

The Metaphysics of Properties

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1. A metaphysician's apology

In the first of this series of articles Jerry Fodor set the scene for his discussion of mental representation: "It rained for weeks and we were all *so* tired of ontology, but there didn't seem to be much else to do" (1985, p. 76). Ignoring ontology in favour of the supposedly more exciting game of mental representations may be justified by the now necessary division of philosophical labour. But let us not forget that any philosophy of mind will presuppose an ontological inventory. It is often simply assumed, for example, that there are mental properties. Assume if you like, but do not pretend that there is no metaphysical work to be done explaining what these properties are and what role they play.

This article says something about the state of the art in work on the metaphysics of properties. "State of the art" suggests an accepted list of methods by which one obtains results and an accepted list of results obtained, or, failing this, an accepted list of questions which ought to be answered by some method or other. Philosophy being what it is, I can find no consensus in this area of metaphysics. This absence of fixed points has two connected sources. Although philosophy advertises itself as the reflective discipline *par excellence*, it is a familiar fact that philosophers lose themselves in projects for which they can provide no reflective description or justification. In the absence of such common reflection the lack of consensus is no surprise. But even when the focus is changed from the nitty-gritty of working out the details of a particular theory to critical reflection on the aims and methods of the theory and back again, there is no unique route which this interplay takes.

Metaphysics has survived numerous attempted assassinations. Hume's call for the burning of the books has not been heeded except by his distant descendants, the logical positivists, whose theatrical derision of metaphysics raised a few cheap laughs. Now the show is over and serious metaphysics flourishes once more. But it has not survived unscathed. There are urgent, unanswered questions about its methods of inquiry.

In this article I shall try to impose some order on some debates that are currently live within the metaphysics of properties. Along the way I point

out the issues that need clarifying and the questions that need answering. Many of these issues and questions are not specific to the metaphysics of properties, but have a more general application. So this article is as much about metaphysics, what it is and what it ought to be, as it is about properties. I have not aimed for impartiality, so some lines of research will be neglected. I make no excuse for concentrating on the work of one or two authors. In particular, Armstrong's and Lewis's work on metaphysics has had an overwhelming influence on subsequent investigations.

2. *Metaphysicians in search of a methodology*

If, as Quine claims, "science ... differs from common sense only in degree of methodological sophistication" (1969, p. 129), then metaphysics, in its current state, belongs firmly on the side of common sense. Some attempts are made at rendering metaphysics scientifically respectable by borrowing methodological considerations from the various sciences, but denuded of their scientific context, it is unclear how to marshal them. Consider Lewis's metaphysical methodology. Metaphysical theories should not contain "overabundant primitive predications", "unduly mysterious ones", or "unduly complicated ones". Nor should they have an "overly generous ontology" or disagree with "less-than-Moorean commonsensical opinions".¹ None of these methodological maxims has a definite content because as stated they are more gestures than explicit rules so that their individual and collective application is indeterminate. The aim of this section is to try to construct a prospectus for a future methodology of metaphysics, distilled from current practice.

1. *Ontology and ideology*²

A metaphysical theory has two parts: the ontology and the ideology. The ontology consists of the entities which the theory says exist ("entity" is my catch-all for any kind of thing). The ideology consists of the ideas which are expressed within the theory using predicates.³ The sorting of the entities into ontological categories is a matter of ideology; predicates, such as "... is a set", are used to say to which category an entity belongs.

¹ The words are Lewis's (1983b, p. 353).

² The distinction derives from Quine (1951).

³ In this section I use "predicates" as a general word for predicates proper, sentence operators such as "Necessarily ...", and other devices used in the expression of ideas.

2. Economy in metaphysics

Metaphysical theories can be compared with respect to the virtue of economy. The ontological economy of a theory is measured by the number of entities within its ontology. The ideological economy of a theory is measured by the number of primitive, undefined predicates within its ideology. The more ontologically economical theory is to be preferred because one should not believe in the existence of entities without good reason. The matter is different with ideological economy. Here the virtue is that which prompts the axiomatisation of mathematical theories. One aims to present a theory with the minimum number of primitive predicates possible because of the aesthetic elegance of such a theory. It would be foolish to maintain that ideologically economical theories are easier to grasp. To see this one only has to try to teach from elegant logic texts. Nevertheless, ideological economy may also be an epistemic virtue, though I do not know how to improve on the following remarks. The more ideological economical a theory is, the more unity the theory has. If a theory has few primitive predicates then they will be employed time and time again for different purposes. And theoretical unity seems to contribute to understanding.

3. The aims of metaphysics and how they compete

A metaphysical theory has two broad aims. First aim: to describe what entities there are and the kinds of entity there are. For example, are there properties, events, processes, possible worlds etc.? Second aim: to provide fruitful conceptual analyses. For example, can we analyse contexts of the form “it is a scientific law that p ”, “ c causes e ”, “necessarily p ” etc.?

Conceptual analyses improve ideological economy by defining some predicates in terms of others. Since an analysis may introduce talk of entities, ideological economy can be purchased at the expense of ontological economy. For example, one could do without a primitive relational predicate “ x is an ancestor of y ” by defining it, in Frege’s way, using the parenthood relation and talk of sets. Another example: one can do without a primitive modal operator “necessarily p ” by defining it using talk of possible worlds. Of course, the trade-off can work in reverse: it is possible to improve ontological economy by beefing up the ideology. Perhaps we can do without possible worlds, if we are allowed enough primitive modal operators. Perhaps we can do without meanings, if we are allowed primitive predicates such as “ x is meaningful” and “ x means the same as y ”.

4. Do these trade-offs makes sense?

Ontological economy and ideological economy are justified in different ways, but they can be traded off against one another. How can this trade-off itself be justified? Suppose I decide to improve the ideological econ-

omy of a theory by introducing talk of more entities and thereby beefing up its ontology. An improvement in ideological economy is justified by aesthetic elegance and perhaps by its contribution to understanding. But in making my theory more elegant and by contributing to understanding, I have created a theory which says more entities exist. But how can I thereby have reason to believe these entities exist? Aesthetic elegance of a theory and the way in which a theory contributes to understanding seem to be one thing, reason to believe in the existence of entities another. The same problem arises in the reverse direction. If I improve ontological economy at the expense of ideological economy, say, by having more primitive predicates, I have made my theory more ugly and less unified. But how can these manoeuvres constitute a reason for thinking that the entities I have avoided positing do not exist? What is needed is some way of connecting the justifications of ideological and ontological economy so that the trade-offs deal in a common currency. For now the connection between aesthetic elegance and understanding, on the one hand, and what exists, on the other, is forged only by Panglossian wishful thinking.

5. Reflective equilibrium

What constrains the development of a metaphysical theory? One constraint is the provision of fruitful conceptual analyses of concepts we employ in our ordinary thought and discourse. Conceptual analyses may entail a certain ontology and hence are one way to satisfy the aim of describing what entities there are. We may want to say something about the entities introduced by a conceptual analysis and this will be further conceptual and ontological work. For example, we may want to define modal operators in terms of possible worlds and then define the predicate "... is a possible world".

Here, as in all philosophical inquiry, we must adopt the method of reflective equilibrium, balancing the demands of theory against the preservation of commonsensical beliefs. These beliefs are not sacrosanct. We may override them if the theoretical benefits of ontological and ideological economy are sufficiently great. For example, some of our common-sense beliefs about modal matters may be rejected for the sake of defining the predicate "... is a possible world". Lewis (1986c, §1.6) does just this. He offers the definition "... is a maximal mereological sum of spatiotemporally related individuals". But, given the prior definition of modal operators in terms of possible worlds, his definition leads to the rejection of the commonsensical beliefs that there might be nothing and that there might be two disconnected space-times.

The preservation of common-sense beliefs is the preservation of two things at once: the truth and the content of those beliefs. So rejection may take two forms: preserve the truth but change the content, or keep the orig-

inal content and declare it false (the third option of changing the content and declaring it false is overkill). On one interpretation of Berkeley (Kripke, 1982, p.64), he takes the former course by arguing that his metaphysics does not contradict the common-sense belief in the existence of external material objects. But he preserves the truth of this belief only by changing its content, having the common man mean by “external material object” “an idea produced in me independently of my will”.

We have seen how conceptual analyses can lead to ontological claims and how such analyses are constrained by commonsensical beliefs. Some think that there is an additional method by which a metaphysical theory settles on an ontology. We must give an *account* of the facts that the common man believes to obtain, that things persist through time and change, that things resemble one another etc., and in doing so we will describe an ontology. “Account” is vague and so are the expressions which are used in place of it: we need an *explanation* of these facts, we need an *analysis* of these facts, we need to know what it is *in virtue of* which these facts obtain. Later on I shall explore whether good sense can be given to these expressions, which makes the demand something other than the demand for conceptual analyses. If there is another job to be done, then it may be that some facts which are commonly believed to obtain will be rejected for the sake of theoretical benefits.

What emerges from this discussion is that one cannot hope to defend a metaphysical theory by constructing knock-down arguments against each of its competitors. There are numerous ways to trade off ideological and ontological economy and to balance these theoretical benefits against the preservation of common-sense belief. It is futile to hope that one such theory will be uniquely coherent. One can only hope to draw up a cost and benefit scoresheet, it being a very real possibility that there will be ties for first place.

3. Making sense of Ockham’s razor

In this section I want to consider the Ockhamite prohibition against an overly generous ontology or, as it is usually put, “do not multiply entities beyond necessity”. One’s first response to this dictum is to say that there is what there is and there isn’t what there isn’t. It is not up to us what there is or isn’t, so if it turns out that there are more things than we would have liked, then that is not through any profligate fault of ours but rather a brute fact about the world. This response misses the point of the dictum. Agreed, we do not create what there is. We try to discover what there is using Ockham’s razor as a principle of discovery.

But what exactly does the principle prescribe? It seems to boil down to the rather banal exhortation not to believe in the existence of anything

unless one has a reason to so believe. Can we do any better? For the purposes of this discussion, I assume that the goal of providing conceptual analyses is properly called an explanatory goal: a conceptual analysis explains some fact by defining expressions which occur in the sentence stating the fact. I also assume that the more nebulous aim of providing an *account* of common-sense facts is also an explanatory goal. These assumptions simplify the discussion to follow.

Let us suppose we are given an explanatory goal for a metaphysical theory. The razor has two sorts of application to theories which have this goal. It can be applied to a single theory or it can be used to compare two or more theories, each theory having its own distinctive ontology.

First, the application to a single theory. The theory says certain things exist. Should we accept it? Ockham's razor encourages us to question whether the explanatory goal of the theory is worth pursuing. Perhaps the goal is illusory because there is no fact to be explained or perhaps there is such a fact, but it is not susceptible of explanation. And even if there is a fact to be explained, the explanation offered by the theory might be bogus. So we have three ways to argue that the ontology of the given theory need not be accepted, three ways for there to be no reason to believe in the existence of some entities. Many have converted this agnosticism into atheism, converting do not believe p into believe not- p , with no explicit justification, but I suppose that here an absence of reasons for the belief that p is itself a reason for the belief that not- p . I do not know how I am supposed to react to the suggestion that there are entities but no reason to believe in them.

Second, the comparison of theories. We suppose that there are two or more theories each having the same explanatory goal. As before, the razor encourages us to ask whether the goal is illusory and to question the explanatory credentials of each theory. But, in addition, the razor can now be used to select a winner from theories each of which meets a genuine explanatory goal in a genuinely explanatory way. It says: choose that theory which has the smallest ontology. For there seems to be a clear sense in which the other theories unnecessarily posit entities: there is another theory which does the job without them. Furthermore, Ockham's razor is now being employed in a positive way, enjoining the acceptance of a theory and the rejection of its competitors. So we cannot rest with mere agnosticism about the ontology of the competitors.

All of this is extremely abstract and so not very helpful for practical metaphysics. One problem which will loom large in what follows is how to spell out the notion of explanation as it applies in metaphysics. Earlier, I complained about the emptiness of the idea of a reason for belief in the existence of some entity. But replacing this idea with talk of explanation hardly seems illuminating.

Moreover, there is a measurement problem. How do we decide which of some group of theories has the least ontology? In answering this question, some have distinguished between quantitative and qualitative ontological economy (for example, Bacon 1995, p. 87 and Lewis 1973, p. 87). On the cost and benefit scoresheet, we are not to mark down the theory simply because it says there are more entities, other things being equal. Rather, what matters is the number of kinds of entity, not the total number of entities. But this distinction seems misconceived. First, given a suitably flexible concept of kind, we can reduce the ontological cost in kinds by subsuming the total number of entities under fewer kinds. Second, even given a robust concept of kind, we can have all the entities we could ever want by choosing suitable kinds. For example, Lewis's (1986c) multi-purpose ontology seems to have only two kinds: sets and possibilia (actual and possible particulars). Third, the putative distinction between qualitative and quantitative economy does not preserve the spirit of Ockham's razor. To believe in the existence of something we ought to have a reason. Sometimes a reason to believe that a kind of entity exists brings in its wake a reason to believe in many entities of that kind. For example, it would be odd to think that there are only a couple of sets or three possible particulars. But these are rather special cases. Where we have a kind of the more ordinary type, where it is possible to think of there being just one entity of that kind, then the number of entities falling under a kind really does matter to the comparison of metaphysical theories on grounds of ontological economy.

Unfortunately, there is a grave problem with measuring ontological economy by the number of entities which a theory says exist. Once we have infinite numbers of entities we are in trouble. For adding one more entity to a denumerable infinity of entities does not increase the cardinality of the number of entities. It is possible to say that a theory with a denumerable infinity of entities is more ontologically economical than a theory with that infinity of entities plus one more, in the sense that the set of entities posited by the first is a proper subset of the set of entities posited by the second. But this is a special case, there being no guarantee that the theories have ontologies which stand in such a relation. The problem raised here is real, for very many metaphysical theories employ, as part of their constructional apparatus, the iterative hierarchy of ZF set theory and so posit an enormous number of entities. Indeed, there is a problem with even asking how many sets there are. At least when we are counting kinds, the number of kinds is likely to be finite. But counting kinds does not seem to accord with the spirit of Ockham's razor. So the conclusion must be that the idea of ontological economy needs urgent attention. For the rest of the paper I assume that future work will vindicate it.

4. Naturalistic ideology

The triviality of Ockham's razor can be replaced by something more substantial by circumscribing the reasons to believe in the existence of an entity. Perhaps one might give the principle some content by advising belief in only those entities which are causally efficacious. Such is Armstrong's naturalism. What supports such a thesis? Armstrong's appeal to the Eleatic stranger looks distinctly circular: "But if they are powerless in the space-time world, then whether they exist or whether they do not will make no difference to what happens in the space-time world. Are they not then useless postulations?" (1988, p. 104). We were looking for a reason to deny that causally inert entities exist. Being told that such entities have no causes or effects is hardly what we wanted. Armstrong says of causally inert objects that "we have no good reason to postulate such entities" (1989a, p. 7). "Having no good reason" bears a metaphysical and an epistemic reading. Metaphysical: causally inert entities do no explanatory work, they "in no way explain anything that happens in the natural world" (Armstrong 1989a, p. 8). On this reading we are given the content of a reason to deny the existence of an entity (that it does no explanatory work). Epistemic: we can have no evidence for the existence of causally inert entities. On this reading a causal constraint is placed on the genesis of reasons, very roughly, in order for someone to have a reason to believe in the existence of an entity, the entity must be causally connected to the believer.

The metaphysical version of naturalism is nothing more than a prejudice about what counts as philosophical employment. Why should every entity within the natural world do some causal explanatory work? If the reply is that that is what one *means* by "an entity that belongs to the natural world", then why is there only the natural world? Unless the prejudice is supported by epistemological argument, there is no reason to think that every object must be involved in some causal explanation. The epistemic version of naturalism is thus more important. But this version must rely on a lingering faith in a global causal epistemology. I have yet to see a convincing causal epistemology which works in even a limited sphere, let alone one which pretends to be universal in its application.

So I am not convinced by either form of naturalism. In fact Armstrong should not be either. Against the epistemic version: he cannot subscribe to a global causal epistemology for two reasons. First, I take it that nothing can counterfactually depend on the existence of a necessarily existent object and so, given the plausible thesis that causation requires counterfactual dependence, there can be no causal link between a necessary existent and

a believer.⁴ Armstrong (1991) seems to believe in necessary existents such as the null set. Second, Armstrong (1978a, p. xv) admits that his theory of universals is based on a priori reasoning. If he aspires to imparting knowledge, then it is not knowledge based on any causal interaction.

Against the metaphysical version: Armstrong does not think that the only type of explanation is causal explanation. He now prefers to think of his argument for the existence of his universals as an inference to the best explanation of “the facts of resemblance, talk of sameness of sort and kind, the application of one predicate to an indefinite and unforeseen multitude of individuals, etc.” (1989a, p. 39, fn. 1). It is clear that Armstrong is not seeking causal explanations of these various circumstances. Metaphysical explanation, whatever it is, is *not* causal explanation, but the involvement of universals in the best metaphysical explanation is supposed to yield a reason to believe in their existence.

5. Ontological categories

Metaphysicians aim to construct a list of extremely general categories of entity which is complete in the sense that every entity that exists or could exist falls under one of the categories. Some examples of categories: particulars, properties, relations, numbers, events, processes, states of affairs, propositions, abstract entities, concrete entities, physical entities, mental entities. It may be that an entity falls under more than one category. For example, the natural number 1 is both a number and is abstract.

Categories can cross-classify. For example, some particulars are abstract, others concrete, and some particulars and all propositions are abstract.

Metaphysicians often work according to the building block method which imposes some structure on the categories. A small number of basic mutually disjoint categories are posited together with a small number of constructional tools, such as mereology⁵ and set theory, which generate new entities from entities falling under the basic categories. For example, one might think of a process as a suitable temporal sequence of events, and, in turn, an event as a suitable set of actual and possible space-time regions.

Let us call the entities constructed by the building block method “constructions” and the entities from which they are constructed “constituents”. We should not think that constructions are in any sense fictional.

⁴ On this point, see Lewis (1986c, p. 111).

⁵ A formal theory of one kind of part-whole relation introduced to English speakers under the description “The Calculus of Individuals” by Leonard and Goodman (1940).

Mereological sums and sets exist in just the same sense (there's only one) as their parts and members, respectively. Sometimes "analysis" is used to name the decomposition of a construction into its constituents. Let us call this "ontological analysis" to distinguish it from "conceptual analysis".

Why engage in ontological analysis? The building block method seems to serve the project of reducing the number of categories of entity. Suppose we begin with actual and possible particulars and mereological sums of them in one category (possibilia, for short) and sets in another. Then we could follow Lewis (1986c, p. 53, pp. 69–71) and give an ontological analysis of a possible world as a certain kind of sum of possibilia and an ontological analysis of a proposition as a set of possible worlds. We have shown the possible worlds to be among the possibilia and the propositions to be among the sets. But have we thereby reduced the number of categories or have we rather shown the categories of possible world and proposition to be species of the categories of possibilia and set, respectively?

