It is this requirement of continuity that constitutes the lawlikeness of motion within a plenum.

In nonrealist language, a plenum in which such a transition occurs is, on the assumption that the parts of a plenum are not distinct existences, inconceivable - the concept of it is unintelligible. But its unintelligibility is not due to a violation of  $(P_1)$ ,  $(P_2)$  - the rules for the identity of objects in spacetime. Any plenum, considered as a whole, satisfies these rules trivially, since it occupies all of space, and all of time. However, I think it would lead to confusion to extend, for this reason, the notion of identity to a plenum (qua plenum). A plenum is precisely not a kind of object, with distinct parts, and itself distinct from other objects. However, I shall not pursue this question here.

I merely want to point out that the unintelligibility of the concept of a plenum such as we described above is due, not to its violation of  $(P_1)$ ,  $(P_2)$ , but to its violation of our hypothetical metaphysical principle, viz. that the parts of a plenum are not 'distinct existences'. If it is assumed that this principle informs and defines our concept of a plenum, then any process in a plenum which violates this principle is inconceivable. Therefore we have to add this principle to our canons of intelligibility. Since it is then inconceivable that any property we attribute to a plenum should not conform to this condition, we can say that it is necessary (in a nonrealist sense) that all such attributions do so conform. The lawlikeness of motion in a plenum is, for the reasons outlined above, necessary in this sense. It follows that, since particles and other physical entities are, according to our present assumption, manifestations of motions in the plenum, the lawlikeness of their behaviour is also necessary in this nonrealist sense.

Now that we have seen the consequences of the postulate that the parts of a plenum do not have identity, that they are not 'distinct existences', we have to return to the question whether or not this postulate can be justified.

I shall not attempt to settle this question here. To do so would, I think, require a great deal of discussion, which I do not wish to enter into in the present context.\* I raise this question, then, only as a signpost to a solution to the problem of the necessity of laws. If we assume that the parts of a plenum are not 'discrete existences', then the transitivity of motion, or change, in a plenum does not involve connections between discrete existences, and it was to such connections that Hume denied logical necessity. There is therefore no objection to regarding this transitivity of motion as logically necessary, nor hence, to regarding the behaviour of the 'entities' which manifest aspects of this motion as logically necessary likewise. I am content, then, to rest the argument of this chapter on this unproved assumption - in addition to the assumption which I invoked at an earlier stage, viz. that the ontology underpinning physics is a Parmenidean, as opposed to a Democritean (or dualist) ontology.

#### Is the World, if it is a Plenum, Necessarily a Plenum?

It might still be objected that, even if it had been demonstrated, firstly, that the actual world is a plenum, and secondly, that continuity of motion is necessary in a plenum, it has not been shown that it is necessary that the world should be a plenum; hence it has not been shown that the lawlikeness that necessarily characterises motion in a plenum, is necessary. If we can conceive of a particulate world, then, even though the actual

---

\*(but see the section 'Statistical Laws' of the present chapter, p. 263)

world is not particulate, or not conceived to be particulate, its lawlikeness which is necessary relative to its plenic nature is not necessary simpliciter; concepts of particulate worlds, relative to whose nature the lawlike behaviour of their discrete contents is not necessary, are intelligible.

The question whether or not any world has to be a plenum is, I think, a question about our conception of space, our metaphysical theory of space. It is initially the issue of the substantivalist vs. the relationist theory of space. Clearly, adopting the substantivalist view of space will be a necessary - but not, I think, sufficient - condition for affirming that spatial worlds necessarily have a plenic nature. It is not sufficient because it would appear to be consistent to hold a substantivalist view of space, while still affirming the ontological autonomy of matter - its non-derived, irreducible status. On this view, the actual world would consist of substantival space(time) occupied by discrete, autonomous entities ("distinct existences"). A plenum however cannot contain anything foreign, anything that is not a part of itself, of its own 'stuff'; on our recent assumption, it cannot contain any 'distinct existences'. However we invoked this latter assumption in connection with its own parts i.e. in order to claim that its own parts are not distinct existences; in the present case, the discrete entities are not considered parts of substantival space in any case, so we do not need to invoke <sup>this assumption</sup> ~~it~~ here. The fact that a plenum cannot contain anything which is not part of itself suffices to show that the actual world, on this 'dualist' view does not constitute a plenum.