We might instead focus on the number of entities, rather than the number of categories of entity. For example, if we have some reason to believe in possibilia and sets, then to show that possible worlds are among the possibilia and that propositions are among the sets is to show that we do not need to posit *sui generis* possible worlds and propositions in addition to the entities we have already posited. So ontological analysis is a real gain in ontological economy.

How are ontological and conceptual analysis related? An entity is assigned to an ontological category using a predicate: "x is a possible world", "x is a proposition" etc. Ontological analysis obviously serves the goal of conceptual analysis because the decomposition of a construction into its constituents will enable one to define the predicate that characterises the category to which the construction belongs. For example, the ontological analysis of a proposition as a set of possible worlds will yield the definition of "x is a proposition" as "x is a set of possible worlds". Perhaps then it is best to reconceive the reduction in the number of ontological categories consequent upon ontological analysis as really a reduction in the number of primitive predicates. This supports my earlier contention that the reduction of the number of ontological categories is not a matter of ontological economy.

Given an ontological category, there are four general questions to ask:

- (1) What distinguishes the category from others?
- (2) Are there any entities in the category?
- (3) Which entities are in the category?
- (4) What are entities in the category like?

The first and last questions are not always distinct. Suppose, for example, that we are attempting to characterise the category of abstract entities by

defining the predicate “*x* is an abstract entity”. Then there will no distinct answer to the last question. For in marking out the category of the abstract we will mention broad metaphysical properties such as causal inefficacy, no location in space-time and necessary existence, which are used in answering this last question about what abstract entities are like. But for some categories the first and last questions can be usefully distinguished. Indeed, in the metaphysics of properties this distinction is especially fruitful.

6. Ontological categories and roles

Some ontological categories can be associated with offices which entities hold, or roles which they play.⁶ Very often, the role can be characterised as explaining a purported fact or solving a problem. For example, we might describe the category of property as containing those entities which play the role of solving the problem of universals (on which more later). The roles which properties play will vary. For example, they may be needed for conceptual analyses and ontological analyses or they may be needed to account for common-sense facts.

Offices or roles can have different holders or players. Call the role-players “candidates” for the role and the groups of entities to which they belong “systems of candidates”. Assuming that the various systems of candidates all play the role equally well, the differences between them must be described in other terms. Hence my fourth question—what are entities in the category like?—has its distinctive content.

This way of conceiving of the debate about properties brings more important questions into the open:

- (5) Is there only one property role or are there several?
- (6) Which property roles are worth playing?
- (7) If there are several worthwhile property roles, can one system of candidates play each role?
- (8) Do the various systems of candidates for the roles play the roles equally well?
- (9) Are there features of the various candidate systems which can decide between them when each system plays a role equally well?

In particular, two distinctive areas of metaphysical inquiry are separated. On the one hand, there is the specification of the role or roles associated with the category of property (or categories, if need be). On the other hand, there is the description of the nature of the candidate system or systems which play the role or roles. This separation reminds us to be wary

⁶ This idea exists in embryonic form in Lewis (1986c, §1.5).

of loose talk of properties, where it is unclear whether this is specific talk about a particular candidate system, say Armstrongian universals, or whether it is general talk about the candidate system, whatever it is, that plays a certain role or roles. This terminological warning has a serious consequence. For the general way of reading talk about properties may not be proper, there being no unique system of candidates that plays the role or roles specified. Thus the metaphysics of properties cannot rest content with a characterisation of properties as the system of things which plays a certain role or roles, since it is not certain from the start that just one candidate system plays the role or roles.

Why is this important? Given the framework outlined above, one route to the knowledge of the existence of properties is this. We associate some role with the category of properties and argue that it must be played. We then argue from the existence of a property role worth playing to the existence of the candidate system that plays the role. But this route does not decide between equally serviceable candidate systems. So, in the case of such ties, if we want to claim that a certain system exists, then we must do more than argue that the given system plays a necessary role. We must proceed to dismiss the other candidate systems on grounds other than their ability to play the role since, *ex hypothesi*, all the candidate systems play the role equally well.

So I agree with Urmson (1986, p. 245) that the metaphysics of properties does not begin with a description of what properties are like followed by a description of the reasons to believe in them. But this does not entail that saying what properties are like goes hand in hand with describing the reasons to believe in them, because one cannot assume that the reasons to believe in properties, the roles which they play, will fix on a unique system of candidates. Describing the role or roles of properties may come first in the order of metaphysical inquiry, but that description need not determine the nature of the system of candidates which plays the role.

7. *Losing metaphysical nerve*

At this point it is possible to lose one's metaphysical nerve. Having noticed that a theory of tropes can be made to mimic his theory of universals,⁷ Armstrong has recently flirted with a kind of metaphysical modesty advocated by H.H. Price in a different context, according to which the two theories are "two systematically different ways of saying the same thing" (Price 1953, p. 30). Call two candidate systems "equivalent" with respect

⁷ As we shall see in §12, it is sets of duplicate tropes, not tropes, which mirror universals.

to a role or roles iff they play the role or roles equally well. Then this view holds that the apparent difference between the equivalent systems is merely apparent. I find it hard to make sense of this view. It may be that the equivalent systems cannot be distinguished with respect to their ability to play a certain role, but if we can say something about the different natures of the elements of the equivalent systems, then this difference is hard to explain away.

It may be admitted that there are differences all right between the equivalent systems, but that metaphysical inquiry cannot decide between the systems because there are no grounds for such a decision. One might even make a virtue out of this impossibility by claiming that it is not the job of metaphysics to decide between such systems. No, the job for metaphysics is *delineating the roles which some system of entities must play, whatever its members are like*. This last position is not easy to reconcile with the idea that positing the existence of a candidate system is warranted only on the basis of its playing some necessary role. For now we are left with no metaphysical argument to decide between the existence of equivalent systems which each play the role. This would not matter if there were other grounds for asserting the existence or non-existence of the systems, but in this case that is precisely what is being denied.

I mention these last two positions not because I am certain that they are right or wrong but because I find it hard to say how to adjudicate between equivalent systems. For example, it is a common complaint that aristotelian universals have the mysterious property of being wholly present wherever and whenever they are instantiated, and so can be wholly present in more than one place at the same time.⁸ The standard reply is that this intuition of mystery is tailor-made for more ordinary particulars such as tables and chairs, but universals were never supposed to be like those sorts of entities. Indeed, an argument from queerness has never been a very convincing philosophical strategy because its supposed universal truth can often be diagnosed as a symptom of a narrow focus. Another example: Lewis (1986a & 1986b) complains that Armstrong's theory of universals commits him to a special kind of universal, a structural universal, and to states of affairs, both of which are objectionable because they fail to obey an analytic truth about composition, that no two entities have the same parts. Some examples: the structural universals methane and butane are each made up of the same universals, carbon and hydrogen; the distinct states of affairs, Tom likes Dick and Dick likes John, each have the same parts, the particulars, Tom and Dick, and the universal likes. But I find Lewis's declared analytic truth about composition to be far from obvious, and on a par with the supposed truth that no entity can be wholly present

⁸ The location of aristotelian universals is discussed in §11 below.

at two places at the same time. The right response for Armstrong is to claim that Lewis's truth about composition is merely a truth about just one form of composition, the mereological kind. Just as a narrow focus can make one question multiply located universals, so it can lead to worries about two entities being made up of the same parts.

These two inconclusive debates have essentially the same form. Both induce some scepticism about the way in which the costs and benefits scoresheet should be drawn up when adjudicating between systems of entities in terms of what they are like. But this is exactly what must be done if a tie between equally serviceable candidate systems is to be resolved. I do not say that it cannot be done nor do I say that we must have an explicit and foolproof algorithm for it to be done. I just say that we do not yet have any accepted principles or even rules of thumb by which it can be done.

To round off this section, I will say something about the second and third of my original four questions:

- (2) Are there any entities in the category?
- (3) Which entities are in the category?

If there is a property role worth playing then there are entities which qualify as properties. Just which entities so qualify will depend on which property role is being played, as will the method of finding this out. For example, suppose the property role⁹ is being a semantic value for an abstract singular term, such as "Humility" in "Humility is a virtue", or a value of a variable occurring in a property-quantifier, such as that which features in "Acquired characteristics are never inherited". This role fails to specify how such values are to be individuated. Suppose they are finely individuated, so that semantic values correspond to meanings of abstract singular terms ("triangularity" does not mean the same as "trilaterality"). Then the method of determining which properties, so conceived, there are will be relatively a priori. Examine our language; type abstract singular terms according to their meanings; posit one property for each meaning.

8. Roles for properties

Is there a common thread to property roles which makes them all *property* roles, even if the details of the roles differ? It is common enough to speak of the qualities, characteristics, properties or attributes which entities have. It is the basic fact that properties can be had which makes them properties. That is not to say that what has properties is not itself a prop-

⁹ A property role advocated by Lewis (1983b, pp. 348–51).

erty, since properties can have properties. But it is true that there are some entities which have properties, but which are not properties. Let us call these entities “particulars”. Thus I endorse the old idea that properties have a dual function: as that which is predicated of a particular and as the subject of further predications. The linguistic mark of this ontological distinction is the use of abstract singular terms in two types of sentence illustrated by “N.N. has humility” and “Humility is a virtue”. Of course, we can turn the first sentence around to form “Humility is a characteristic of N.N.”, but this transformation merely reinforces the fact that properties are *of* particulars, are *had* by particulars, and not vice versa. So I take it that a role for a type of entity cannot be properly called a “property role”, unless the entities which fill the role are understood to be the sorts of things which can be had by particulars.¹⁰

Even though all property roles share this common feature, there are many differences between them. I endorse the perspective advocated by Lewis in the following passage:

It's not as if we have fixed once and for all, in some perfectly definite and unequivocal way, on the things we call “the properties” ... Rather, we have the word “property”, introduced by way of a varied repertory of ordinary and philosophical uses. The word has thereby become associated with a role in our commonsensical thought and in a variety of philosophical theories ... But it is wrong to speak of *the* role associated with the word “property”, as if it were fully and uncontroversially settled. The conception is in considerable disarray. It comes in many versions, differing in a number of ways. (1986c, p. 55)

Each property role requires its own paper for full discussion. So here I can only attempt a taxonomy of these various roles, concentrating on those which are of contemporary interest.

1. Solving the problem of universals

In Armstrong's words, “The problem of universals is the problem of how numerically different particulars can nevertheless be identical in nature, all be of the same ‘type’” (1978a, p. 41). Properties are introduced to solve this problem: they are the types which different particulars have in common. Armstrong thinks that he can fix on particular candidates, which he calls “universals”, which play this property role in the best way. But before we can evaluate Armstrong's argument we have to determine the precise nature of this role. Unfortunately, though it is often invoked in discussions of properties, the role has never been well-described. §17–25 below

¹⁰ Philosophers like to use the fancy word “instantiate” and its cognates. So they say that particulars instantiate properties, instead of saying that particulars have properties.

attempt to work out what this role is. Armstrong uses the word “how” in the statement of the problem of universals given above. The crucial issue is what sort of question is being asked. Does Armstrong have in mind some distinctive kind of metaphysical explanation? If so, what can that explanation be?

2. *Semantic theory*

The word “property” is often used to stand for the meanings of certain types of expression of a natural or formal language. There are two dimensions of variation. First, the types of expression which have properties as their meanings may vary, the chief candidates being predicates, such as “... is wise”, and abstract singular terms, such as “wisdom”. Second, different semantic theories resolve the ambiguity and vagueness of the intuitive notion of meaning in various ways, often by describing different kinds of meanings. It would be absurd to try to tease out a single determinate role for properties in semantics. The most that can be said is that properties are the meanings, in some sense or other, of predicates and/or abstract singular terms. For the most part, semantic theorists resist dubbing a meaning a property unless its identity conditions are intensional. For example, within the tradition of Californian semantics,¹¹ the intension of a predicate, a function mapping possible worlds to the sets (extensions) of entities to which the predicate applies in those worlds, is dubbed a “property”. Some semantic theories will leave the nature of properties undecided: all that is said is that there is some system of entities, the properties, which play such and such semantic role. Other theories will make a specific proposal about the nature of these entities. So the Californians take properties to be set-theoretic entities, namely, functions from worlds to extensions.¹²

¹¹ The label is Putnam’s (1975, pp. 262–3). Carnap (1958, §4), and Montague (1974, p. 152), are good Californians.

¹² Three more examples of properties in semantic theory. In Frege’s two-level semantic theory of sense and reference, properties (or concepts, as he calls them) are the referents of predicates. Properties, so construed, are peculiar in two ways (Frege 1980). First, they cannot be the referents of abstract singular terms because Frege takes the syntactical distinction between singular terms and predicates to mark an ontological distinction between objects and properties. Second, properties have extensional identity conditions: properties with the same extensions are identical. The second feature leads to confusion. So, for example, Quine (1960, p. 151) has Frege identifying the sense, rather than the reference, of a predicate with a property, presumably because Quine thinks that properties must be individuated intensionally. Russell, in contrast, works with a one-level referential theory of meaning in which adjectives, prepositions and verbs all refer to platonic universals (Russell, 1912, Ch. 9). My third example is more up to date. The situation semantics developed by Barwise and Perry (1983) is grounded in a conception of the world as made up of situations, complex entities consisting of particulars instantiating properties and relations at spatio-temporal locations, the properties and relations being the worldly correlates of predicates.

3. Causation and law

Properties figure in the theory of causation in several ways, all of which seek to make some sense of the ordinary idea that a cause has its effects in virtue of its properties. Often it is said that properties are involved in/participate in/are constituents of causal relata, the entities which sentences expressing singular causation relate. In fact such sentences have many different forms but some theorists attempt to found the variety on one basic form. For example, one might take the basic form to be “*e* because *c*”, where “*e*” and “*c*” are place-holders for sentences. Then it is argued that causal relata are the ontological correlates of such sentences, these correlates being called “situations”, “events”, “states of affairs”, “facts” and “facta” (let’s stick with the first name). These situations are structured entities having various other sorts of entity as constituents, but in all cases they have properties as constituents. So now we can make sense of the claim that a cause has its effects in virtue of its properties by arguing that in any case of singular causation the causal relata are situations having properties as constituents.¹³

This is the abstract structure of the various theories of causal relata as situations. The common feature of such accounts is that they posit ontological correlates of predicates, properties, which are the constituents of situations. Just how many properties there are varies from theory to theory, since the relationship between predicates and properties need not be a simple one-one correspondence. But I take it that properties which do not bestow causal powers on their instances are ruled out by this conception of properties.

Most analyses of the concept of singular causation employ the notion of a scientific law. “Law” is used in two ways, either to refer to a sentence or proposition, or to a worldly correlate of a sentence or proposition. Those who make the distinction between the law-sentences (or propositions) and the laws which are their worldly correlates must say something about the worldly correlates. One line of theory, formulated in slightly different ways by Armstrong (1983), Dretske (1977) and Tooley (1977), construes these laws as consisting of properties being related by a special relation. For example, Armstrong takes the simple law that all *F*s are *G*s to be the state of affairs consisting of *F* and *G*, first-order properties instantiated by particulars, instantiating the second-order relation of nomic necessitation. The name “nomic necessitation” is not meant to entail that the law itself is necessary. No, the properties *F* and *G* might not have stood in such a relation, in which case there would have been no such law. Nevertheless, given that the state of affairs identified with

¹³ See, for example, Kim (1976) who talks of events; Menzies (1989) who talks of situations; and Mellor (1995, chs. 9–13), who uses the novel “facta”.

the law exists, it is necessary that the regularity, all *F*s are *G*s, exists. There is no converse entailment, for there are regularities which are merely accidental.

Such a theory of laws posits some system of candidates to play a property role, namely, as the constituents of laws. According to this conception of properties, there are only as many properties as are needed to be constituents of laws. So which laws there are will determine which properties there are. For example, there may only be the laws of physics, or there may be laws for each domain of scientific inquiry.¹⁴

4. *Lewis's uses for natural properties*

Lewis (1983b) argues that there is some system of candidates, the natural properties, talk of which enables us to frame conceptual analyses of numerous concepts of philosophical interest. The central idea is that sharing natural properties makes for similarity in intrinsic respects. Naturalness comes in degrees, with perfectly natural properties being the limiting case. Equally, similarity comes in degrees, the limiting case of similarity being duplication. Two things are duplicates iff they share all their perfectly natural properties. The idea of natural properties is explored in §14 below.

5. *Metaphysics of modality*

Modal metaphysicians find that they often need to talk of possible worlds other than the actual world in giving conceptual analyses. Thus something needs to be said about the nature of these possible worlds. Of course, one might take possible worlds to be *sui generis* entities, but many have tried to say something about possible worlds by identifying them with supposedly well-understood entities. A common strategy is to employ properties in these identifications. One can either identify possible worlds with a certain kind of property or one can identify possible worlds with some sort of construction from properties along with other types of entity. A couple of examples: Forrest (1986) has suggested that possible worlds are certain sorts of properties; a linguistic ersatzist who takes possible worlds to be maximal consistent sets of sentences, may find it useful to construct such sentences, in a broad sense, from properties.¹⁵ These projects differ enormously in their detail, but they share two

¹⁴ See also Mellor (1995, chs. 15–6), in which he argues against the Armstrong-Dretske-Tooley theory of laws, but retains the idea that laws have properties as their constituents.

¹⁵ The label “linguistic ersatzism” is Lewis’s (1986c, §3.2). There he suggests construing Skyrms’s (1981) idea that possible worlds are collections of compossible facts, represented by ordered *n*-tuples of particulars and properties (or relations), as a form of linguistic ersatzism.

important features. First, in order for the identification of possible worlds with properties, or constructions out of properties, to work, it had better not be that properties are themselves entities which are somehow constructed from possible worlds. Second, there must be enough properties to go round, in particular, there will have to be uninstantiated properties. Forrest identifies all but one world with uninstantiated properties, the concrete world in which we live being the instance of the exception. The linguistic ersatz will need uninstantiated properties if the full range of possibilities is to be captured.¹⁶

6. *Metaphysics of mathematics*

The ontology of mathematics is ripe for reduction once one has sufficient properties at one's disposal. The options here are essentially the same as with the reduction of possible worlds. One can either identify mathematical entities with properties or with constructions which have properties as constituents. So, for example, attempts have been made to identify sets with properties of or relations between their members and with states of affairs, containing properties of their members as constituents.¹⁷ Obviously any such project will have to posit an enormous number of properties, one for each set. Attempts to identify other sorts of mathematical entities, such as the natural numbers, with properties have also been made. For example, Maddy (1990, Ch. 3, §2) takes a natural number to be a property of *sui generis* sets, namely, the property of having a certain number of members.