Again, I shall not try to settle this question. I have no suggestion as to what would constitute a sufficient condition for regarding spatial worlds as necessarily plenic. But this question does, I think, suggest some interesting lines of enquiry. For it provokes the question whether the substantivalist view of space-time may in fact be committed to a monist ontology entailing a reductionist view of matter. Is it, after all, coherent to view space on the one hand as substantival, and hence as a sort of plenum, and on the other hand allow that this plenum is occupied by 'foreign' discrete, autonomous entities, when a plenum is, by its nature, already full, so to speak, and cannot admit anything additional or foreign?

I leave this question open, offering, again, only a signpost to a solution: the way to show that (spatial) worlds are necessarily plenic is, perhaps, to pursue the metaphysical implications of the substantivalist view of spacetime. It should be noted that the fact that the nonrealist theory of the necessity of laws implicates the substantivalist view of spacetime in this way is consonant with the connection between these two views that we have remarked repeatedly throughout this thesis.

Are Worlds Necessarily Spatiotemporal?

Our opponent will say that even if we admit that space is substantival, and that substantival space is necessarily plenic, where this entails a reductionist view of matter, and that motion in a plenum is necessarily lawlike, it has not been shown that space itself is necessary. If worlds are not necessarily spatial, then nor are they necessarily plenic, hence nor are they necessarily lawlike.

Before attempting to answer this question, I first want to amend it. According to Relativity Theory, space and time are not distinct; they are different aspects of the same reality. This surely cannot be a contingent identity. If space and time are aspects of the same unity, then the nature of space is presumably dependent on that of time, and that of time on space. I shall not try to defend this claim, which as it stands, is based merely on intuition. I make it only in order to generalise my opponent's above question to the question whether worlds are necessarily spatiotemporal.

The answer to this question is *prima facie*, for the nonrealist, simple: we ~~lack~~ any concept of a nonspatiotemporal world. Hence there is no relevant concept to be considered intelligible or otherwise, possible or impossible. But the opponent might reply, yes we do have such a concept. The concept of a nonspatiotemporal world is just what it says it is; we may not have any corresponding image for this concept, and we may not be able to say what such a world would be like; but we do have the minimal concept. In face of this rejoinder, the nonrealist has to, first, suggest conditions for the intelligibility of this concept, and then ~~to~~ determine whether or not the concept satisfies them. To do this he has, I think, to elucidate the concept of a world, or of worldhood, and then see whether the notion of a nonspatiotemporal world is a contradiction in adjecto.

The concept of a world is, at any rate in origin, an empirical concept - derived from our experience of the actual world. We have empirical access to only one example of a world, viz the actual world. If we allow that we can apply the abstraction procedure to a single object, then there is no reason why we should not have developed an abstract concept of worldhood from our acquaintance with just one

world. As in all acts of abstraction, the process of abstracting from the actual world to form an abstract conception of worldhood will involve selective attention - diverting our attention from what we take to be mere details of the world's nature, or structure, and focussing on what we take to be its most general, or fundamental, aspects. It seems unquestionable to me that the most general or fundamental aspect of our world is its spatiotemporality. If this is accepted, then the concept of worldhood, arrived at through abstraction from the actual world, includes spatiotemporality as an analytically essential aspect or property of worlds. Ergo, 'nonspatiotemporal world' is a contradictio in adjecto.

### Statistical Laws

Having set out to affirm and explicate the necessity of the laws of physics, we have in the end to face the fact that in a certain domain of physics, viz Quantum Mechanics, the laws proposed are not deterministic, but are considered to be irreducibly statistical.

For certain views of causality, which affirm the existence of ontologically necessary connections between cause-events and effects-events, this fact of statistical lawlikeness presents no additional problem; for the necessary connection can just as well be one-many as one-one. The fact that specific one-many correlations obtain between events is as noteworthy, in that it constitutes a regularity, and stands in as great a need of explanation, as does the fact that specific one-one correlations obtain. Hence the fact that the laws of Quantum Mechanics are irreducibly statistical in no way supports or vindicates the Humean view of causation. These

statistical laws pose the same basic difficulty for the Humean view as do classical laws, viz how are we to distinguish contingent universal frequencies from lawlike universal frequencies; it makes no difference for this problem whether the frequencies are in the ratios of one to one, or one to many. The one-one correlations are merely a limiting case of the one-many correlations, a special case of observed frequencies.

For the present view of laws, however, the variability of the behaviour of micro-systems under the same experimental conditions does present a problem. For we have here 'explained' the interaction of particles as being the manifestation of an underlying unity, viz a subparticle system of continuous motion. If the motion at the subparticle level as a whole is universally systematic, or lawlike, as we have claimed, then wherever the plenum is in a particular state of motion, this will be manifested in the same way at the particle level. Hence, if the evolution of a microsystem of particles,  $S$ , is identical with a certain sub-particle system of motion,  $\mathcal{S}$ , and if motion at the subparticle level is lawlike, then wherever a subparticle system of motion which exactly duplicates the features of  $\mathcal{S}$  occurs, a micro-system of particles exactly duplicating the features of  $S$  should be manifested. Due to the lawlike nature of motion in a plenum (which we suggested is a consequence of the nature of a plenum), there is no scope for variation in the evolution of microsystems which initially duplicate the features of  $S$ . But Quantum Mechanics asserts precisely this sort of variation. Consider for instance the classical two hole diffraction experiment. In this experiment, particles emitted from a source go through a screen,  $A$ , which has two holes in it, separated by some distance.

They then fall on a screen, B, placed behind A, where they leave a permanent mark. The density distribution of these marks after some time shows, not the result that one would expect on classical assumptions, but the interference pattern that is characteristic of waves - a result which would be expected if the source were emitting, not particles, but waves. However, after a further time, screen B shows a result not at all predictable from classical wave mechanics, and which is not reproducible i.e. it varies from one experiment to the next. If the time of exposure is further increased, so as to allow for large numbers of impacts in most areas of screen B, the cumulative density of impacts again takes the form predicted by the wave theory. The important point of this experiment, from our present point of view, is both that it shows the wavelike behaviour of particles (though without permitting a simple reduction of particles to the local effects, or manifestations, of classical waves), and that it shows that micro-systems which initially duplicate the features of one another suffer different evolutions under the same experimental conditions.

The sole option for my theory of laws in the face of the latter Quantum Mechanical result is to deny that two microsystems which appear, to our measuring instruments, to exactly duplicate each other's quantitative features, but which subsequently, as further measurements show, differ in their evolution, really did exactly duplicate each other's features, at the sub particle level, in the first place. I have to postulate that any two such microsystems are in reality manifestations of slightly different subparticle systems of motion, or occur in slightly different contexts of such motion, where these differences are not detectable by means of our measuring instruments.

This is essentially a 'hidden variables' view of Quantum mechanics. It does not, however, postulate hidden variables as distinct causal factors influencing the microsystems <sup>in</sup> a classical causal manner. Rather, it postulates them as undetectable differences, at the subparticle level, in the original systems themselves. The hidden variables theories that have been formulated in rigorous mathematical form so far, as, for instance, by Bohm,\* have drawbacks, both conceptual and mathematical, which render them unacceptable to most physicists.\*\* However, the hidden variables approach represents, in its most basic conceptual outlook, an attempt to reconcile the results of Quantum Mechanics with the fundamental conceptual principles of Relativity Theory. The later Bohm has developed this approach, conceptually if not technically, into the theory of the holomovement, which is, in its stated intention, an attempt to reconcile the disparate ontologies prescribed by the two currently conflicting branches of physics, Relativity and Quantum Mechanics.