Such projects assume that there are mathematical entities such as sets and natural numbers. Recently, there has been a revival of interest in a form of mathematical structuralism which holds that mathematical theories such as arithmetic do not have some special system of entities, "the" natural numbers, as their special subject matter, but rather talk about a mathematical structure such as the natural number structure.¹⁸ Such structures, it is said, are realised or could be realised by numerous different systems of entities. Unfortunately, those who have proposed this form of structuralism have

¹⁶ A point made by Lewis (1986c, pp. 158–65).

¹⁷ Bealer (1982, pp. 111–9) and Jubien (1989a & 1989b) use properties, Bigelow (1988, pp. 105–9, & 1990) uses relations. Bealer and Jubien think they are doing without sets in favour of properties. But is there any real difference between replacing sets with properties and identifying sets with properties? Armstrong (1989a & 1991) uses states of affairs, on which more in §11 below. I criticise Armstrong and Bigelow in Oliver (1992).

¹⁸ See, for example, Resnik (1981, 1982 & 1988) and Shapiro (1983 & 1989). This form of structuralism must be distinguished from another, according to which mathematical theories neither talk of a unique system of entities nor of a structure which many systems realise or could realise, but rather talk generally about any system of entities which satisfies the axioms of the theory. Lewis (1991, §2.6) canvasses a structuralism of this latter sort for set theory.

said very little about the nature of such structures.¹⁹ This is an avenue which is ripe for exploration by those who look to employ properties and relations in identifications and constructions. For structures appear to be relations which entities in a given system instantiate, the multiple realisation of a structure corresponding to the multiple instantiation of a relation.

9. *Candidates for properties*

The fundamental difference between particulars and properties shared by all the accounts of the nature of particulars and properties to follow is determined by the asymmetry of instantiation. Particulars have or instantiate properties, but not vice versa. Properties may themselves have or instantiate properties, but do not have or instantiate particulars. Thus we have a hierarchy of particulars, properties of particulars, properties of properties of particulars and so on, anchored at the bottom with the particulars which instantiate but are not themselves instantiated. To begin with we may take as examples of particulars entities such as tables and chairs, the moon, Socrates and subatomic particles, and, as examples of properties of particulars, having a certain mass, being wise, and being spherical. So far I have neglected relations such as being a certain spatial distance from, being taller than and being heavier than. In what follows, I shall work with properties for ease of presentation, but when it is important to distinguish properties and relations I shall do so. Moreover, I shall concentrate on the properties of particulars, first-order properties, rather than higher-order properties such as properties of first-order properties.

It is convenient to begin with four adequacy conditions of an account of properties which are shared by those who propose candidates for properties. First, some account must be given of the example sentence: “particular *a* instantiates the property *F*”. It is assumed that such an account will have “particular *a*” and “the property *F*” as names. Hence something must be said about the metaphysical nature of their referents. It is also assumed that the account will say something about the relational predicate “... instantiates ...”, but what must be said is so far left undecided.

The second and third conditions are that the account must preserve the following truths: (a) different particulars can have the very same property; (b) a particular can have many properties. These truths are extracted from simple inferences. Examples: particular *a* has property *F* and particular *b*

¹⁹ Shapiro does make this tantalising remark: “the problem of the relationship between mathematics and reality is a special case of the problem of the instantiation of universals. Mathematics is to reality as universal is to instantiated particular” (1983, p. 538).

has property *F*, therefore there is some property which both *a* and *b* have; particular *a* has property *F* and particular *a* has property *G*, therefore, there is some particular which has both *F* and *G*.

The fourth condition concerns the identity conditions of properties, in particular, properties of particulars. Two properties may be instantiated by the very same particulars. Standard example: the property of having a heart and the property of having a kidney have the very same instances, but they are different properties.

An account of particulars can take one of two forms. Either one can take particulars to be *sui generis* entities or one can take them to be metaphysical constructions from other kinds of entity. The same goes for properties. So we have four options: particulars and properties as *sui generis*; *particulars sui generis*, *properties constructed*; *particulars constructed*, properties *sui generis*; particulars and properties constructed. What can be said about the predicate "... instantiates ..." depends on the option chosen. In what follows we will see these options in action.

There are three basic types of candidates for properties, but within each type there are many variations. Variants of a given type of candidate may arise from the different characteristics needed to play different property roles. For example, different property roles may demand different identity conditions for properties. Variants may also result from broader differences of metaphysical doctrine. For example, if one takes properties to be *sui generis* entities one must decide whether such entities are abstract or concrete entities, and this decision can be influenced by metaphysical dogma such as the refusal to admit any sort of abstract entity.

10. Properties as sets of particulars

The first type of candidate for properties is inspired by standard model theory in which set-theoretical objects are assigned to predicates and their corresponding abstract singular terms. The simplest case is where the property *F* is a metaphysical construction, the set of particulars which, as we would say pre-theoretically, instantiate the property *F*. Particulars are taken as *sui generis*, and the instantiation predicate is the set-membership predicate. When I say particulars are *sui generis* and hence not metaphysical constructions, I do not mean to deny that they may have more ordinary constituents, such as other particulars which are their spatial parts, and perhaps particulars which are their temporal parts. A metaphysical construction is a construction from other metaphysical kinds of entity. So, on this account, particulars may have other particulars as parts, but this does not entail that they are metaphysical constructions, since these parts

are of the same metaphysical kind as the whole. Properties, on this account, are metaphysical constructions because they are identified with sets of particulars, where particulars are a *sui generis* metaphysical kind.

Unfortunately, the identification of properties with sets runs into trouble rather quickly. If the domain from which the members of the sets is drawn is confined to actual particulars, then we have the wrong identity conditions for properties. Let us look at the matter from the perspective of model theory in order to find entities which are better candidates for properties. Different styles of model theory assign different sorts of object to predicates and abstract singular terms. For example, we might, in a purely extensional semantics, assign sets of actual particulars to predicates as their extensions. But the extensions of predicates will not do for the extensions of abstract singular terms because we will want sentences of the form “*F*-ness is not the same property as *G*-ness” to be true even if their corresponding predicates have the same extensions. One way to do this is to identify the extension of an abstract singular term with the intension assigned to its corresponding predicate in an intensional semantics. In an intensional semantics, the intension of a predicate determines how the extension of a predicate varies as various values of indices change. If we suppose that we are dealing with variation only in the possible worlds at which sentences of the given language are true, then the intension of a predicate might be a function from an index set of possible worlds to sets of particulars, that is, to the extensions of the predicate in the various worlds. Now these intensions seem to be good candidates for the actual extensions of the abstract singular terms corresponding to the predicates since they are more finely individuated than the extensions of the predicates.

So this is one route to the idea that properties are the intensions of predicates. I have said that those intensions are functions from worlds to sets of particulars. So there must be some entities, worlds, and some entities, the particulars which are in those worlds. If we accept Lewis’s (1968) counterpart theory according to which no particular can be in more than one world, then we can replace the functions with sets of particulars, it now being guaranteed that no particular can turn up in more than one world. Thus we have Lewis’s (1986c, §1.5) idea that a property is the set of its actual and possible instances.

First-order relations are identified with sets of *n*-tuples of actual and possible particulars, the value of *n* depending on the degree of the relation. For example, *a* and *b*, in that order, instantiate the relation *R* iff the ordered pair $\langle a, b \rangle$ is a member of the set of ordered pairs identified with *R*. Higher-order properties and relations are to be identified with higher-order sets. For example, a second-order property is the set of all the first-order properties which instantiate it. The complexity of properties can be modelled

by set-theoretic operations. Some simple examples for first-order properties: conjunction is set-theoretic intersection, disjunction is union, negation is complementation relative to the domain of actual and possible particulars.

How many first-order properties are there? Since these properties are just sets of actual and possible particulars, there are as many first-order properties as there are these sets. Similarly for first-order relations and higher-order properties and relations. So, given plausible assumptions about the number of actual and possible particulars, the number of properties and relations far exceeds our ability to name such properties in any language fit for communication. There are, of course, uninstantiated properties, those sets which do not have any actual particulars as instances. But there will be limits on the number of properties resulting from the ways set theories have evolved to cope with Russell's paradox. For example, according to ZF set theory, there is no set of all sets, so there cannot be the corresponding property.

The account of properties as sets meets the four adequacy conditions. It gives an account of "particular a instantiates property F ". It allows different particulars to have the very same property because different particulars can belong to the same set. It allows one particular to have different properties because it can belong to different sets. Finally, it does not identify properties which have the same actual instances: that is the point of allowing possible particulars to be members of the sets identified with properties.

Properties inherit definite identity conditions from the sets with which they are identified. The axiom of extensionality for sets says that sets x and y are identical iff they have the same members. So "two" properties, conceived as sets of actual and possible particulars, are identical iff they have the same actual and possible particulars as instances or, using the jargon, iff they are necessarily co-extensive (according to some notion of metaphysical necessity). Lewis (1986c, pp. 55–6) points out that sometimes properties are conceived as being even more narrowly individuated. For example, triangularity and trilaterality are necessarily coextensive, and so when they are identified with the sets of their actual and possible instances, they turn out to be one and the same property. But, on one conception, properties are as finely individuated as the meanings of their names or the corresponding predicates. So the difference in meaning between "triangularity" and "trilaterality" entails that they name different properties. Lewis is tolerant. There is no saying which is the right conception of properties, which are the right identity conditions for properties. There are different conceptions of properties each having their own identity conditions. What matters is that Lewis can identify any proposed system of properties with some suitable system of set-theoretical entities. To this end, he suggests one way of identifying the more narrowly individuated properties

with structured sets, by analogy with the individuation of the meanings of expressions using intensional isomorphism (1986c, pp. 56–7).²⁰

The metaphysical nature of properties will be determined by the nature of sets. Sets are standardly conceived as abstract objects, though what this means is a difficult matter. It is usually said that sets do not have a spatio-temporal location, and have no causal powers.²¹ So anyone with naturalist leanings will worry about properties so construed. But even if sets and other abstract objects are admitted, one might still have worries about the sets which are here identified with properties. For these sets contain actual and possible particulars. Here we enter the thickets of the metaphysics of modality. Anyone who declines to adopt Lewis's modal realism and so denies that *possible* worlds and their inhabitants, possible particulars, exist will either have to reject this identification of properties with sets of actual and possible particulars, or find some adequate ersatz version of these sets. I cannot discuss this debate here, save to say that any ersatzist who constructs possible worlds and their inhabitants from properties cannot then identify properties with sets of actual and possible particulars, just as those who construct possible worlds from propositions cannot then identify propositions with sets of possible worlds.

There is a feature of the identification of sets with properties which has a more general metaphysical significance. Benacerraf (1965) observed that a set-theoretical reduction of the natural numbers can proceed in an infinite number of ways, just which set is identified with zero and which set-theoretic function is identified with the successor function being largely arbitrary. We can apply this observation to the use of sets in the theory of properties. Lewis identifies properties with sets of actual and possible particulars, but he could have identified them with functions from possible worlds to sets of actual and possible particulars. These functions, in turn, can be construed as sets of ordered pairs, each containing a world and a set of particulars, and the ordered pairs themselves can be identified with sets in an indefinite number of ways.

Some have thought that such a degree of arbitrariness is out of place in "serious metaphysics" (Armstrong 1986, p. 87).²² But I am not so sure. Presumably the objection to arbitrariness is the thought that there must be a fact of the matter which determines what a property, event, proposition etc. is. But what sorts of fact can we appeal to? We can describe the role

²⁰ For the idea of intensional isomorphism, see Carnap (1958, §14).

²¹ There are some who disagree, for example, Maddy (1990, Ch. 2). I suspect that her disagreement depends on thinking that sets are wholes composed from their members as parts. Some bad arguments for this idea are exposed in Oliver (1993).

²² It is interesting to note that Armstrong's (1991) identification of sets with states of affairs is as arbitrary as any identification of the natural numbers with sets. See Oliver (1992, p. 132).

which such metaphysical entities are supposed to play. So we can say that properties are instantiated by particulars (and, similarly, that propositions are objects of attitudes, events are causal relata, etc.). But a description of the role does not determine what is to be the role-player, unless, of course, we refuse to identify the entities of a particular metaphysical category with entities drawn from another category such as sets. The choice seems to be between saying that properties are *sui generis* entities that hold a certain office and identifying properties with certain sets, sets that are fit to hold that office, while acknowledging that such an identification is somewhat arbitrary.

11. Properties as universals

The second account of properties takes them to be *sui generis* entities, which I shall call “universals”. It is said that a particular instantiates a universal. There are many versions of this account which vary according as the nature of particulars and universals is spelled out and what is said about instantiation. Again, I focus on properties rather than relations, and first-order properties rather than their higher-order brethren, except when I need to say something special about these.

First, one may distinguish between a platonic and an aristotelian conception of universals.²³ This distinction turns on whether universals have a spatio-temporal location. The platonic version denies that universals have a spatio-temporal location, so they are abstract entities. The aristotelian version says that universals do have a location. But where exactly are they located? The usual answer is that they are somehow in their instances and so are wherever their instances are. This leads to some queer features of the location of aristotelian universals: (i) one universal can be wholly present at different places at the same time and (ii) two universals can occupy the same place at the same time.

Given that we want to satisfy the second adequacy condition even where the property is instantiated by two particulars at the same time, we must say that the universal is in both particulars at the same time. Now this could be so by having different parts of the universal in each of the particulars. But it is claimed that this is not how universals are in their instances; they do not have parts which are spread around their instances. Instead, they are wholly present in their instances. So we have to conclude that (i) is true.

²³ These labels have become popular and may not accurately reflect the views of Plato and Aristotle. They derive from Armstrong (1978a) who also talks of the distinction between transcendent and immanent universals, corresponding to the old distinction between *universalia ante rem* and *universalia in rebus*.

Given that we want to satisfy the third adequacy condition even where the properties are instantiated by the same particular at the same time, and that universals are wholly present in their instances, we must say two universals can occupy the same place at the same time, that is, (ii) is true.

Thus universals violate what Quinton (1958, p. 44) calls “the laws of thinghood” (the versions of (i) and (ii) with “particular” in place of “universal”). There is worse to come once we try to make more sense of how an aristotelian universal is in its instances. One obvious way to make sense of this is to take a particular to be some sort of bundle of the universals which it instantiates, though for this to be at all plausible it will have to be a bundle of just the intrinsic (non-relational) universals which it instantiates. Various bundling operations may be proposed. For example, one might say that a particular is the set of its universals. But if the particular is a concrete entity then this cannot work because sets are abstract. So one will have to use a bundling operation, such as mereological fusion, which, at least in some cases, generates concrete bundles. Whether this will work depends on what sorts of intrinsic universals are in the bundle. If the universals can be instantiated by more than one particular, then it is possible that two different particulars share all these universals. But if the bundles are mereological fusions of these universals, then the two particulars turn out to be one. Since the conception of particulars as a bundle of universals is a metaphysical truth, and so a necessary truth, the possibility of two particulars sharing all their intrinsic universals defeats this conception.²⁴

The bundles can be particularised in one of two ways. First, one can introduce special non-qualitative universals into the bundles which guarantee that no other particular can instantiate all of the universals in the bundle. For example, one can introduce so-called haecceities, universals such as the properties of being identical to particular *a*, being identical to *b*, etc. The hope is that we can make sense of these universals without having to presuppose the existence of *sui generis* particulars whose names apparently occur in names of the universals.

Those who deny that there are such non-qualitative universals will take the second option which introduces a *sui generis* particular into the bundle. Bundles are no longer bundles of universals only, they are bundles of universals plus a particular.²⁵ We now run into terminological difficulties. For I have said that a particular is a bundle, but also that the bundle contains a

²⁴ See Armstrong (1978a, Ch. 9). Unanswered question: if metaphysical truths are necessary and a priori, are they also analytic? It seems quite implausible to think that the ordinary man is committed to thinking that particulars are some sort of bundle or whatever because of the meanings of the words he uses.

²⁵ This is the option Lewis (1986c, §1.5) prefers in his discussion of the aristotelian conception of universals. The following discussion on parts and location elaborates on some of Lewis's remarks.

particular. To straighten things out, I borrow some terminology from Armstrong (1978a, pp. 114–6) who puts it to a slightly different purpose. Call the particular which is the bundle “the thick particular” and the particular *in* the bundle “the thin particular”. Then we can say either that the thick particular or the thin particular instantiates universals. Let us opt for the first.

How does the idea of a thick particular help make sense of universals being in their instances? The matter is simplest for the universals which are contained in the bundle identified with the thick particular. These universals are parts of the thick particular and so in a good sense are in the thick particular. This explanation has a cost, however: we have to acknowledge a part-whole relation which is not spatio-temporal. For a spatio-temporal part would be located at a region which is itself a part of the region occupied by the thick particular. The universals which are parts of the thick particular are not located in this way for they are supposed to occupy the same region as the thick particular. So we must recognise a metaphysical, non-spatio-temporal sense of part. Further, a universal occupies the same region as the thick particular which contains it but the universal does not itself have parts, each of which occupies a part of the region which the whole universal occupies.

The oddities about location and parts multiply when we consider relations. So far I have talked of the intrinsic universals which are parts of the thick particular. What place can we find for relations? Again we start with the idea of universals as in their instances. In the case of a dyadic relation instantiated by two thick particulars, the natural choice of instance for the relation to be in is some whole which has the two thick particulars as parts, in addition to any relations holding between the two thick particulars. Then we locate the relation at the divided region occupied by the two thick particulars, now noting that the relation can occupy a divided region without itself being divided.

After reading all of this, one might begin to wonder whether aristotelian universals are really preferable to platonic universals. True, the former conception conforms to our belief that properties are *in* their instances but at the cost of quite puzzling claims about location and parthood. How important is this belief? Not very, I suggest. The strongest interpretation it can plausibly bear is that it is just a different way of saying that the instances *instantiate* the properties. If I am right we might return to the platonic conception of universals and start to look for reasons why it ought to be preferred to the aristotelian conception. The aristotelian conception aims to find a spatio-temporal location for universals by locating them in their instances. This yields two reasons to find this conception wanting. First, uninstantiated properties and relations may do some useful philosophical work. On the aristotelian conception, however, uninstanti-

ated universals do not exist because universals are present in their instances: no instances, no universal.²⁶ Second, properties and relations of abstract objects may need to be acknowledged. But such objects have no spatio-temporal location and so they cannot instantiate aristotelian universals, there being nowhere for such universals to be.

There are many other differences between theories of universals besides the distinction between platonic and aristotelian conceptions, too many to list all the possible variations and their advocates. The principal dimensions of difference depend upon the answers to the following questions. What are the identity conditions of universals? What universals are there? What can be said about the predicate "... instantiates ..."?

If properties are taken to be sets of actual and possible particulars, then the answers to these questions are determined by the nature and number of sets. In contrast, when properties are taken to be *sui generis*, as universals, one has to start from scratch. I propose to illustrate the way such questions can be answered by examining Armstrong's theory of universals.²⁷

Armstrong posits two *sui generis* categories of entity: particulars and universals. Particulars instantiate first-order universals and first-order universals instantiate second-order universals etc. It is an *a posteriori* matter what universals there are, just as it is an *a posteriori* matter what particulars there are. But as a matter of fact, there are both properties and relations of the first-order and the second-order. Armstrong suggests space-time points as candidates for particulars, having a certain charge and having a certain mass for first-order properties, spatio-temporal relations for first-order relations, determinables such as being a mass for second-order properties and the nomic necessitation relation for a second-order relation.

Armstrong's conception of universals is aristotelian: they are present in their instances. Thus he holds a principle of instantiation which rules out uninstantiated universals. Universals are wholly present wherever they are instantiated, their instances literally have something in common. Here

²⁶ I have very little to say about the platonic conception. In fact, it is hard to say very much. For under this conception, universals are abstract, *sui generis* entities and particulars must also be *sui generis*. Particulars cannot be constructed from universals because no construction from abstract entities can be concrete but some particulars are concrete. It would be wrong to think the platonic conception *outré* for it has a major advantage over the aristotelian conception, namely, that it can admit uninstantiated universals. The question whether uninstantiated properties are required in an ontology for science is fiercely debated, a crucial question being whether vacuous laws need uninstantiated universals as constituents. Armstrong says no (1983, Ch. 8); Tooley (1977, 1987, Ch. 3, §1.4) and Mellor (1995, Ch. 16) say yes. See also Forrest (1993) and Jubien (1989), both of whom describe platonic conceptions of universals.

²⁷ My account is drawn from Armstrong (1978a, 1978b, 1989a, 1989b). The early and late works contain some differences in doctrine which I am ignoring here.

Armstrong's story diverges from that given above because he has a third category of constructed entities, namely, states of affairs. Particulars and universals are united in states of affairs. For example, the state of affairs of *a*'s instantiating *F* has the particular *a* and the universal *F* as its only constituents. There are also states of affairs having first-order and second-order universals as their constituents. The relation between constituents and state of affairs is not the mereological part-whole relation. The existence of *a* and *F* is not sufficient for the existence of the state of affairs of *a*'s instantiating *F*, because *a* might not be *F*, but it is sufficient for the existence of the mereological whole having *a* and *F* as parts. Moreover, states of affairs are ordered, unlike mereological wholes. For example, for some relation *R*, the state of affairs of *a* bearing the relation *R* to *b* is distinct from the state of affairs of *b* bearing the relation *R* to *a*, even though they have precisely the same constituents.

Armstrong has two conceptions of particulars: the thin and the thick. The thin particular instantiates universals. The thick particular is a state of affairs with two constituents: the thin particular and the conjunction of the intrinsic properties which the thin particular instantiates; the thick particular is the state of affairs of the thin particular instantiating this conjunctive property. This conception of a thick particular is different from that sketched above. The first conception construed a thick particular as a mereological sum of a thin particular and intrinsic universals. The second conception construes a thick particular as a state of affairs with the thin particular and the conjunction of its intrinsic universals as constituents. The latter conception still gives sense to the idea that an intrinsic universal *F* is in its instance *a*. *F* is some sort of part of the conjunction of *a*'s intrinsic properties,²⁸ and this conjunction is in turn a constituent of the state of affairs, *a*'s instantiating this conjunctive property, the state of affairs being the thick particular corresponding to the thin particular *a*.

Armstrong's views on the location of universals have changed. In one place (1988, pp. 110–2) he locates intrinsic universals in the way just mentioned but refuses to locate relations at the same place as the mereological whole consisting of the thick particulars associated with the thin particulars which are related. His positive suggestions for the location of relations are too tentative to repeat here. In another place he claims: "Universals are constituents of states of affairs. Space-time is a conjunction of states of affairs. In that sense universals are 'in' space-time. But there are in it as helping to constitute it" (1989b, p. 99). As he would be the first to admit, this is far from a complete account. All depends on whether he can

²⁸ But not a mereological part. See Armstrong (1989a, p. 70), where he retracts his earlier thesis (1978b, Ch. 15, §II) that conjunctions of properties have their conjuncts as mereological parts.

make good his claim that “space-time is a conjunction of states of affairs”. It seems hard to reconcile with the suggestion that some states of affairs have space-time points as their particular constituents.

How does Armstrong decide what universals there are? The over-arching theme is that the discovery of universals is an a posteriori matter, a task for total science, by which he means physics. Thus all a priori arguments for the existence of universals are rejected: “if it can be proved *a priori* that a thing falls under a certain universal, then there is no such universal” (Armstrong 1978b, p. 11). For example, we cannot argue, in relatively a priori fashion, from the existence of a predicate to the existence of a universal which is its meaning. Another example: since we know a priori that a particular is identical with itself, there is no universal of being identical with itself.

The theme of a posteriori discovery is filled out in many ways. Lewis characterises Armstrong’s view in the following way: “There are the universals that there must be to ground the objective resemblances and the causal powers of things, and there is no reason to believe in any more” (1983b, p. 345). Hence Armstrong thinks of universals as playing two roles, namely grounding objective resemblances and grounding causal powers. “Grounding” is vague, but he has in mind something like the following. First, it is assumed that if two particulars both instantiate some one universal, then they are genuinely similar in some respect. Here we run into problems. Armstrong assumes that we will all share with him a notion of genuine similarity and uses this shared understanding to reject certain proposed universals. First, note that this seems to be an a priori way of deciding what universals there are not, contrary to his professed a posteriori method of inquiry. Putting this to one side, I complain that it is hard to explain what this notion of similarity is except by detailing the principles by which he rejects proposed universals and by looking at specific rejections. He claims that “it is a *necessary* condition of *P* being a property that there be no limits *in logic* to the number of things which are *P*” (1978a, p. 37). Moreover, predicates which make essential reference to a particular do not correspond to universals. These two principles rule out relational properties such as being the wisest of men and revolving around the sun (Armstrong 1978b, pp. 14–5). So it seems that Armstrong has in mind a notion of similarity which concerns qualitative and intrinsic respects, qualitative respects being those properties which can apply to any number of particulars, intrinsic respects being those properties which are non-relational, which have nothing to do with other things.²⁹

²⁹ Unfortunately this does not fit the text since Armstrong (1978b, pp. 78–9) admits relational properties as universals, such as the relational property of revolving around a star. Lewis (1983b, p. 357) argues that he should not have done this. But perhaps they are working with different notions of similarity.

He is appealing to our intuitive understanding of such a notion of similarity when he rejects disjunctive and negative universals. For example, he rejects negative universals using this argument: “If particulars are identical in a respect, then they resemble each other. But it is surely implausible to suggest that *not being P* is a point in which *a, b, c ...* etc. resemble each other” (Armstrong 1978b, p. 23). Yet the purported property of not being *P* may apply to any number of particulars and may be intrinsic.³⁰ So Armstrong must be relying on some further feature of the notion of genuine similarity. There is a real question here whether our intuitive notion is as determinate as Armstrong pretends. It seems probable that we have several ordinary notions of similarity which are each of them vague, in which case any elucidation of the notion of genuine similarity will have to make a choice between the several ordinary notions and will sharpen the chosen vague notion. So I prefer to think of Armstrong as proposing such an elucidation. Unfortunately, this interpretation of Armstrong’s project cannot fit with his once and for all rejection of certain universals. For it may be that another elucidation will require the rejected universals to capture similarities.

Armstrong’s second use for universals is to ground the causal powers of things. This use rules out certain proposed universals and enables Armstrong to frame tentative identity conditions for properties. How do properties ground causal powers? The link is made using scientific laws in the following rough way: “causal connections ... involve law-like connections ... a law-like connection is a connection subject to a general rule, and so must depend on the general nature, that is, the properties, of the particulars subject to the rule” (Armstrong 1978b, p. 44). This connection between causation, laws and properties can be filled out in various ways but whichever way is chosen some support will be given to our ordinary claim that a cause has its effects in virtue of certain of its properties. So

³⁰ In a later work (1989a, Ch. 8), Armstrong introduces a distinction between first-class and second-rate properties. First-class properties are genuine universals which make for similarity, second-rate properties are those which supervene on entities we already have good reason to believe in. Entities *A, B, ... , N* supervene on entities *a, b, ... , n* iff *a, b, ... , n* exist in some one possible world and in any possible world in which *a, b, ... , n* exist, so do all of *A, B, ... , N*. Thus the way is open to admit disjunctive and negative properties as second-rate properties. For example, the disjunctive property *P* or *Q* supervenes on the first-class universals *P* and *Q*. The same is true of relational properties, such as revolving around a star, for it supervenes on certain states of affairs, such as *a*’s revolving around *b* and *b*’s being a star. But Armstrong thinks that such a relational property is a first-class universal. I cannot see why. His doctrine of supervenience is bound up with the following incoherent claim about supervenient entities: “ontologically, they are no addition to the universe” (1989a, p. 114). Since supervenient entities exist and are not identical to the entities upon which they supervene, they *must* be an ontological addition.

there are to be only those properties which ground causal powers. Thus Armstrong rules out negative and disjunctive universals on this count too, as well as properties such as being identical with itself and existence. The connection between causation and properties is used to give identity conditions for properties, conceived as a non-duplication principle, rather than as a non-circular analysis: property *P* is the same as property *Q* just in case *P* and *Q* bestow the same causal powers on the things which instantiate them (1978b, pp. 43–7).

It is good question whether Armstrong's two uses for universals can be satisfied by the same system of entities. For example, it is hard to see why one should admit universals which only happen to be instantiated once in the actual world if the use of universals is to ground similarities. For, *ex hypothesi*, no other thing instantiates the universal and so there is no similarity in this respect to be grounded. I suppose Armstrong admits such universals because they do a different job, namely, grounding the causal powers of things.

We have seen how Armstrong answers the first two of the three questions which must be answered by any theory of universals. Third question: what does he say about the predicate "instantiates"? Here we encounter a notorious problem for any theory of universals; let us dub it "the problem of instantiation". I think it is a problem which has never been properly defined, nor has what counts as a solution been properly determined. Much of the trouble hinges on unclarities about the role of infinite regresses in metaphysics, when they are vicious and when virtuous.

The problem of instantiation is often put in terms of a demand for an explanation, namely, why does the particular *a* instantiate universal *F*, but not universal *G*? What seems to be required is some account of how the particular is united with some universals but not with others. Putting it this way forces the following pseudo-solution. The predicate "... instantiates ..." holds of a particular and a universal because there is some entity, the relation of instantiation, which holds between particular and universal. But then a similar question arises. Surely this relation must be a universal, and if so, it is instantiated by some pairs of particulars and universals and not by others. How so? Perhaps there is another entity, call it the relation of super-instantiation, which unites pairs of particulars and universals with the old relation of instantiation. A regress threatens because we just ask the "how so" question again. Do not say that the regress can be blocked by denying that instantiation is a universal. For suppose it is some third type of *sui generis* entity. One can still ask the question how it is that this entity is united with some pairs of particulars and universals and not with others.

What is wrong with such regresses? If we need an infinite hierarchy of uniting relations, then we fall down on the count of ontological extravagance. Can anything more be said about why such an infinite hierarchy is bad? Sometimes it is said that the regress is vicious.³¹ I can understand such a charge if by “vicious” one means humanly impossible. For example, if we think that it is impossible for one to perform infinitely many distinct actions then a vicious regress is generated if in order to do *X*, one must do *Y*, and in order to do *Y*, one must do *Z*, and so on. But the case at hand has nothing to do with the finite capacities of humans. I can also understand the charge if one is attempting some definitional project. Such projects must end with undefined terms, but one might describe the project at the outset in such a way that the definitions never end. In this case, the regress would be vicious in the sense that the project one sets oneself can never be fulfilled. But the case at hand has nothing to do with a project of definition.

There is still a lingering feeling that the infinite regress is worse than uneconomical. Perhaps the demand for explanation is a clue. I suppose there can be nothing wrong in itself with an infinite hierarchy of explanations, each stage in the hierarchy being explained by its successor. But in this particular case it appears that no explanation of the original union between a particular and a universal is given at all. For at no stage in the regress do we have more than a collection of entities, it just goes on and on inventing new unifying relations at each stage to unify the collection of entities at the previous stage: but no genuine unity is ever reached.

Whatever is said about the problem with this regress, I would halt it by refusing to answer the question as it is put. We should stop with the brute facts that some particulars instantiate a given universal and others do not. The predicate “... instantiates ...” holds of some pairs of particulars and universals and does not hold of others. There is no entity in the world corresponding to this predicate, but this does not stop the predicate having an application and it does not prevent us uttering truths when we say that a particular instantiates a universal. So Armstrong is right to deny that there is any relation corresponding to the predicate “... instantiates ...”.³² There is more to be said about the predicate “... instantiates ...”. Some of it will be said later.

³¹ It is a symptom of the uncertainty about the problem with infinite regresses that writers hedge their bets. For example, Armstrong: “the regress that results is either vicious or at least viciously uneconomical” (1989b, p. 108); Campbell: “an infinite regress which is either vicious or, at the very least, massively uneconomical” (1990, p. 35).

³² He said that in his early work (1978a, Ch. 11, §1). But in a later work (1989b, Ch. 5, §12) he worries whether he was right.

12. Properties as sets of tropes³³

Expounding the theory of tropes quickly runs into terminological problems which need to be sorted out immediately. Let us proceed by example. Suppose we have two red books. The trope theorist says each particular book instantiates a trope of redness, but a different trope for each book. In a minimal sense of property, tropes are properties for it is true that particulars instantiate tropes. But according to the sense of property we have been using, tropes are not properties because it is not true that one and the same trope is instantiated by the two books. I propose to continue to use “property” in this latter sense and to rule that tropes are not properties. Tropes can be divided into property-tropes and relation-tropes, corresponding to the division between properties and relations. As before, I will talk of property-tropes (often just using “trope”) and properties, except when the difference between property-tropes and relation-tropes or properties and relations matters.

So far, then, we have nothing to play the role of properties and relations. But the trope theorist can manufacture these entities as metaphysical constructions from tropes. In our example, the two red books each instantiate their own special trope of redness, but these tropes are perfect duplicates, they are exactly similar. Using the predicate “... is exactly similar to ...” we can sort tropes into equivalence sets, these sets serving as properties and relations. For example, the property of redness is the maximal set of the tropes of redness. The members of the set are exactly similar to one another and to no trope which is not a member of the set.

Now that we have both tropes and properties, we need two instantiation predicates: “... instantiates, ...” holding between particulars and tropes; “... instantiates_p...” holding between particulars and properties. The latter can be defined in terms of the former: particular *a* instantiates_p property *P* iff there is some trope *t* such that *a* instantiates, *t* and *t* is a member of *P*. We have now preserved the idea that two particulars may instantiate (instantiate_p) the same property, by having each instantiate (instantiate) its own trope, both tropes being members of the property.

³³ In what follows I elaborate and modify the sketch of a trope theory given by Lewis (1986c, §1.5) because this seems to be the best account of tropes. Lewis is unsure whether to adopt trope theory. Among those who advocate some form of trope theory are: Bacon (1995), Campbell (1981, 1990), Martin (1980), Mulligan, Simons & Smith (1984), Simons (1994) and Williams (1953a, 1953b, 1986). Armstrong (1989b, Ch. 6) gives trope theory a sympathetic reading. There are many differences of doctrine among these authors, only some of which will be mentioned. In case you do not recognise tropes, they also go under the following names: “abstract particulars”, “cases”, “individual accidents”, “moments” and “property-instances”.

As we saw in §10, the construction of properties as sets of particulars must use possible as well as actual particulars, otherwise distinct properties will be conflated. In contrast the construction of properties as sets of tropes need not use possible as well as actual tropes. For example, the property of having a heart and the property of having a kidney are two distinct sets of actual tropes, containing the tropes of having a heart and the tropes of having a kidney, respectively (Campbell 1981, p. 484). The only case where one might want to introduce possible tropes is in distinguishing two uninstantiated properties, which on the present scheme will both be identified with the null set. However, it is usual to hold an aristotelian conception of tropes, according to which tropes are present in their particular instances, and which does not allow for uninstantiated tropes.

Some trope theorists provide a metaphysical construction of particulars as well as properties.³⁴ The best sort of construction will use some sort of part-whole relation which can generate concrete wholes from tropes. Sets of tropes will not do because they are always abstract. Let us use the mereological part-whole relation. Particulars are then the mereological wholes of the tropes which, as we would pre-theoretically say, they instantiate. We cannot speak pre-theoretically, however, because that would be to assume the very particulars we are constructing. Not every sum of tropes is a particular, so we need to select those sums which are. Hence we introduce a new dyadic predicate, let it be "... is compresent with ...", which unifies the tropes which constitute particulars, and we say that a particular is a mereological sum of tropes which is maximal under the predicate "... is compresent with ...", that is, any trope which is compresent with a trope which is part of the sum is also part of the sum. This construction of particulars allows us to define "... instantiates_t ...": particular *a* instantiates_t trope *t* iff *t* is a mereological part of *a*.

In §11, I pointed out that constructing particulars as mereological sums of universals which can be shared by two particulars could not work because it incorrectly rates the identity of indiscernibles a necessary truth. *The advocate of universals must introduce into the sum either special universals which cannot be shared or a sui generis entity, the thin particular.* In contrast, the trope theorist who constructs particulars as distinguished mereological sums of tropes needs no such device. For the tropes which compose the sums cannot be shared by more than one particular (Campbell 1981, pp. 481–3).

³⁴ Some, but not all. Martin (1980) argues that tropes are instantiated by sui generis particulars. Armstrong (1989b, Ch. 6, §1) thinks Martin's the best theory of tropes. I do not think there is much to be said for such a view if one is playing the game of ontological economy. See Simons (1994) for a discussion of both types of trope theory and a proposal for a third.

The construction of particulars is simplest and most plausible when the tropes in the sum are confined to intrinsic property-tropes. Particulars turn out to have the intrinsic property-tropes which they instantiate, as non-spatio-temporal, metaphysical parts since the tropes will each occupy the same place as the whole particular. Thus, as with aristotelian universals, more than one trope can occupy the same place at the same time and a trope occupies a place without having parts which occupy parts of the place. But unlike aristotelian universals, one trope cannot be wholly present in more than one place at the same time.

Relation-tropes relate particulars conceived as sums of intrinsic property-tropes. They too are metaphysical parts of their instances, an instance in this case being the mereological sum of the particular relata together with the relation-tropes which relate them. As with the aristotelian conception of relations as universals, relation tropes occupy the same place as the sum of their relata. If that region is divided, they occupy it without themselves being divided.³⁵

We can conclude that there is hardly anything to choose between an aristotelian conception of universals and this conception of tropes on the count of oddities involving parts and location. The only real difference is the fact that universals, unlike tropes, can be wholly present in more than place at the same time. But this difference is insignificant when compared to the other numerous points of similarity.