This conflict involves, among other things, a class<sup>h</sup> between deterministic laws and statistical laws. Relativity is basically in this respect a classical theory, as Einstein demonstrated, holding out against the indeterministic interpretation of Quantum Mechanics to the end. The conflict between these two theoretical domains, as yet unresolved, constitutes the impasse of modern physics. I therefore make no apology for the commitment of my theory of laws to a

---

\* D. Bohm. Physical Review, 85, 166 and 85, 180, (1952)

\*\* For a discussion of these theories and their drawbacks, see, for instance, Bernard d'Espagnat: Conceptual Foundations of Quantum Mechanics. Part III, Chs. 7, 8, 9.

nonconventional approach to Quantum Mechanics. A view which agrees with the Relativistic outlook at the expense of certain controversial aspects of the interpretation of Quantum Mechanics is at present, in the light of this impasse in physics, as viable as one which sacrifices certain classical aspects of Relativity Theory for the sake of one of the standard interpretations of Quantum Mechanics.

Bohm has recognised the inadequacies of his early mathematical formulations of the causal, or hidden variables, interpretation of Quantum Mechanics, but holds with its basic approach, though with a shift of emphasis to holism. This is brought out in his present conception of causation in physics. He proposes a new notion of 'formal causality', as opposed to the old notion of 'dynamical causality', which informed classical physics. The suggestion is that the form of a thing, or of a world, is the 'law' which determines the nature of its parts. 'We propose...that, in a pure quantum state, the wave function described is a form and not a dynamical sequence. In physics, the notion that the form that a thing has may be regarded as a cause has been used extensively in recent times especially in connection with ideas of symmetry (e.g. one appeals to symmetry as an explanation of the properties of particles). We are suggesting here that the quantum theory implies a much wider application of this mode of thinking than has been common thus far<sup>\*</sup>' (p. 457-58)

Bohm tries to bring Relativity and the quantum theory conceptually closer by arguing that the most fundamental aspect of the quantum theory is the 'nonseparability' it asserts of spatially distinct microsystems which have once interacted. This non-separability implies a fundamental nonlocal mode of physical

---

\* Baracca, Bohm, Hiley, Stuart: 'On Some New Notions Concerning Locality and Nonlocality in the Quantum Theory', *Il Nuovo Cimento*, Vol. 23E, N.2. August 1975.

existence within the quantum framework; the fact of such a fundamental nonlocal mode calls for a holistic interpretation of physics. A general holistic outlook provides common conceptual ground for Relativity and Quantum Mechanics - though more specific incompatibilities still abound (e.g. the instantaneous 'interaction' of two spatially separated quantum systems apparently implies the existence of a signal with velocity greater than that of light.) There has, Bohm says,\*\* 'been too little emphasis on what is, in our view, the most fundamentally different new feature (of Quantum Mechanics) of all; i.e. the intimate inter-connection of different systems that are not in spatial contact. This has been especially clearly revealed through the by now well-known experiment of Einstein, Podolsky and Rosen.' (p. 93-94).

This experiment shows that, once two quantum systems have interacted, and have spatially separated, a measurement on one, rendering certain properties of that system well-defined, will simultaneously render the corresponding properties of the other, spatially distinct system, well-defined. This 'quantum interconnectedness' cannot be causal, without violating the fundamental principle of Relativity that causal signals propagate with finite velocity. Bohm takes this fact of quantum interconnectedness as the cornerstone for his holistic interpretation of the quantum theory, and of physics in general. Later in the last-mentioned paper he writes, '...the "parts" (of a quantum many-body system) are seen to be in an immediate connection, in which their dynamical relationships depend, in an irreducible way, on the state of the whole system (and indeed