Indeed, there is another important point of comparison between this trope theory and a theory of universals, which like Armstrong's, posits states of affairs. A state of affairs has constituents, in the simplest case, a particular and a first-order universal. For example, when *a* instantiates the property *F*, there exists the state of affairs, *a*'s instantiating *F*, which has *a* and *F* as its only constituents. The trope theorist is able to mirror these states of affairs with tropes. For example, corresponding to the state of affairs, *a*'s instantiating *F*, there is the trope, the *F*-ness of *a*. The trope theorist thinks of this trope as an unstructured entity from which he constructs the particular *a* and the property *F*. In contrast, the advocate of universals thinks of the state of affairs as a structured entity, constructed from the particular *a* and the property *F*. So there is a genuine metaphysical difference between the two sorts of entity. But the close correspon-

³⁵ Campbell (1990, Ch. 5) argues against the existence of relation-tropes on the ground that they need bearers, whereas property-tropes do not. In the text I have assumed that relation-tropes do have bearers. I am not sure whether this must be so. In any case, I find the difference between property-tropes and relation-tropes which Campbell points out insufficient evidence for the non-existence of relation-tropes; it is just an interesting difference. Moreover, Campbell's attempt to do without relation-tropes is far from persuasive since it rests on an implausible principle which Campbell calls Foundationism: "No relational differences without qualitative differences" (1990, p. 113).

dence ought to make us pause. For suppose we argue that states of affairs exist because they play necessary theoretical roles. Then we shall have to consider whether this role could be played as well by the corresponding tropes. For example, it may be possible to replace situations or states of affairs in their role as causal relata by tropes providing tropes can correspond to the sentences used in statements of singular causation. If the result is a tie, we will need some other way of deciding between a theory of universals which incorporates states of affairs and a theory of tropes.

Finally, what of our primitive predicates "... is exactly similar to ..." and "... is compresent with ..."? Again, I think the right thing to say is that it is a brute fact that these predicates apply to some pairs of tropes and not to others. In particular, one ought to avoid saying that when two tropes are exactly similar or compresent, there exists a relation-trope of exact similarity or of compresence holding between the two tropes. Relation-tropes of exact similarity will themselves be exactly similar and so we begin an infinite regress.³⁶ Relation-tropes of compresence will force a reworking of the theory of tropes presented here because we will now have to construct particulars from intrinsic property-tropes together with the relation-tropes of compresence which hold between the first lot of tropes. Presumably, these relation-tropes of compresence will themselves be compresent, and so we begin an infinite regress once more (Simons 1994, §4). It is not clear to me whether these regresses are worse than uneconomical, but I suppose that is bad enough.

13. Brief comparison of the candidates

- (i) If you don't like sets, then you cannot take properties to be sets, either sets of actual and possible particulars or sets of tropes.
- (ii) If you don't like possibilia, then you cannot take properties to be sets of actual and possible particulars.
- (iii) If you don't like abstract objects, then you don't like sets and you cannot take properties to be platonic universals.
- (iv) If you don't like metaphysical parts and odd spatio-temporal locations, then you cannot take properties to be aristotelian universals or sets of tropes.
- (v) If you don't like any of these things, then you had better look elsewhere.

³⁶ Campbell (1990, pp. 34–7) denies that the regress is vicious. Daly (1994) shows his arguments to be very weak.

14. *Lewis's natural properties*

As I have stressed, these three proposals for candidates for properties each have many variants. One important question to ask is: what are the particulars which the properties instantiate? For example, are they ordinary things such as tables and chairs or are they extraordinary things such as subatomic particles or are they both of these? The aristotelian conception of universals and the theory of tropes are likely to focus on the very small, for it is supposed that particulars do not themselves have parts which stand in relations. In order to include larger particulars and the properties which they instantiate, the theories sketched above will have to be developed. For the larger particulars will have smaller particulars as parts and one wants to know how the larger particulars can be loci of predication. There is no such problem with the theory of properties as sets of particulars or with a platonic theory of universals.

Another important question is: are the particulars entities which endure, that is, persist through an interval of time by being wholly present at each time in the interval, or are they rather instantaneous entities, so-called temporal parts, which only exist at one time, or are they sums of temporal parts, perduring entities, which persist through an interval of time by having temporal parts which exists at each time in the interval, one temporal part for each time?³⁷

These questions concern the nature of particulars. There are also questions concerning properties. The nature of particulars will obviously constrain the properties which will be included. For example, it will be necessary to include properties of tables and chairs as well as properties of space-time points, if these different particulars are themselves included. But there is an independent issue about the number of properties which are admitted. In Lewis's terminology (1983b, p. 345), which has become popular, a theory of properties can be either sparse or abundant. We have already seen examples of each kind. If properties are sets of actual and possible particulars, then there are as many properties as there are these sets, more than we could ever hope to name in any language. This is an abundant theory of properties. In contrast, Armstrong's theory of properties as aristotelian universals is sparse. There are only those universals which ground similarity and the causal powers of those particulars which instantiate them, far fewer than the number of property names in English as it now is. Of course, the distinction between abundant and sparse theories is not sharp

³⁷ The terms "endure" and "perdure" are Johnston's (1987).

because it depends on the relative numbers of properties which a theory posits.³⁸

In this section I explore Lewis's (1983b, 1986c, §1.5) argument for a sparse theory of properties, which he calls "natural properties". The discussion has two purposes. First, it illustrates the general theme that the roles which properties play, here the natural properties, does not determine the nature of those properties. Second, Lewis's discussion of natural properties serves as a paradigm of the route to the existence of entities via conceptual analysis.

Lewis argues that there is a system of entities, the natural properties, since numerous conceptual analyses talk of such entities. For example, "x is a duplicate of y" is defined as "x and y share all their perfectly natural properties".³⁹ Then the predicate "x is a duplicate of y" is used to define "x is an intrinsic property" and "x and y are divergent worlds", the latter being used, in turn, to define the thesis of Determinism. Talk of natural properties is needed to define Materialism, to define the predicate "x is a law of nature", the latter being used in the definition of "x causes y". Lewis's counterfactual definition of "x causes y" must rule out back-tracking counterfactuals which are defined in terms of the predicate "x and y are divergent worlds". Causal relations are events, according to Lewis, and to define the predicate "x is an event" one must talk of natural properties once more. The list does not end there: natural properties are also employed in the analysis of the content of thought and language. If one agrees with all of Lewis's conceptual analyses, one cannot but fail to be impressed with the ideological economy which talk of natural properties brings and this ideological economy is held to give us reason to believe in natural properties.

What are natural properties like? Here are some of the features which Lewis employs. First, naturalness is not confined to properties but applies to relations as well. Henceforth when I speak of properties, I mean prop-

³⁸ I see no reason why an aristotelian conception of universals or a theory of tropes need be sparse. Certainly, Lewis's claim that "it is just absurd to think that a thing has (recurring or non-recurring) non-spatiotemporal parts for *all* its countless abundant properties!" (1986c, p. 67) is far from convincing. It is not as if there is insufficient room for the universals or tropes; they are metaphysical, not spatio-temporal parts. A platonic theory of universals can quite happily be abundant and a theory of properties as sets of actual and possible particulars is abundant. Why might one need an abundant theory of properties? As I say in the text, Lewis thinks that an abundant theory of properties is needed for semantic theory because we need a semantic value for each abstract singular term (or for each set of terms which share their semantic role). As I pointed out in the discussion of roles for properties, an abundant theory of properties will also be needed by those who aim to identify mathematical objects with properties, or constructions from properties, and possible worlds with properties, or constructions from properties.

³⁹ Lewis (1986c, pp. 61–2) has slightly amended his definition of "x is a duplicate of y" but the difference will not matter in this paper.

erties or relations, except when mentioning Lewis's definitions. Second, the sharing of natural properties is linked to qualitative similarity, "they carve at the joints" (Lewis 1986c, p. 60). This feature of natural properties justifies the definition of "x is a duplicate of y" as "x and y have the same perfectly natural properties"; "x is a duplicate of y" is a special resemblance predicate, expressing resemblance in every intrinsic, qualitative respect. Third, the definition of "x is a duplicate of y" uses the idea of a perfectly natural property. Lewis thinks of the naturalness of a property as a matter of degree, with perfect naturalness as a limiting case. He suggests that the charge and mass of subatomic particles are perfectly natural, the colours are less natural than charge and mass, and grue and bleen are less natural than the colours. Fourth, that a property is natural, whether it be perfectly natural or somewhat natural, is an objective matter. A property is not made natural by us, neither by our innate quality spacing⁴⁰ nor by our agreement and lack of hesitation in classifying new instances of the property on the basis of some given instances⁴¹. Since there are objective similarities in nature, so the natural properties which make for such similarities are objective.⁴² Fifth, that a property is natural, whether it be perfectly natural or somewhat natural, is an absolute matter. In other words, a property is either natural (to whatever degree) in all possible worlds or none. Thus, natural properties cannot be defined to be those which figure in laws of nature.⁴³ For the contingency of such laws will entail that the naturalness of properties is a world-relative matter.

These features of Lewis's natural properties constrain but do not determine the nature of these properties. Lewis's penchant for ontological economy leads him to identify the natural properties with entities he

⁴⁰ This is the basis for Quine's (1969) reconstruction of the notion of a natural kind.

⁴¹ This is the basis of Quinton's theory of natural classes (1973, pp. 263–5).

⁴² It is possible to be sceptical of any such notion of objective similarity. The leading sceptic is Goodman (1970). He argues that the idea of equating or measuring similarity in terms of the sharing of properties will not work, unless one can somehow distinguish the important properties from the unimportant properties. He thinks such a distinction is bound to be interest and context relative. The distinction between important and unimportant properties corresponds to Lewis's distinction between natural and unnatural properties. It is Lewis's hope that this latter distinction is perfectly objective. Taylor's (1993) criticism of Lewis is inspired by Goodmanian scepticism about the idea that nature is carved at the joints by natural properties. He finds the "joints utterly mysterious, the manner of the carving entirely arcane" (p. 88) and proposes a theory-relative replacement for Lewis's natural properties defined in terms of the predicates which play "the more central and fundamental classificatory roles" (p. 89) within a given theory.

⁴³ Fodor (1976, p. 14) says that a property determines a natural kind iff there is a scientific law which applies to events in virtue of their instantiating the property. So if there are different laws, then different properties determine natural kinds.

already believes in. Lewis thinks we need to have some system of entities to serve as the semantic values of abstract singular terms and the values of variables of property-quantifiers. He calls such entities “properties” and identifies them with sets of actual and possible particulars. In fact, any such set is a property according to Lewis, regardless of whether there is an abstract singular term which has it as its semantic value. These abundant properties cannot be the natural properties because they do not make for similarity. But this does not mean that the natural properties are *sui generis*. Instead, Lewis conceives of the natural properties as an elite minority of his properties.

Naturalness is a matter of degree. Lewis aims to select the perfectly natural properties and then to select the somewhat natural properties by defining them in terms of the perfectly natural properties. How are the perfectly natural properties to be selected? There are two broad choices: either one may invoke a primitive predicate “... is perfectly natural” applied to sets, or one can attempt to define this predicate. Lewis canvasses three ways to define the predicate. First, the predicate applying to sets can be defined in terms of a complex resemblance predicate which is multigrade, contrastive and applies to the members of sets: “Something like: x_1, x_2, \dots resemble one another and do not likewise resemble any of y_1, y_2, \dots ” (1983b, p. 347). Lewis questions whether it is worth trading the primitive predicate “... is a perfectly natural property” for this complex primitive predicate but does not know of any way to decide his question. But he does admit that the strings of variables within the complex predicate may be infinite, and even nondenumerably infinite. I would have thought that any such predicate would have been ruled out on the grounds that it does not belong to a language which we can understand.

The other two definitions share a common feature. They both define the predicate “... is a perfectly natural property” by introducing talk of entities which correspond to perfectly natural properties. So they can be said to give an ontological ground to the distinction between perfectly natural properties and the rest.

The first definition employs something like Armstrong’s theory of universals. The idea is that there is one-one correspondence between perfectly natural properties and universals. For example, the perfectly natural property having mass m is such that its members and only its members each instantiate the corresponding universal of having mass m . Thus we can define “... is a perfectly natural property” as “is such that all and only its members instantiate some one universal”.

The second definition employs the theory of tropes.⁴⁴ The idea is that there is a one-one correspondence between perfectly natural properties and maximal sets of duplicate tropes. Where the theory of universals has all those things with mass *m* instantiating the very same universal of having mass *m*, the theory of tropes has all those things each instantiating its own special trope. All these tropes of mass *m* are perfect duplicates of one another. We form a maximal set of these tropes, a set of tropes under the equivalence relation of duplication. Then we define "... is a perfectly natural property" as "... is such that all and only its members instantiate one or other of the tropes in some maximal set of duplicate tropes".

Stepping back from the detail of these definitions, we see that they are more examples of the way in which conceptual analyses introduce talk of entities. Just as it may be argued that we have reason to believe in natural properties because of the utility of talk of such entities in various conceptual analyses, so it may be argued that we have reason to believe in universals (or tropes) because of the utility of talk of such entities in the conceptual analysis of the predicate "... is a perfectly natural property".

One should note that in order for the definition of "... is a perfectly natural property" to go through in terms of either tropes or universals, one must admit tropes and universals which are instantiated by possible as well as actual particulars. This makes sense within the framework of Lewis's ontology of possible worlds because he can include possible universals or possible tropes as parts of his worlds. But those who find this an ontological extravagance cannot admit such universals and tropes, nor of course would they accept their instances, possible particulars.

So far we have worked through the details of three definitions of the predicate "... is a perfectly natural property". Lewis does not decide between these definitions and does not decide between defining the predicate and taking it as primitive. But he does opt to define the predicate "... is a somewhat natural property" in terms of "... is a perfectly natural property". The definition he gives is not precise but that is how it should be for the predicate being defined is not precise. His idea is that somewhat natural properties are those which "can be reached by not-too-complicated chains of definability from the perfectly natural properties" (1986c, p. 61). This seems to entail that any disjunction of two perfectly natural properties is as natural as any other, in fact they are equally very natural, but not quite perfectly natural, because they can be reached from the perfectly natural properties by a simple definition using disjunction (which corresponds to set-theoretic union).

⁴⁴ Tropes are not considered in Lewis (1983b) but they appear in Lewis (1986c, §1.5).

This way of picking out the somewhat natural properties has a curious result.⁴⁵ Sharing of natural properties is supposed to capture qualitative, intrinsic similarity. The limiting case of similarity is duplication, the sharing of the same perfectly natural properties, but there are many degrees of similarity which fall off from this limiting case. In particular, the sharing of natural properties will make for similarity, the more natural the properties, the more the similarity. But would we say that two particulars, one of which has the perfectly natural property *P* and the other of which has the perfectly natural property *Q*, are similar in some intrinsic respect because they share the intrinsic property *P* or *Q*. Armstrong thinks it is “laughable” (1979b, p. 20) to conclude that such particulars are similar. But it seems that Lewis must say that *P* or *Q* is a very natural property the sharing of which makes for a good deal of similarity. This only goes to show what we all along suspected, namely, that there is no single, ordinary notion of similarity which Lewis and Armstrong are analysing. Indeed, there is worse to come. For most of the time Lewis describes his perfectly natural properties as those which physics aims to discover. So we have some grip on the notion of duplication for, as Lewis says, “if physics succeeds in this, then duplication within our world amounts to sameness of physical description” (1983b, p. 357). This is not the whole story, however. For Lewis (1991, p. 33) thinks that it is a sensible to ask what the intrinsic properties of singletons (unit sets) are, and intrinsic properties are defined in terms of perfectly natural properties. I simply fail to understand how the idea of perfectly natural properties and the associated idea of duplication can apply to mathematical objects.

So far we have assumed that the natural properties are an elite minority of the properties, where these are identified with sets of actual and possible particulars. The question we have explored is how to select the natural properties. The arguments for the existence of natural properties only show that there must be some system of entities, the natural properties, talk of which is useful in numerous conceptual analyses. What are the prospects for conceptions of these natural properties other than as elite sets of actual and possible particulars? In particular, can we construe them as universals or sets of tropes? Some of the conceptual analyses in which Lewis talks of natural properties require that there be uninstantiated natural properties, properties which have no actual instances, but which do have instances in some possible world. So, in order to preserve these uses, one must admit uninstantiated universals or uninstantiated tropes. Moreover, since Lewis thinks that perfectly natural properties correspond one-one with universals and sets of duplicate tropes, it is difficult to see what

⁴⁵ Pointed out by Hirsch (1993), p. 75. Chapter 3 of this work is a good discussion and defence of the ideas of objective similarity and natural properties.

can be said about less than perfectly natural properties. For, *ex hypothesi*, there is no universal or set of duplicate tropes which can serve as a less than perfectly natural property. It seems that the only option is to abandon the hypothesis and expand one's ontology of universals and tropes to include those which make for similarities which fall off from the limiting case of duplication (the sharing of perfectly natural properties).

15. Quine's animadversions on properties

As background to the discussion of the problem of universals, Quine's animadversions on properties will be briefly recounted. First, some Quinean terminology. For Quine, nominalism is the thesis that there are no abstract objects. He also calls abstract objects "universals".⁴⁶ His examples of putative abstract objects are: numbers, sets, ordered n -tuples, functions, properties (or attributes, as he often calls them) and relations. Second, the development of Quine's views. In the beginning, Quine and Goodman (1947) subscribed to Harvard-nominalism but Quine soon rejected that thesis, acknowledging that it could not be reconciled with the ontology of classical mathematics, and hence of the natural sciences which are inextricably bound up with that mathematics. Nevertheless, he satisfied his fondness for ontological economy by admitting only one type of abstract object, sets. Talk of numbers, functions and ordered n -tuples and the like is to be interpreted as, or replaced by, talk of sets (for example, Quine 1960, Ch. 7, §55). What of properties (and relations, though as usual I shall focus on the former)? From beginning to end Quine has eschewed properties. His arguments against them are many and various. I shall discuss two here.

The first argument against properties is that they have unclear identity conditions (for example, Quine 1970, p. 67). As I said earlier, it is a given that properties are more narrowly individuated than sets of their actual instances. The axiom of extensionality supplies identity conditions for

⁴⁶ Terminology is a mess here. Quine's nominalism (let us dub it "Harvard-nominalism") is different from Armstrong's nominalism (let us dub it "Oz-nominalism"). Harvard-nominalism is the thesis that there are no abstract objects, Oz-nominalism the thesis that there are no universals, where "universals" are one type of candidate for the role of properties (see §11). The double meaning of "nominalism" can generate confusion, as can the other meanings of "universal". Quine uses "universal" to mean the same as "abstract object", others use "universal" to mean the same as "property" or "relation", where these latter terms carry no implication about what such entities are like. Harvard-nominalism and Oz-nominalism must also be distinguished from Goodman's nominalism (1986), the latter being a rejection of entities, such as sets, which fail to obey a certain principle of composition.

sets: set x is identical to set y iff x and y have the same members. But two properties may have the same instances.