---

\*\* Bohm, Hiley, 'On the Intuitive Understanding of Nonlocality as Implied by Quantum Theory', Foundations of Physics, Vol. 5, No. 1 Mar. 75.



on that of broad<sup>er</sup> systems in which they are contained, extending ultimately and in principle to the entire universe). Thus one is led to a new notion of unbroken wholeness which denies the classical idea of analysability of the world into separately and independently existent parts.' (p. 94-95). Then, '...when the (quantum) wave function can be expressed approximately as a product of functions of co-ordinates of different "elements", then these latter will behave relatively independently. But such a relative independence of function is only a special case of general and inseparable dependence. So we have reversed the usual classical notion that the independent "elementary parts" of the world are the fundamental reality and that the various systems are merely particular contingent forms and arrangements of these parts. Rather, we say that inseparable quantum interconnectedness of the whole universe is the fundamental reality and that relatively independently behaving parts are merely particular and contingent forms within this whole.' (p. 101-102) To go on to radically new concepts, which incorporate the wholeness of form, "we have to go deeply into all our basic notions of space, time and the nature of matter, which are at present inseparably intertwined with the idea of localisability i.e. that the basic form of existence is that of entities that are located in well-defined regions of space (and time). We have instead to start from nonlocality as the basic concept, and to obtain locality as a special and limiting case, applicable when there is relative functional independence of the various 'elements' appearing in our descriptions.' (p. 105).\*

---

\* See Note 1 and Note 2

Although Bohm tries, by means of this holistic interpretation of the quantum theory, to provide common conceptual ground for Relativity and Quantum Mechanics, it should be noted that the sort of holism, or plenum, implied by Relativity is rather different from that implied by Bohm's interpretation of Quantum Mechanics, although both seem to play a role in the concept of the holomovement (and I am not sure that Bohm distinguishes them clearly before he weds them there). The first sort of plenum, implied by the Relativistic, field theoretical viewpoint, is that in which motion is transmitted continuously, and with finite velocity, from one part of the plenum to another. If we assume that the parts of a plenum are not 'distinct existences', then we can regard this continuous transmission of motion as necessary within a plenum. The second sort of plenum, implied by quantum interconnectivity, or nonseparability, and also by Bohm's analogy of the hologram, is that in which the whole order of movement in the plenum is 'carried', or 'reflected', to some degree of detail, in every part of the plenum. In this case, since a change in the state of motion in one part of a plenum is a change in the state of motion of the plenum (in the sense that a change in the state of a part of a whole is a change in the state of the whole, though not in all the parts of that whole), the new state of motion, or order, entailed by such a change in the state of one part will be instantaneously 'reflected' in every part of the plenum. In this way, such a change in one part will entail a change in all parts of the plenum, since it entails a change in the total order that is 'reflected' in every part.

I have in this chapter postponed brining out this distinction between two sorts of holism, or conceptions of plenum, because I wished to examine more closely the concepts of quantum interconnectivity and nonlocality before trying to explicate it. However, it must be noted that on either conception it has to be assumed that the parts of a plenum are not 'distinct existences' before we can allow that the transitivity of change is necessary in a plenum. That is, it must be assumed that the parts of a plenum<sup>um</sup> are not distinct existences before it can be considered as necessary either that motion is continuously transmitted in a plenum, or that the overall order of the plenum<sup>um</sup> is 'reflected' in every part of it. Without this assumption it can still be maintained that either the continuity of motion, or the reflection of the whole in the part, or both, are imposed on the plenum, and hence that the transitivity of change in a plenum is contingent i.e. it does not represent true lawlikeness.