Given that the identity conditions of the members are clear, the axiom of extensionality ensures that the identity conditions of sets are clear. Quine complains that the identity conditions for properties, in contrast to sets, are radically unclear and for that reason properties ought to be rejected. As Quine is fond of saying, no entity without identity. Why are the identity conditions for properties unclear? The standard ways for making out these identity conditions depend on notions involving modality (such as necessary equivalence) or meaning (such as analyticity or synonymy), which notions are septic according to Quine. For example, one might hold that the property of being P and the property of being Q are identical iff it is analytically true that all and only things which have P have Q .

One might question whether intensional notions such as synonymy and necessary equivalence are as septic as Quine makes out. Indeed, Quine's darling, natural science, is up to its ears in modal notions because of its use of the concepts of disposition, causation and law. If modal notions are to be abandoned, then there will not even be a desert landscape to describe. Moreover, one might attack the general principle, that only entities with clear identity conditions be admitted, since it rules out all those entities for which philosophers have struggled to give identity conditions, such as persons, animals, natural inanimate objects and artifacts. The principle also assumes that we cannot rest content with primitive facts of identity and difference. This seems wrong for the process of giving clear identity conditions for different categories of entity must end with a category (or categories) of entity for which no informative identity conditions can be given. For example, the identity conditions of sets of physical objects may be given in terms of the physical objects which are their members, the identity conditions of physical objects may be given in terms of the spatio-temporal regions which they occupy, the identity conditions of spatio-temporal regions may be given in terms of the spatio-temporal points which make them up, but what can one say about the identity conditions of the points themselves?

The second argument against properties turns on the idea of ontological commitment. Quine thinks that nothing we truly say is ontologically committed to properties. There are three types of subsentential expression the use of which might be thought to incur commitment to properties: predicates such as "... is red" in "the sunset is red"; abstract singular terms such as "humility" in "humility is a virtue"; property quantifiers occurring in sentences such as "acquired characteristics are never inherited" and "there are undiscovered fundamental physical properties". I shall return to the

issue of ontological commitment in §21–23 below, but for now here is a brief summary of Quine's views.

His procedure for testing ontological commitment is as follows (for example, Quine 1980). Translate the given sentence into a favoured canonical notation (for Quine, first-order logic with identity), singular terms being Russelled away in favour of expressions employing the existential quantifier. The ontological commitment of the translation is determined by working out which entities must be assumed to be in the domain of the quantifiers occurring within it in order for it to be true. The original sentence inherits its ontological commitment from its translation. So the use of a predicate harbours no ontological commitment, for it is only quantification into positions which are held by singular terms which harbour such commitment.

Quine's strategy for dealing with abstract singular terms has two parts. First, translation into canonical notation may reveal that the occurrence of an abstract singular term is merely apparent. For example, he suggests that we paraphrase "humility is a virtue" as "humble persons are virtuous" (1960, p. 122), which goes over to a sentence of the canonical notation which fails to contain an existentially quantified variable corresponding to the apparent singular term "humility" in the original. Second, even if the abstract singular term is genuine, Quine argues that there is no need to think that the abstract singular term refers to a property (strictly, that there is no need to think that a property must be included in the domain of quantification for the translation into the canonical notation to be true). Instead, the singular term can be thought of as referring to one of a variety of entities, which sort depending on the given singular term, the principal sort being sets. For example, Quine (1960, p. 122–3) suggests that "humility is rare" features "humility" as a genuine abstract singular term referring not to the property of humility, but to the set of humble persons. His strategy for dealing with property quantifiers is to reconstrue the quantifiers as ranging over other sorts of entities, just as he deals with genuine abstract singular terms by arguing that they refer not to properties, but other more respectable entities such as sets (for example, Quine 1960, Ch. 6, §43).

16. Armstrong's two arguments for universals

Armstrong (1978a) proposes two apparently different arguments for the existence of properties. Indeed, he takes them to be arguments for the existence of his favoured system of candidates for properties, aristotelian universals. The first and most important argument is an argument from the problem of universals. As Armstrong presents it: "Its premiss is that many

different particulars can all have what appears to be the same nature ... The conclusion of the argument is simply that in general this appearance cannot be explained away, but must be accepted. There is such a thing as identity of nature" (1978a, p. xiii).

The second argument is an argument from the ontological commitment of abstract singular terms and property-quantifiers. Armstrong (1978a, Ch. 6) argues that there are severe difficulties in paraphrasing away occurrences of abstract singular terms and property-variables to eliminate apparent ontological commitment to properties. This second argument has an obvious connection with the second of Quine's arguments against properties, for it is Quine's contention that such paraphrases are available. But we have yet to see how the first argument is related to Quine's views and how Armstrong's two arguments are related to one another. Before we can explore these connections we must examine the first argument from the problem of universals in greater detail.

17. The argument from the problem of universals

The argument from the problem of universals has another name: the one over many argument. The premise of the one over many argument expresses the fact whose explanation poses the problem in the problem of universals. The problem of universals is not well-named. It suggests that the problem is with *universals*, when what is intended is that universals provide a solution, and if Armstrong is right, the best solution to a problem.

What is the problem or premise? Time and time again in works on the theory of properties, the problem or argument is invoked. But it turns out that there are many versions, having many different forms. For example, Campbell describes the problem thus: "Take two white things again. They deserve a common description, namely, 'white'. What is the link between them which underlies this linguistic fact?" (1976, p. 206). This seems to be related to Armstrong's linguistic version of his problem: "It is asked how a general term can be applied to an indefinite multiplicity of particulars" (1978a, p. xiii). Let us call this the semantic version of the argument and the problem: we need some account of how predicates apply to particulars. Sometimes epistemological problems are confused with the semantic problem. For example, one might ask how it is possible for someone to recognise that a predicate correctly applies to a particular or how it is possible to correctly apply a predicate to new instances.

A glance at Armstrong's work shows that he has in mind neither the semantic problem nor the epistemological problems. He does have some-

thing to say about the semantics of predicates but only after he thinks he has established the existence of universals and he explicitly refuses to identify his problem with the semantic problem (1978a, p. xiii). He says very little about the epistemology of predicate application.

Campbell has also moved away from the semantic problem, now preferring to split the problem as two questions.

Now we can pose two very different questions about, say, red things. We can take *one* single red object and ask of it: what is it about this thing in virtue of which it is red? We shall call that the *A question*.

Secondly, we ask of any *two* red things: what is about these two things in virtue of which they are both red? Let that be the *B question*. (1990, p. 29)

No mention of predicates there, but plenty of mystery. We know we are in the realm of murky metaphysics by the presence of the weasel words “in virtue of”. Campbell seems to be asking for some sort of non-causal, metaphysical explanation of the facts mentioned in his questions. So let us call such versions of the problem of universals, metaphysical problems.

When we examine Armstrong’s work in detail it is clear that he is posing some kind of metaphysical problem too. But again there is not just one problem, but many. The various versions differ along two dimensions. First, the fact that supposedly needs some sort of account differs. Second, the characterisation of the type of account which is sought differs. I should say that none of this is explicit in Armstrong’s writings. One cannot help feeling that he has not noticed the various versions of his problem. This is regrettable for two reasons. First, this problem is the main support for his theory of universals. Until we get clear on the problem we cannot evaluate Armstrong’s case. Second, Armstrong’s problem has been severely criticised. Two examples: Devitt and Sterelny say that “the one-over-many is a pseudo problem; the explanations prompted by it are pseudo explanations” (1987, p. 228); Lewis accuses Armstrong of setting an aim which no one can meet: “No theory is to be faulted for failing to achieve it” (1983b, p. 353). We must clarify Armstrong’s problem and distinguish its versions to see if there is a version of the problem which warrants these criticisms and whether there are any versions which escape them. The unclarity of Armstrong’s presentation makes my discussion part description and part rational reconstruction. It should be remembered in what follows that Armstrong is arguing for the existence of aristotelian universals, his particular candidates for properties, so he must show both that there are properties and that other conceptions of properties, as sets of possibilities, as platonic universals etc., are no good.

18. Versions of the metaphysical problem

I detect six different types of fact which demand an account according to Armstrong. These facts can be represented in schematic form as:⁴⁷

- (1) *a* and *b* are of the same type/ have a common property
- (2) *a* and *b* are both *F*
- (3) *a* and *b* have a common property, *F*
- (4) *a* has a property
- (5) *a* is *F*
- (6) *a* has the property *F*

Some preliminary distinctions. (1), (2) and (3) concern two particulars, (4), (5) and (6) just one. So we have something like the distinction that Campbell makes with his A and B questions. (1) leaves the common property unspecified, (3) specifies it. (2) does not talk of the “having of a property”, but uses plain old predication. Similarly, (4) leaves the property unspecified, (6) specifies it; (5) does not talk of the “having of a property”, but uses plain old predication.

(1) appears as the premise of the one over many argument, “many different particulars can all have what appears to be the same nature” (1978a, p. xiii), and again in the expression of the problem of universals, “The problem of universals is the problem of how numerically different particulars can nevertheless be identical in nature, all be of the same ‘type’” (1978a, p. 41).

(2) appears immediately after (1) in these remarks about the Oz-nominalist: “How is he to account for the apparent (if usually partial) identity of numerically different particulars? How can two different things both be white or both be on a table?” (1978a, p. 12). We begin with an unspecified having of a common property and end with a fact of common specified predication. I shall return to (3) after discussion of (4), (5) and (6).

In this passage Armstrong’s focus seems to change: “There is one sense in which everybody agrees that particulars have properties and stand in relations to other particulars. The piece of paper before me is a particular. It is white, so it has a property” (1978a, p. 11). Here the fact to be given an account is (4). But we move quickly to (5): “What is in dispute ... is the account or analysis to be given of the gross facts. This appears to be the situation in the dispute between Nominalism and Realism. Both can agree that the paper is white and rests upon a table. It is an adequacy-condition of their analyses that such statements come out true” (1978a, p. 11). And then back to (4) in the next paragraph: “We start with a basic agree-

⁴⁷ They each have obvious relational analogues.

ment, then: that in some minimal or pre-analytic sense there are things having certain properties and standing in certain relations" (1978a, p. 11). When Armstrong comes to discuss the various nominalisms, he says that their aim must be to provide "a logical analysis, a *reductive analysis*" (1978a, p. 13) of facts, not of type (4) or (5), but of type (6): "*a* has the property *F*". Nevertheless we return to type (5) in Armstrong's characterisation of what he calls Ostrich Nominalism: "I have in mind those philosophers who refuse to countenance universals but who at the same time see no need for any reductive analyses of the sorts just outlined. There are no universals but the proposition that *a* is *F* is perfectly all right as it is" (1978a, p. 16).

There is an obvious explanation of Armstrong's vacillation between the various two-particular versions (1)–(3) and the one-particular versions (4)–(6). Armstrong must think that "*a* is *F*" is equivalent to "*a* has the property *F*", and he thinks that one can infer "*a* has a property" from the specific "*a* has the property *F*". Similarly, "*a* and *b* are both *F*" and "*a* and *b* have a common property, *F*" are equivalent (hence the appearance of (3) in the list above), and one can infer "*a* and *b* have a common property" from "*a* and *b* have a common property, *F*". I take it that Armstrong moves between the two-particular versions and the one-particular versions because he endorses the inference from "*a* has the property *F*" and "*b* has the property *F*" to "*a* and *b* have a common property, *F*".

Armstrong asks how it is that his various facts obtain, for an account or analysis of them, for an explanation of them, for that in virtue of which they obtain. All these requests are terribly vague. So we must do some work to try to make them more specific. I detect three possible interpretations which play some role in Armstrong's thought. Each applies to the sentences which express his facts. First, the request is for a *conceptual analysis*, there being two candidates for analysis. Second, the request is for a specification of the *ontological commitments* of the sentences. Third, the request is for a specification of the *truth-makers* of the sentences. I shall examine each of these requests in turn. The aim of the exercise is to try to make some sense of the idea of metaphysical explanation.

19. *Conceptual analysis: predication*

Armstrong claims that nominalists must give "a logical analysis, a *reductive analysis*" (1978a, p. 13) of the scheme "*a* has the property *F*". What does this mean? One could take the demand for an analysis to be a demand for conceptual analysis. This demand would be met if one could produce, for any instance of the scheme, another sentence which captures its con-

tent. “Capturing content” is vague and will have to be left that way. Material equivalence is certainly too weak, strict synonymy too strong. Even necessary equivalence is too weak because if Q is necessarily equivalent to P , then so is $Q \& R$, where R is any necessary truth (it does not matter whether we consider narrow logical necessity or the broader metaphysical necessity).⁴⁸

Lewis (1983b, pp. 351–5) interprets Armstrong’s demand for an analysis in this way. First question: is this a sensible demand? It is certainly a queer sort of conceptual analysis which is demanded. It is *not* the demand for one-off analyses of instances of “ a has property F ” or its equivalent “ a is F ”, which would be met piecemeal for each instance of “... has property F ” or “... is F ”. Instead Armstrong seems to be demanding a general analysis which will apply to all instances of this scheme and its relational analogues. Lewis argues that the demand is unreasonable because it cannot be met. The demand is that there be no unanalysed predication. But it is not hard to see that this aim cannot be achieved: “For how could there be a theory that names entities, or quantifies over them, in the course of its sentences, and yet altogether avoids primitive predication?” (Lewis 1983b, p. 353).⁴⁹ Any attempt to come up with the required general analysis will have to use some predicate and by doing so it fails in its task as a general analysis. Lewis points out that Armstrong’s own theory has a primitive predicate, “... instantiates ...”, so his criticisms of theories which do without his universals on the ground that they involve primitive predication are nullified.

I doubt that this is a good interpretation of Armstrong. Lewis (1983b, p. 352) makes great play of the difference between giving an account of a purported fact and analysing a purported fact. Analysing, he says, is just one way to give an account. There are two others: one can deny it or one can accept it as primitive. But it is clear that Armstrong has no such distinction in mind: he talks of an account and an analysis in the same breath.

⁴⁸ The constraints on conceptual analysis—the project of defining some predicates in terms of others—in metaphysics have never been made clear. There are several questions. First, what does “capturing the content” mean? For example, can one deviate from the common man’s understanding of “particular”, by defining particulars to be, say, mereological sums of tropes? Second, should primitive predicates be those which are somehow prior in the order of understanding? Sometimes the elusive notion of conceptual priority is employed here, but I confess to finding that notion barely intelligible. Third, what other constraints ought to be put on primitive predicates? Lewis’s (1983b, p. 353) claim that they should neither be “unduly mysterious” nor “unduly complicated” raises more questions than it answers.

⁴⁹ The same point is made by Nerlich (1976, p. 59).

20. *Conceptual analysis: similarity*

The demand for a general conceptual analysis of predication cannot be met but it is unclear whether Armstrong subscribes to the demand. In some places, the focus of conceptual analysis appears to be our talk of qualitative resemblance or similarity. There are numerous, rather vague expressions so some regimentation is necessary. The idea is to define any serviceable resemblance expression in terms of properties. Here is one way to proceed.

We start with the two place predicate: “*x* exactly resembles *y*” and define it as “*x* and *y* share all their properties”. We can think of this as a limiting case, defining precise degrees of resemblance in terms of the ratio of shared properties to unshared properties, and the vague “*x* resembles *y*, more or less” as the equally vague “the ratio of shared to unshared properties of *x* and *y* is large”. Precise and vague resemblance relations of higher degree which express comparisons, such as the vague “*x* resembles *y* more than *z*”, can then be defined.⁵⁰

There are two problems with such definitions, both turning on common-sense beliefs about resemblance. First, we believe that it is at least possible, if not actual, that two particulars exactly resemble each other. So we must limit the number of properties over which the quantifier ranges in our definiens, otherwise we will include properties, such as being identical to Socrates, which cannot be shared. Similarly, if we have too many properties, then we will not be able to preserve such truths as “electron *a* is more similar to electron *b* than to a writing desk”. So we must limit the domain of properties. Let us suppose we have done this, and call the properties figuring in the domain, “natural properties”.⁵¹ Then we recast all our definitions accordingly.

Now we might suggest the following definition for our ordinary predicate “*x* resembles *y* in some respect”: “there is some natural property which *x* and *y* share”. The adequacy of this definition will depend on how many natural properties there are. Suppose *a* is red and *b* is orange. It seems correct, if not particularly informative, to say “*a* resembles *b* in some respect”. If this is equivalent to “there is some natural property which *a* and *b* share”, there had better be such a natural property. If there is no such property another solution suggests itself. Instead of insisting on a single natural

⁵⁰ I am ignoring arithmetical problems which arise if the number of shared of unshared properties is infinite.

⁵¹ Lewis’s natural properties are one species of natural property, in this broader use of “natural property”. For he defines a special resemblance predicate “*x* is a duplicate of *y*”, which expresses intrinsic, qualitative similarity, as “*x* and *y* share all their perfectly natural properties”. See §14 above.

property which is shared, one could have two natural properties which resemble each other. We have arrived at Armstrong's definition (he has "a resembles b" instead of "a resembles b in some respect"):

... a particular *a* resembles a particular *b* if and only if:
There exists a property, *P*, such that *a* has *P*, and there exists a property, *Q*, such that *b* has *Q*, and either $P = Q$ or *P* resembles *Q*. (1978b, p. 96)

Of course, this merely postpones the matter of defining every resemblance predicate since a resemblance relation flanked by names for properties appears in the definiens. But Armstrong (1978b, Ch. 22) suggests a way of defining this predicate in turn using the predicate of partial identity applied to properties.

The precise details of the plan for defining resemblance predicates do no matter for our purposes. Some such definitions will be required by anyone who wishes to analyse resemblance between particulars in terms of the sharing of properties. Such definitions are conceptual analyses and purchase ideological economy by beefing up the ontology: we remove primitive predications of resemblance by introducing talk of properties. It is never necessary to offer such definitions of resemblance predicates. One can simply take such predicates as primitive predicates which are undefined in one's metaphysical theory.⁵²

One of the resemblance predicates defined above is "x resembles y in some respect", which seems to be used interchangeably in ordinary discourse with "x and y have some common property" (or "x and y are of the same type"). These latter predicates occur in sentences of type (1) in Armstrong's list. So it would not be outlandish to suggest that he is after some conceptual analysis of such sentences, especially since later in the same work he offers such an analysis. Moreover, we can specify respects to yield predicates of the form "x resembles y in respect *F*" which seem to be used interchangeably with predicates of the form "x and y have a common property, *F*-ness" or "x and y are both *F*", which feature in sentence types (2) and (3). The conceptual analyses of resemblance predicates which I have sketched do provide some reason to believe in the existence of properties, but no more than *some* reason since the pressure to analyse can always be resisted.

Indeed, the pressure to analyse must be resisted in some cases. Not all sharing of predicates can be analysed as the sharing of properties (Mortensen 1987, p. 99 makes this point). For example, Russell's paradox

⁵² The trope theory sketched in §12 above takes a resemblance predicate as primitive, namely, "... is exactly similar to ..." which applies to tropes. Trope theorists could analyse the resemblance of particulars in terms of the sharing of natural properties, but in order to say what a property is, they must resort to this primitive predicate.

for properties shows that we cannot always infer “*a* has the property of *F*-ness” from “*a* is *F*”, where the former is read as containing a name for the property of *F*-ness. Otherwise the predicate “... is a property which does not instantiate itself” would yield the property of being a property which does not instantiate itself, and this property cannot exist, for it instantiates itself just in case it does not. So there must be resemblance predicates of a form which cannot be given a simple analysis in terms of the sharing of properties.

Russell’s paradox limits only the analysis of resemblance predicates such as “*x* and *y* resemble in respect of *F*” as “*x* has *F*-ness and *y* has *F*-ness”, where “*F*-ness” is a name for a property. But even if more complicated analyses of the resemblance predicates are given, there seem to be resemblance predicates which cannot be defined (see Lewis 1983b, p. 354 for a similar point). Suppose we agree with Armstrong on the truth of these two sentences: “electron *e* instantiates the universal of charge *c*” and “proton *p* instantiates the universal of mass *m*”. Now we have a respect of resemblance between the pair of *e* and *c* and the pair of *p* and *m* marked by the shared predicate “instantiates”, namely, that the first member of the pair instantiates the second member. Are we to define the predicate which expresses this resemblance in terms of the sharing of a relational universal of instantiation? We may, but then a similar resemblance will be generated between two triples. The definitions cannot go on forever: we must end with primitive predicates. Alternatively, it may be said that the sharing of the predicate “instantiates” does not correspond to a real qualitative resemblance. Hence there is no resemblance predicate that needs to be defined. Whichever way out is chosen, exactly the same choice may be made by those who aim to define resemblance in terms of the sharing of properties, but have a different conception of properties. We should conclude that the conceptual analysis of resemblance predicates is not mandatory. Moreover, even were it assumed that such an analysis ought to be provided in terms of shared properties, there are limits which constrain any such programme of analysis and cannot decide between different conceptions of properties.

21. *Ontological commitment*

Devitt (1980) begins with the following familiar passage from Armstrong: “The problem of universals is the problem of how numerically different particulars can nevertheless be identical in nature, all be of the same ‘type’” (1978a, p. 41). Devitt understands Armstrong to be asking after the ontological commitments of sentences expressing sameness of type. Devitt’s schematic example is:

(i) *a* and *b* have the same property (are of the same type), *F*-ness.

Taking his cue from Quine, Devitt argues that sentences of the form (i) are not ontologically committed to some one entity, *F*-ness. Apparent ontological commitment can be revealed as merely apparent by paraphrase, so a short series of paraphrases is given which does the trick. (i) is paraphrased as:

(ii) *a* and *b* are both *F*

and this is paraphrased in turn as the two sentences

(iii) *a* is *F*; and

(iv) *b* is *F*.

To determine the ontological commitment of (i) we determine the commitment of (iii) and (iv), and the commitment of (iii) (and (iv), making appropriate changes) is read off from the right hand side of the biconditional of Quine's semantic theory: (iii) is true if and only if there exists an *x* such that "*a*" designates *x* and "*F*" applies to *x*. In other words, "*a* is *F*" is only committed to the existence of *a*, not *F*-ness.

So, in essence, Devitt has Armstrong asking whether predicates harbour ontological commitment. Before we examine whether Devitt is right to side with Quine in denying that predicates harbour ontological commitment we should ask whether this is a good interpretation of Armstrong. It seems so. Recall his characterisation of Ostrich Nominalism: "There are no universals but the proposition that *a* is *F* is perfectly all right as it is. Quine's refusal to take predicates with any ontological seriousness seems to make him a Nominalist of this kind" (1978a, p. 16). Moreover, Armstrong (1980, p. 448, fn. 2) suggests that the title of chapter 6 of his *Nominalism and Realism* (1978a), which contains the second argument concerning the ontological commitments of abstract singular terms and property-quantifiers, ought to have been "Arguments for Realism that work even if Quine is right about ontological commitment". The implication is that Armstrong's other argument for Realism, the argument from the problem of universals, is concerned with ontological commitment and somehow turns on Quine being wrong about ontological commitment, in particular, about whether predicates harbour ontological commitment. So I think there is a strong case for Devitt's interpretation of Armstrong's argument from the problem of universals.⁵³

⁵³ A symptom of the muddle about Armstrong's argument from the problem of universals is Lewis's misinterpretation of Devitt's criticism. Lewis (1983b, pp. 354–5) thinks of Devitt as embarking on the project of providing a conceptual analysis of (i) in terms of (iii) and (iv). But this cannot be right because Devitt thinks that the argument from the problem of universals applies to (iii) and (iv) as well. According to Devitt what must be determined are the ontological commitments of these two sentences.

Now I want to show that the argument from the problem of universals, so construed, must fail. Remember that Armstrong slides between sentences of the form “ a is F ” and sentences of the form “ a has the property F ”. Instances of the first contain a monadic predicate “... is F ” attached to a singular term. Instances of the second contain a dyadic predicate “... has ...” attached to two singular terms, the latter of which is the abstract singular term “the property F ”. As I have said, Armstrong thinks that sentences of these two forms are equivalent. It seems that he also thinks that sentences of the second form reveal the ontological commitments of the sentences of the first form. For it is only by making that assumption that we can explain the demand addressed to the nominalist for a reductive analysis of the schema “ a has the property F ”. The idea is to determine the ontological commitments of a simple subject-predicate sentence (of the first form) by determining the ontological commitments of its more complex equivalent (of the second form). The latter sentence employs an abstract singular term apparently referring to a property, so the question for the nominalist is whether he can show such reference to be merely apparent. He can do this by providing a paraphrase of the sentence which does away with any abstract singular term purporting to refer to a property. The paraphrase will thus constitute a reductive analysis of the sentence because it reduces ontological commitment, revealing the commitment to properties as merely apparent.

Two examples of the reductive analyses Armstrong criticises. Predicate nominalism: a has the property, F , iff a falls under the predicate “ F ”; Class nominalism: a has the property, F , iff a is a member of the class of F s. Because Armstrong holds onto his equivalence between “ a is F ” and “ a has the property F ” (similarly, for the relational “ $a R b$ ” and “ a bears the relation R to b ”), it is easy work for him to convict any proposed reductive analysis of failing to meet the task. For any proposed sentence will contain a predicate (of some degree) and Armstrong can appeal to his equivalence to convict the proposed sentence of commitment to properties or relations. So we find him continually arguing that the proposed reductive analyses are subject to what he calls “the relation regress”. For example, both predicate and class nominalism use a two place relation, “... falls under ...” and “... is a member of ...”, in their analyses, and hence via the equivalence, each analysis does not remove the apparent reference to relations (Armstrong 1978a, pp. 18–21, pp. 41–2).

Suppose that we agree with Armstrong that no reductive analysis can be found and that we have to accept that sentences of the form “ a has the property F ” contain a genuine abstract singular term referring to a property. Since sentences of this form are committed to properties, so are their equivalents with the form “ a is F ”. But look closely at “ a has the property

F". It contains the dyadic predicate "... has ..." (which Armstrong often replaces with "... instantiates ..."). Since Armstrong accepts the equivalence between "*a R b*" and "*a* bears the relation *R* to *b*", "*a* has the property *F*" is equivalent to "*a* bears the relation of having (or instantiation) to the property *F*", the latter sentence revealing the ontological commitment of the former. The latter sentence apparently contains an abstract singular term referring to a relation, namely the relation of instantiation. But Armstrong does not believe that there is a relation of instantiation. How can he justify this? Either he can deny that "*a* has the property *F*" is equivalent to "*a* bears the relation of having (or instantiation) to the property *F*", in which case we should ask why we cannot deny the equivalence for predicates other than "... has ...". Or he can accept the equivalence in general, but argue that the ontological commitment of "*a* bears the relation of having (or instantiation) to the property *F*" is revealed by its simpler equivalent "*a* has the property *F*", the latter not being committed to a relation of instantiation. But in this case we should ask why it is not true in general that the ontological commitment of sentences of the forms "*a* has the property *F*" and "*a* bears the relation *R* to *b*" are revealed by their simpler equivalents "*a* is *F*" and "*a R b*", respectively. In neither case can Armstrong have what he wants, namely, an argument for the conclusion that predicates harbour ontological commitment, save for the predicate "... instantiates ...".

In fact, Armstrong is in worse trouble for a reason I have so far ignored. The distinctive part of Armstrong's theory of universals is its a posteriori element. The inventory of universals is determined by empirical enquiry, not by a priori reasoning. In particular, predicates do not correspond one-one with universals: "I suggest that we reject the notion that just because the predicate 'red' applies to an open class of particulars, therefore there must be a property, *redness*" (1978b, p. 8).

Armstrong's argument that predicates harbour ontological commitment relies on the following line of thought: that "*a* is *F*" is equivalent to "*a* has the property *F*"; the latter sentence contains a genuine abstract singular term referring to a property; so the latter and the former sentences are both committed to properties. But now suppose that our sentence is "*a* is red". This is equivalent to "*a* has the property of being red". The latter sentence contains a genuine abstract singular term referring to the property of being red; so the latter and the former sentences are both committed to the property of being red. But this chain of reasoning looks to be precisely of the sort which Armstrong is battling against.

So, even if he can cope with the trouble about instantiation, he still seems to be in as much trouble as his opponents. For what he must do is offer a reductive analysis of all sentences of the form "*a* has the property

F”, where there is no corresponding universal to which “the property *F*” refers. For playing by his own rules, only so can he remove the commitment to properties. Nowhere does he provide an analysis of these sentences and I suggest the chances are slim. What sort of analysis can Armstrong offer for “... has the property of being a game” if the only genuine properties are those of the natural sciences?

22. *More on ontological commitment*

In §21, I showed that it is plausible that Armstrong’s argument from the problem of universals attempts to establish that predicates harbour ontological commitment. I also showed that, given some other of his views, the attempt must fail. In this section I want to open up the discussion of ontological commitment so that we may return to Quine’s views.

The obvious way to determine whether properties exist is to determine the ontological commitments of theories which we hold to be true. If properties are among the ontological commitments of our theories, then we have the best possible reason to think that they exist. This route to the existence of properties appears to circumvent the more theoretical considerations which I outlined above. For according to this route, we do not argue that there are properties because there is a property role which is best played by some range of entities. Instead, the route is supposed to be more direct: properties exist because we truly say they do.

The difference between these two routes to the existence of properties is not significant. Determining the ontological commitments of sentences is itself a theoretical enterprise. We should acknowledge that there is a difference between the apparent and real ontological commitments of a sentence. A sentence can have hidden ontological commitments which can be revealed by analysis; equally, a sentence can have an apparent ontological commitment which disappears on analysis.

Furthermore, it is wrong to think of the apparent commitments of a sentence as determined by some pre-theoretical intuition about the commitments of a sentence. No: apparent and real commitments are both determined by applying semantic theories, the apparent and real semantic theories, to sentences. Apparent and real commitments diverge when the apparent semantic theory is wrong. Semantic theories are evaluated in the light of a whole host of considerations, some commonsensical, others more metaphysical. For example, suppose the apparent semantic theory dictates that an occurrence of a definite description in a true sentence refers to a worldly item. Then we will soon run into trouble with negative existential sentences. Do we declare there to be two realms of being? No,

we revise our apparent theory. Then we run into trouble with sentences such as “the average man has 2.4 children”. Are there such things as average men? No, we revise our apparent theory again, and so on.

To suppose that there is no distinction between the apparent and real commitments of a sentence is to suppose that we all have the correct semantic theory for the whole corpus of English sentences. But this is absurd. The apparent semantic theory of the ordinary man is a hazy and ill thought out beast which needs to be developed and modified by the philosopher. And philosophers disagree among themselves about the apparent commitments of sentences, because these commitments are precisely determined by applying a semantic theory, a theory whose merits will inevitably be debatable. Do not say that the apparent semantic theory is simply the claim that a sentence is committed to whatever it explicitly mentions. That would be to make the mistake of thinking that the notion of “explicit mention” is theory-neutral. But it is not. How would you argue against someone who said that “the average man has 2.4 children” is apparently committed to the average man on the grounds that it explicitly mentions him?

Moreover, the difference between apparent and real ontological commitment is bound to be employed by those who think that ontological and ideological economy can be traded off against one another. For example, Lewis expands his ontology to include possible worlds partly because he can then remove modal primitives, such as “Necessarily, ...” by defining them in terms of quantification over possible worlds. The apparent ontological commitments of sentences beginning “Necessarily, ...” do not include possible worlds, but if Lewis is right, the real commitments do.

The route to the existence of properties via ontological commitment provides little information about what properties are like. Compare the analogous route to the existence of particulars. Suppose that we follow Quine in discerning commitment to particulars in our best theories because they must be reckoned to be values of the bound variables of the translation of our best theories into his canonical notation. We are not told what such particulars are like. For example, do they persist through time by enduring or by perduring? Here is a difference which will not be decided by a scientific theory concerning, say, subatomic particles, although it is committed to particulars, electrons, protons and the like. Again, are particulars *sui generis* entities or are they some sort of construction, mereological sums of tropes perhaps?

It is no doubt true that some issues about the nature of particulars may be decided by considering what is said by the sentences of the theory which is committed to them. Thus, for example, one might find within the theory sentences which attribute some spatio-temporal location to partic-

ulars. But this is by no means guaranteed. Another example: arithmetical sentences, such as “there is a prime number between 4 and 7”, may indeed be committed to particulars, numbers, but it is hard to find a firm commitment to the abstract status of numbers within those sentences which arithmeticians are disposed to hold true. That they do not say that numbers are spatio-temporally located, say, does not entail that they hold that numbers are not located, nor does their silence entail that there is no metaphysical difference to decide. The same point will carry over to the argument for the existence of properties from the ontological commitments of our theories; little metaphysical information is likely to be forthcoming about the nature of properties.

Three questions have to be answered if this route to the existence of properties is to succeed. What does “ontological commitment” mean? To which theories are we to look to determine ontological commitment? Where is ontological commitment to properties to be located within the sentences of the chosen theories?

I take the fundamental bearer of ontological commitment to be an interpreted sentence; a theory derives its commitment from the sentences it contains; a person from the sentences he sincerely asserts or writes down with assertoric intent. Ontological commitment is best thought of as a relation between two sentences, the bearer of the commitment and the sentence which explicitly expresses the commitment. Two sorts of sentence explicitly express commitment: “*a* exists” for a specific entity *a*, and “*F*s exist” for a kind of entity *F*. The commitment relation is implication or entailment: sentence *S* implies sentence *T* iff it is not possible for *S* to be true and *T* to be false. We say that a sentence *S* is ontologically committed to the entity *a* (or to *F*s) iff *S* implies “*a* exists” (or “*F*s exist”). If it is necessary that *a* exists (or that an *F* exists), then trivially every sentence is committed to *a* (or *F*s). But this does not make the determination of ontological commitment to necessary existents pointless, for there can be privileged sentences to which we appeal to establish the existence of *a*, say, and from there we establish that *a* exists necessarily, so establishing that every sentence is committed to *a*.

As has been said, to determine if properties exist, we must examine the ontological commitments of our best theories. But what are our best theories? “Theory” is a rather posh word for some collection of sentences. The question is which such collections deserve our attention. Clearly, it ought to be those that we deem true. But should the sentences belong to ordinary discourse or to some more rarefied discourse of science? To see why this matters consider how even Quine must admit that we do sometimes talk as if various red things have something in common. For him, of course, this is a “popular and misleading manner of speaking” (1980, p.

10) which would be done away with once we talk of scientific matters in his canonical notation. There are two possible dimensions of difference between ordinary discourse and scientific discourse. First, the kinds of construction that are used. For example, we might abandon talk of red things “having something in common” in a scientific discourse (I doubt that we ever would). Second, we might use the same constructions but hold true different sentences which feature such constructions. Thus, speaking scientifically, we may deny that red things have something in common but insist that charged particles do.

As I noted in the discussion of Quine’s views, there are three sorts of subsentential construction that have been taken to harbour ontological commitment to properties: predicates, abstract singular terms and property-quantifiers. How do we decide whether sentences featuring each of these constructions do in fact harbour ontological commitment? Let us begin with Devitt’s discussion of ontological commitment:

The key idea is that a person is committed to the existence of those things that must exist for the sentences he accepts to be true. What must exist for a given sentence to be true is a semantic question to which our best theory may give no answer in which we have confidence. (1980, p. 434)

So Devitt shares the idea of ontological commitment sketched above and thinks that to determine questions of ontological commitment we must look to semantic theory. As we saw, the commitment of his sample sentence, “*a* is *F*”, is read off from the right hand side of the biconditional of Quine’s semantic theory: “*a* is *F*” is true if and only if there exists an *x* such that “*a*” designates *x* and “*F*” applies to *x*. In other words, “*a* is *F*” is only committed to the existence of *a*, not *F*-ness.

How convincing is Devitt’s argument? He links the notion of ontological commitment to semantic theory, so we need some way of saying when a semantic theory is correct and an argument which makes the connection with ontological commitment plausible. Now a quick but useless route to this connection is to hold that a semantic theory is correct just in case it reveals the ontological commitments of the sentences with which it deals. This is useless because we wanted to arrive at a correct semantic theory and then use it to determine ontological commitment.

Suppose that it is said that the following clause appears in the correct semantic theory: “*a* is *F*” is true iff there is a ϕ such that “... is *F*” designates ϕ and “*a*” falls under ϕ . If we read off ontological commitment from the right hand side of this clause, then we see that “*a* is *F*” is only committed to *F*-ness, not to an entity designated by “*a*”. If it was all right to have a primitive semantic relation, “applies to”, relating predicates and entities designated by singular terms, then it ought to be all right to have another primitive semantic relation, “falls under”, relating singular terms

and entities designated by predicates. And parodying Quine, we may say that it is only “a popular and misleading manner of speaking” to say that there is some one thing which *F*-ness, *G*-ness and *H*-ness all have in common when *a* is *F* and *G* and *H*. The obvious reply is to claim that when one says “*a* is *F*” one just knows that one is speaking about *a*, and that the sentence would not be true unless *a* existed. But so far nothing has been said to counter the suggestion that when one says “*a* is *F*” one just knows that one is speaking about *F*-ness, either with or without *a*, and that the sentence would not be true unless *F*-ness existed.

At this point, one can wheel in quantificational considerations. The reason that we need to assign a referent to “*a*” in “*a* is *F*” is that we can move from this sentence to the existential generalisation “there is some *x* such that *x* is *F*”, and a satisfactory semantics for this latter sentence must have the bound variable ranging over some entities, one of which is designated by “*a*”.