The assumption of either of these sorts of plenum, or of both, is sufficient to ground my theory of the necessity of laws. On neither assumption, however, can indeterminism, or irreducibly statistical laws, be accepted. But while Relativistic holism fails to 'explain' the laws of Quantum Mechanics, quantum holism, as expounded by Bohm, does. In order for my theory to take the quantum laws into account, then, I have to acknowledge my commitment to a holism which at least incorporates quantum holism. The main purpose of this section has been to show that there exists a holistic interpretation of Quantum Mechanics, in which irreducibly statistical laws are not assumed. This interpretation, which I have not of course attempted to defend, but have assumed only, as an extension

of my original assumption of a plenum ontology, removes the obstacle to my theory of the necessity of laws that the quantum theory, on its standard, indeterminist interpretation, posed.

This brings me to the end of the argument whereby I have sought to affirm and explicate the necessity, in a nonrealist sense, of physical laws. There remain, however, certain loose ends still to be tied.

### Initial Conditions

It has been argued in this chapter that lawlikeness in a world is necessary, but not that the particular set of laws exhibited in the actual world is so.\* Possible world realists normally consider at least two categories of possible world: those that have the same laws as our world, but different initial conditions, and those that have different laws.\*\* If we admit that we have an explicable concept of worldhood, and, that we can state intelligibility conditions for concepts of qualitatively different worlds, so that certain of these concepts can be considered possible, then it is in accordance with the arguments of this chapter to accept that concepts of worlds of either of these categories may be possible. But we must understand the concept of initial conditions as follows. According to our view of laws, laws are immanent in the state of affairs which exhibits them; there is no ontological distinction between a set of physical conditions -

---

\*This implies that my argument has not established - and indeed it has not sought to establish - that the necessity of laws is such as to permit, in principle, a priori inference from a given cause to its effect. We discover the laws of a world a posteriori; but once we have discovered its laws, or its peculiar regularities, then, from the thesis that lawlikeness is necessary, we can infer that those laws will hold universally in that world i.e. that they truly are laws.

\*\*They may also consider worlds that have the same laws and initial conditions as our world but which, due to the irreducibly statistical nature of the microlaws, shall differ empirically from our world; they may, too, admit nonlawlike worlds.

initial or otherwise - and the laws manifested in them. Now while it is consonant with this view that different states of affairs may exhibit the same set of laws i.e. that the same set of laws be immanent in each of them, it is not consonant with it that the same state of affairs may exhibit different sets of laws. Hence, although we may allow that the same set of laws <sup>may</sup> be immanent in different sets of initial conditions, or different initial segments, of worlds, we cannot allow that worlds with the same initial <sup>9</sup>segment may exhibit different sets of laws. In other words, sets of laws are not arbitrarily imposed on a given set of physical conditions. The view that permits this proceeds from the old assumption that the basic ontology of the world is a set of discrete autonomous individuals or particles ('distinct existences'), and that a set of laws is a substantive ontological addition imposed on these individuals, in the way that (legal) laws are imposed on the discrete, autonomous members of society.

#### From a Mathematical Point of View

I anticipate an objection to my theory of laws from mathematics. My argument that chaos is not possible does not, it will be said, get to grips with the real problem, which is the definition of 'chaos', or, in the mathematical term, of randomness. How can we decide whether chaos is possible while we lack a rigorous definition of chaos? This is indeed what mathematics lacks, or rather, it lacks a consensus as to the correct definition of randomness.

In reply, I would point out that due to the reducibility of mathematics to set theory, any mathematical definition of disorder is going to be formulated in terms of relations between sets of individuals. If such a definition is then applied to a state of

affairs in the physical world, there must be a mapping from the purely abstract mathematical sets i.e. from the function, or set of functions, involved in this definition, into sets of physical individuals. Minimal individuals will suffice; the only constraint on them is that they be individual i.e. have self-identity, and that they be physical.

If we take these individuals to be a sort of minimal particle, then an observation made earlier in this chapter comes into force again, viz that particles that persist for long enough to be identified as particles have a structure, and hence represent a degree of order; any state of affairs which involves particles cannot therefore be said to constitute chaos - a degree of order, of lawlikeness, obtains. Hence it appears that only in an already (though perhaps not exhaustively), lawlike universe can the mathematical concept of randomness be physically instantiated. It follows that the question of the mathematical definition of randomness is simply irrelevant to our question, viz whether or not physical chaos is possible.

The mathematician might claim that the set of functions involved in the definition of randomness can be mapped into the set of spacetime points. The result of this would be that physical 'chaos' would be represented in the topological deformation and lack of connectedness of spacetime itself - the result of a random ordering of spacetime points.

But are spacetime points physical individuals? Mathematical spaces are sets of points. But mathematical space is not physical space, and it is open to question whether physical space can be construed as a collection of zero-dimensional points - where these are supposed to be physical entities.

In any case, the question is whether or not we need a mathematical definition of randomness before we consider whether worlds may be chaotic. I pointed out that any mathematical definition will take the form of defining a random ordering of individuals, or elements, and that a physical situation consisting of a set of individuals, however they may be ordered, already exhibits a significant degree of order, since physical individuals have structure. My mathematical opponent then suggested that the physical individuals figuring in a situation of chaos would be spacetime points, ~~and that physical chaos would be spacetime points,~~ and that physical chaos would thus consist of the topological deformation and multiple unconnectedness of spacetime. It should be noted that this suggestion implies a substantivalist view of spacetime; for the relationist theory could not construe spacetime points as physical individuals, but only as abstract constructs whereby the mind relates physical individuals. But the substantivalist view of space conceives space as a plenum. According to our earlier assumption, the parts of a plenum are not 'distinct existences', they do not have identity in their own right. Since my own views concerning chaos rest on this assumption, I shall rest my case on it here as well. On this assumption, then, physical space does not consist of a collection of physical individuals, viz points. Hence the mathematician cannot invoke points as the physical individuals which are randomly ordered in a situation of physical chaos. The individuals which he must invoke therefore will be individuals with a minimal structure e.g. material particles. Although an ordering of such individuals may be random, such a random ordering will not constitute physical chaos, in the sense of total absence of lawlikeness.

## Note 1

In Chapter 2 (p.58,9) I briefly considered a situation in which the identity of one individual is determined by, or in accordance with, the identities of the other individuals in his world; if those other individuals had different properties, he would have correspondingly different properties - not as a result of causal interaction between himself and those individuals, nor as a result of a common causal ancestry of all the individuals in that world, but rather as a result of the inter-connectedness, or interdetermination, of the identities of individuals in that world. I think the fact of quantum interconnectedness, or nonseparability, indicates that the quantum situation resembles such a situation. In measuring certain of the properties of a given quantum system, a, we cause these properties to become well-defined in that system, thereby conferring a particular qualitative identity on a; in so doing, however, we are simultaneously causing the corresponding properties of another, spatially distant quantum system, b, which has once interacted with a, to become well-defined, thereby conferring a particular complementary qualitative identity on b.

Hence the identity of b is noncausally determined by, or in accordance with, the identity of a. If we generalise, we reach a situation resembling that described above.



## Note 2

In Chapter 3, in connection with the argument against the assumption of causal interaction between *possibilia* and *actualia*, I claimed that being a spatiotemporal entity implies being localised in spacetime. In the light of the Bohmian thesis that the ordinary existential mode of spatiotemporal systems is nonlocal, I have to qualify this claim, as follows. In order to have a well-defined identity, a spatiotemporal entity must be localised in spacetime. This is consistent with our argument in Chapter 6, that identity is conceptual, as opposed to ontological, and that it is determined by the rules  $(P_1)$ ,  $(P_2)$ , which state that to have identity, an entity must occupy one and only one place at a given time. It follows from these rules that an entity can be assigned identity only insofar as it is spatiotemporally localised. (We note that Bohm seems to agree that nonlocal hidden variables do not have well-defined identity.\*)

In Chapter 3 the question at issue was whether our knowledge or awareness of *possibilia* was due to causal interaction between our minds and those *possibilia* themselves. Hence it was a question of whether an entity with a well-defined identity causes our idea, or awareness, of it - in the way that concrete entities with well-defined identities e.g. oranges, cause our percepts of oranges. Such an entity, having a well-defined identity, must, if it is considered as existing in spacetime, indeed be localised in spacetime.

Thus qualified, then, the argument of Chapter 3 is not inconsistent with the Bohmian viewpoint.

---

\*See 'Locality and Nonlocality in the Quantum Theory', *Il Nuovo Cimento*, Vol. 28B, N.2., Aug. 1975 p. 462n.

# Bibliography

Works cited in the text (with editions from which page references are taken, where relevant)

- R. M. Adams, 'Theories of Actuality', *Nous* VIII.3. Sept. '74.
- \* J. Bennet, 'Kants Analytic', Cambridge University Press, 1966.
- D. Bohm, 'Causality and Change in Modern Physics', Routledge, Kegan Paul, London, 1967
- 'The Special Theory of Relativity', Benjamin, 1965.
- 'On Some New Notions Concerning Locality and Nonlocality in the Quantum Theory', *Il Nuovo Cimento*, Vol. 28B, N.2., Aug. 75.
- 'On the Intuitive Understanding of Nonlocality as Implied by Quantum Theory' *Foundations of Physics*. Vol. 5, No. 1, Mar. '75. (co-authored with B. J. Hiley).
- 'Quantum Theory as an Indication of a New Order in Physics.' *Foundations of Quantum Mechanics*. Academic Press. 1971
- B. d'Espagnat, 'Conceptual Foundations of Quantum Mechanics. Benjamin, 1971
- R. Feys, 'Les logiques nouvelles des modalités', *Revue Neoscholastique de Philosophie*, Vol. 40 (1937), Vol. 41 (1938)
- N. Goodman, 'Fact, Fiction and Forecast', Bobbs-Merrill, 1965.
- W. D. Hart, 'Imagination, Necessity and Abstract Objects', in *Studies on Frege I, Logic and Philosophy of Mathematics* ed. Schirh. Verlag-Holzboog, 1976
- G. E. Hughes, N. J. Creswell, 'An Introduction to Modal Logic', Methuen, 1968
- D. Hume, 'A Treatise of Human Nature' ed. L.A. Selby-Bigge, Clarendon, Oxford, 1968
- J. Hintikka, 'Logic, Language, Games and Information', Clarendon, Oxford, 1973
- S. A. Kripke, 'Naming and Necessity' in *Semantics of Natural Languages*, ed. D. Davidson and G. Harman, Dordrecht 1972.
- D. Lewis 'Anselm and Actuality', *Nous* 4, 1970
- 'Counterfactuals', Blackwell, 1973.
- 'Counterpart Theory' *J.P.* Vol. LXV, No. 5, 1968
- Leibniz, 'The Leibniz-Clarke Correspondence', ed. H. G. Alexander, Manchester, 1956.
- L. Linsky, 'Reference and Modality', OUP 1971.
- J. Mackie, 'The Cement of the Universe', Clarendon, Oxford, 1974.
- 'Problems from Locke'. O.U.P. 1976
- 'Truth, Probability and Paradox', Clarendon, Oxford, 1973.
- A. Plantinga, 'The Nature of Necessity', Clarendon, Oxford, 1974.
- Plato, 'Hippias Major'
- 'Sophist'.
- W. V. Quine 'From a Logical Point of View', Harrap Torchbooks, 1963.
- L. Sklar, 'Space, Time and Spacetime', University of California Press, 1974.
- D. P. Snyder, 'Modal Logic and its Applications', Van Nostrand Reinhold, 1971.
- P. F. Strawson, 'The Bounds of Sense', Methuen, 1966.
- \* R. Allen, 'Plato's Euthyphro and the Earlier Theory of Forms', Routledge, London. 1970.