But can we not say the same for assigning a referent to the predicate “... is *F*”? For we can equally move from “*a* is *F*” to the existentially quantified “there is some ϕ such that *a* is ϕ ”. It may be said that the last move, unlike the first, is simply illegitimate because there are no entities to serve as the values of variables. But we have so far seen no reason to believe this. Indeed, natural language seems to be replete with such sentences. For example, we can infer “there is some property which John has” from “John is tall”; “There is something such that John is it and Jane is not it” (or, more naturally, “John is something which Jane is not”) from “John is a man and Jane is not a man”. That is why the following observation is of little ontological interest:

... there is no need, as long as the underlying logic is assumed to be first order, to introduce entities to correspond to predicates ... for large stretches of language, anyway, variables, quantifiers, and singular terms must be construed as referential in function; not so for predicates. (Davidson 1984, p. 210)

If one tried to use this observation to show that predicates are not referential in function, then one could justly be accused of parsimony by neglect. Only by perversely ignoring the other large stretches of language which seem to require a second-order language for their expression can one think that one has shown anything about the referential function of predicates.

One could reply that the sentence “there is some property which John has” is not obtained from “John is tall” by quantifying into the predicate position, but is rather obtained by quantifying into the position occupied by the abstract singular term “the property of tallness” in “John has the property of tallness”. So we are given no reason to think that predicates have a referential function. This objection cannot be evaded by moving to

“there is something which John is”. For again it may be replied that here one does not quantify into the position occupied by the predicate. For if one really did so quantify, the copula would not be left behind (see Wiggins 1984, p. 317). These are delicate issues which cannot be pursued here. Fortunately, they seem to be of little relevance. To see this remember that the question is whether predicates harbour ontological commitment, not whether they have a referential function. Having a referential function is one way, but not the only way, to harbour ontological commitment.

So, for the sake of argument, let us agree with Quine that predicates have no referential function. Cases of apparent quantification into predicate position (the position occupied by “... is *F*” in “*a* is *F*”) are to be reconstrued as quantification into the position occupied by an abstract singular term (the position occupied by “the property *F*” in “*a* has the property *F*”). Now it follows from the intuitive notion of ontological commitment that necessarily equivalent sentences have the same ontological commitments. This may be said to be a problem for the intuitive notion. For example, “*P* & $2+2=4$ ” has the same ontological commitments as “*P*”. Of course, we could alter the kind of necessity involved in the intuitive notion to exclude this necessary equivalence. But I think any plausible alteration will yield the following necessary equivalence: “*a* is *F*” is necessarily equivalent to “*a* has the property *F*”.

We might try ruling out this equivalence by insisting that necessarily equivalent sentences are strictly synonymous. Then we would have to give up a central use of the notion of ontological commitment, namely, to claim that the ontological commitments of a sentence can be revealed through the provision of a necessarily equivalent sentence. For any notion of synonymy which is strict enough to rule out the synonymy of “*a* is *F*” and “*a* has the property *F*”, will prevent anything being revealed. If *P* is to reveal the ontological commitments of *Q*, where *P* and *Q* are necessarily equivalent sentences, then *Q* had better mislead us as to its ontological commitments and *P* had better not. Then it is hard to see how the necessary equivalence of *P* and *Q* can be a strict form of synonymy, for *Q*’s deception is likely to be founded on a structural difference between *Q* and *P*, which will be sufficient to render *Q* and *P* non-synonymous. For example, *Q* may feature a singular term such as “the average man” which does not occur in *P*. So I think we are stuck with the necessary equivalence of “*a* is *F*” and “*a* has the property *F*”, whatever sense of necessity features in the intuitive notion of ontological commitment.

This necessary equivalence enables us to argue that the predicate “... is *F*” harbours ontological commitment in the following way. We suppose that “*a* has the property *F*” entails “the property *F* exists”. Since “*a* has the property *F*” and “*a* is *F*” are necessarily equivalent, “*a* is *F*” entails

“the property *F* exists”. So, according to the definition of ontological commitment, “*a* is *F*” is committed to the existence of the property *F*.

Of course, this argument is not conclusive. For the way is open to argue that “*a* has the property *F*” is only apparently committed to the property *F*, its real commitment being revealed by the equivalent “*a* is *F*” which should receive the Quinean semantics above. How can we resolve the issue? First, we should ask the Quinean to make sense of sentences such as “there is some property which John has” which follows from “John has the property of tallness”. It is not enough to paraphrase this sentence alone to remove the commitment to a property. One must also look at other sentences which feature abstract singular terms and property-quantification. For example, suppose that “Humility is a virtue” is really committed to the property of humility. Then we may form the sentence “Humility is a virtue and Socrates has humility”, from which we can infer “There is some property which is a virtue and which Socrates has”.

The point which emerges from this discussion is that we can ignore the issue of the referential function of predicates and argue that predicates harbour ontological commitment providing that the corresponding abstract singular terms do as well. Hence we have returned to the question whether abstract singular terms harbour ontological commitment to properties. As I said in §15 above, Quine has two strategies for dealing with a sentence which contains such a term. First, one can offer a paraphrase of the sentence in which the abstract singular term does not occur. Second, one can agree that the sentence is to be taken at face value, but that the referent of the abstract singular term is not a property, but some other entity, usually a set.

Armstrong, following Jackson (1977) and Pap (1959), argues that paraphrases are not always available. For example, Quine’s translation of “Humility is a virtue” as “Humble persons are virtuous” is plainly inadequate. For if we suppose that as things actually are, every tall person is virtuous, then “Tall persons are virtuous” is true, but it does not follow that “Tallness is a virtue” (Jackson 1977, p. 427). So Quine’s translation is not necessarily equivalent to the original. For the same reason, it is not possible to apply Quine’s second strategy to “Humility is a virtue” for the obvious way of applying that strategy is to have “Humility” refer to the set of humble persons and “...is a virtue” say that every member of this set is virtuous. Clearly, this will not do; if, as it happens, every member of the set of tall persons is virtuous, it does not follow that tallness is a virtue.

One might adapt the paraphrase strategy by employing a modal operator but this will not work either (Jackson 1977, p. 427). Consider translating “Red is a colour” as “Necessarily, every red thing is coloured”. The

translation is not equivalent to the original because “Necessarily, every red thing is extended” is true but “Red is an extension” is false.

So it seems that Quine’s strategies for abstract singular terms will not work. Nor will his strategy for property-quantifiers. This strategy seeks to interpret apparent property-quantifiers as really quantifiers over other sorts of entities, Quine’s two candidates being sets and open sentences (or predicates). I cannot see how either interpretation will work. Once it has been admitted that “Red” in “Red is a colour” is a genuine singular term and that it stands neither for a set nor an open sentence, then the sentence “Something is a colour”, which we may infer from the first, cannot feature a quantifier ranging over sets or open sentences.

At this point, three remarks on the significance of the availability of paraphrase are in order, followed by an important fourth in the next section. First, an ad hominem point against Armstrong. At the end of the chapter in which he rehearses Jackson’s and Pap’s arguments against the availability of nominalist paraphrases of sentences featuring abstract singular terms and property-quantifiers, he notes that his conclusion must be qualified. For example, even though “He has the same virtues as his father” cannot be paraphrased in an Oz-nominalistically acceptable way, this does not entail that there are virtues:

An a posteriori Realism cannot be content to establish the existence of particular universals as easily as that! But I think that the argument does show that we can give an account of “the virtues” only in terms of universals: that range of properties and relations which make it true that a particular possesses a certain virtue. (1978a, p. 63)

As far as I can tell, Armstrong never provides a paraphrase of “He has the same virtues as his father” which shows that it is not really committed to virtues. Why then is Armstrong so certain that there are no such things? It seems open to someone to challenge his a posteriori realism by exhibiting the sorts of sentences which Armstrong uses to challenge the nominalist.⁵⁴

My second point is that the whole method of arguing about the availability of paraphrases and its relevance to ontological commitment is disappointingly inconclusive, because of the general nature of the argument. Those who think paraphrases are available for their purposes, produce one or two examples and think that will do, no argument being given why one should think that a paraphrase is available in all cases. Those who think at least one problematic sentence will resist paraphrase, criticise a candidate

⁵⁴ This is the analogue of the point made at the end of §21 above. I think that anyone who is impressed by the unavailability of paraphrases for sentences which contain abstract singular terms and property-quantifiers should adopt an abundant theory of properties. Jubien (1989a) does as he should.

paraphrase and think that will do, no argument being given why there cannot be an adequate paraphrase lurking around the corner.

Finally, Alston's (1958) point about the strategy of reducing ontological commitment by paraphrase should be noted. Suppose we have a sentence *P* which is apparently committed to some entity, *E*. *Q* is necessarily equivalent to *P*, but it is said that *Q* is really not committed to *E*. Hence, it is said that *P* is only apparently committed to *E*, its paraphrase *Q* showing that the commitment is only apparent. Alston's point is that we can turn this reasoning around. Why should we think that *Q* deceives, rather than *P*? Why not say that *Q* is apparently not committed to *E*, but its equivalent *P* is really committed to *E*, hence *Q* is really committed to *E*? I do not know how to answer this question and without an answer the whole project looks to be septic. It is no good saying that of a pair of equivalent sentences, the sentence which is committed to more entities is always deceptive, for those who use the notion of ontological commitment do not believe the suggested general principle; they acknowledge that ontological commitments can be hidden and can be revealed by paraphrase. What is needed is a test for when a sentence is only apparently committed and when really committed to some entity or kind of entity.

23. Interlude: the use of properties in semantic theories

The use of the notion of ontological commitment is intertwined with two ideas. First, the ontological commitment of a sentence can be revealed by the exhibition of a paraphrase of the sentence. Hence the distinction between apparent and real ontological commitment. For example, we have seen how Quine uses paraphrases to argue that the apparent commitment of certain sentences to properties is not real. Second, the real ontological commitment of a sentence is given by the real semantic theory for the sentence (and the language which contains it). For example, we have seen how Devitt employs Quine's semantic theory for simple subject-predicate sentences to determine the ontological commitments of those sentences. I have shown that there are problems with each idea. I now want to consider Lewis's thoughts on these matters to bring out another problem.

Lewis argues that in order to apply compositional semantics to sentences such as "Humility is a virtue" and "He has the same virtues as his father", we should assign semantic values to abstract singular terms and let such entities be the values of the variables of the property-quantifiers. He thinks that the existence of paraphrases for such sentences is irrelevant:

Perhaps sometimes we might find paraphrases that will absolve us from the need to subject the original sentence to semantic analysis ... But even if such paraphrases sometimes exist—even if they *always* exist, which seems unlikely—they work piecemeal and frustrate any systematic approach to semantics. (Lewis 1983b, p. 348–9)

The conclusion is that the appropriate semantic values for abstract singular terms are Lewis's abundant properties (sets of actual and possible particulars) and these properties are to be the values of the variables of the property-quantifiers. Armstrong's universals will not do because they are too sparse. For example, there is no universal of humility.

Prima facie, Lewis's argument is not to the point. Armstrong never talks of any supposed project of systematic, compositional semantics. As I have interpreted him, he is concerned with the ontological commitments of sentences featuring abstract singular terms and property-quantifiers, and the availability of paraphrase is relevant to that concern. Equally, Lewis does not talk of ontological commitment. How are we to make sense of this? Earlier I said that the real ontological commitment of a sentence is given by the real semantic theory for the sentence. The simplest way for ontological commitment to be given by a semantic theory is for that theory to assign objects as referents to referring expressions within the sentence. Lewis's semantic values seem to be precisely such referents.

Unfortunately, the matter is not so simple. Consider, for example, the model-theoretic semantic theory proposed by Lewis in his "General Semantics". In that paper he suggests that proper names and quantified noun phrases both have sets of properties ("characters") as their extensions (1983a, §VII). Are we to say on the basis of this semantic assignment that a sentence such as "David Lewis is mortal" is not committed to David Lewis but rather to the set of his properties?⁵⁵

Here's how Lewis conceives of a systematic semantics:

First list a finite vocabulary of basic expressions—words, near enough—and assign each of them some sort of syntactic category and semantic value. Then list rules for building expressions from other expressions; and within each rule, specify the syntactic category and the semantic values of the new expression as a function of the categories and values of the old expressions whence it was built. One syntactic category will be the sentences. Then specify truth conditions for sentences in terms of their semantic values.

⁵⁵ Compare Lewis's remark: "... I don't think we should say that an ordinary proper name refers to a bundle of properties. My name, for instance, refers to me—and I am not a bundle of properties" (1986c, pp. 41–2, fn. 31).

The semantic values have two jobs. They are there to generate other semantic values; and they are there to generate truth conditions of sentences. (1986c, p. 41)

This abstract description of the project of compositional semantics can be filled out in various ways, depending, for example, on how context-dependence is accommodated. But the general idea is clear.

I can now explain why the matter is not so simple. The first point to note is that the assignment of semantic values is constrained by the goal of describing the truth-conditions of the sentences of the language, but this goal underdetermines that assignment. Anything that does the job will do. Such a semantic theory has really lost touch with the concern about the ontological commitments of sentences and I suppose that is why Lewis is careful not to talk in such terms. For him, being a semantic value is a theoretical role and we need to assign semantic values to abstract singular terms. But it would be misleading to say that such terms harbour ontological commitment to these semantic values. If it is permissible to assign the ordinary proper name “David Lewis” either the man himself or the set of his properties, given suitable compensating changes in the assignments to other types of expression, then we can play the same trick with “Humility” and assign it either a property, construed in Lewis’s way as the set of actual and possible humble particulars, or the set of this property’s properties. With no way of deciding which of the two assignments is the one which reveals the ontological commitments of sentences containing “Humility”, we should admit that this sort of semantic theory tells us little about ontological commitment.

This is not to say that it does not give us an argument for the existence of properties. For semantic theory supplies one property-role worth playing. If there is good reason to think that abstract singular terms should be assigned semantic values, then there are properties. It does, however, leave us with an awkward and unanswered question: which sort of semantic theory will determine the ontological commitments of a sentence?

24. *Truth-makers*

I shall now return to the discussion of Armstrong’s problem of universals and the third interpretation of Armstrong’s demand for an account, namely, that he is asking what makes his various sentences true and thinks that the best account of the truth-makers of such sentences will involve his universals.

The question “In virtue of what is this sentence true?” can be interpreted as a demand for a truth-maker for the sentence.⁵⁶ Truth-makers are required by the truth-maker principle which in schematic form is:

(TM) Every true sentence of type *T* has a truth-maker.

Different versions of (TM) result from different values of *T*. For example, we might require that it is only contingently (*T*=contingent) true sentences that have truth-makers.

The truth-maker principle is a sanitised version of a correspondence theory of truth, shorn of the unworkable idea of truth as a kind of pictorial resemblance, but retaining the doctrine that the world is independent of linguistic description and must be a certain way in order for a given sentence to be true of it. (TM) turns the way the world must be into a demand for a truth-maker, an entity that is that way. The intuitive idea is that there must be something in the world which, in some sense, is responsible for or grounds the truth of a sentence. This is clearly not a causal sense of responsibility or grounding. What else can it be? Here we take over the attempt to spell out the sense in which a cause necessitates its effect as meaning that the existence of a cause is necessarily sufficient for the existence of the effect, that is, the existence of the cause entails the existence of the effect. That will not do as a definition of causation, but it does give us a sense in which truth-makers can ground the truth of the sentences which they make true. So we define the relational notion of a truth-maker, *T*, for a given sentence, *S*, as:

T is a truth-maker for the sentence *S* iff “*T* exists” entails “*S* is true”

where entailment is to be construed in an intuitive way, the necessity being broadly logical or metaphysical (Fox 1987; p. 189 suggests this definition). The right hand side has to be modalised if we are to preserve the idea that the truth of different sentences can be grounded in different aspects of the world. This would be lost if the right hand side was expressed using the material conditional, for then any existent entity would be a truth-maker for any truth. But a similar problem infects the present definition. According to it, many true sentences will be made true by the existence of the entire world, whereas we wanted some more intimate connection between a true sentence and its truth-maker. The obvious solution is to convert the conditional on the right hand side into a modal biconditional. But this would lead to the thesis that each sentence has its own special truth-maker. If we call these

⁵⁶ It can also be understood as a demand for the ontological commitments of the sentence. Hence a confusion between truth-makers and ontological commitments. “In virtue of” really ought to be banned.

truth-makers facts, then, each sentence *S* has the fact that *S* as its personal truth-maker.⁵⁷

Let us now proceed to examine Armstrong's notion of truth-makers. He is content to remain with the original definition of truth-makers given above. He is never explicit about this, but one can tease the definition out by reading between the lines.⁵⁸ How does he deal with the problem of the whole world making many different sentences true? By distinguishing different conceptions of the world: as made out of thin particulars or as made out of states of affairs. On the first conception, it is just not true that the world makes many different sentences true. For example, take the sentence, "the Morning Star is bright". It is not made true by the world, as a sum of thin particulars, for that same sum could have existed without the sentence being true; it is possible that the Morning Star exists without being bright. On the second conception, it is indeed true that the world makes true this sentence. But within the world, so conceived, one can distinguish a constituent state of affairs which also makes it true. So we can distinguish among the truth-makers for a given sentence in the following way. Call a truth-maker for a sentence "minimal" iff it has no constituents which make the sentence true; and "overblown", otherwise.⁵⁹ Then, by concentrating on minimal truth-makers, we have the differentiation which we wanted to preserve. This does not mean that Armstrong thinks that each true sentence has its own special truth-maker. The loose connection between predicates and universals which Armstrong endorses is mirrored by a loose connection between true sentences and truth-makers. A given sentence may have more than one truth-maker. For example, "electron *e* has charge *c* or mass *m*" is made true by each of the truth-makers for its disjuncts. Two or more sentences may have the same truth-maker. For example, the true sentences "the postbox is red" and "the postbox is coloured" may each have the same truth-maker, namely, the state of affairs consisting of the postbox having the particular property which is responsible for it being a determinate shade of red.

⁵⁷ Or if you want some extensionality, then it leads to the thesis that each set of sentences closed under substitutions of co-referential subsentential constituents has its own special truth-maker. So, for example, the two sentences "The Morning Star is bright" and "The Evening Star is bright", being derived from each other by substitution of co-referential singular terms, are made true by the same fact. Of course, there are bound to be tricky issues here about which subsentential constituents refer and which notion of co-referentiality is appropriate for those that do.

⁵⁸ See, for example, Armstrong (1989a, pp. 41–2, pp. 92–7, and 1989b, pp. 88–9). Curiously, Armstrong talks of predicates, not just sentences, having truth-makers (1989a, p. 41, fn. 3).

⁵⁹ Similar definitions are given by Fox (1987, p. 190) and Mulligan, Simons and Smith (1984, p. 297).

Given that the truth-maker principle, with truth-makers defined in the way indicated above, is warranted, we have a metaphysical role which must be played by some sort of entity. Armstrong thinks that his states of affairs are the best candidate for the role. And since these states of affairs are conceived as having particulars and universals as constituents, we have an indirect argument for the existence of universals.

The truth-making role cannot be played by the universals themselves. For suppose that "*a* is *F*" is a contingent truth and that there is a universal *F* corresponding to the predicate "... is *F*". Then *F* by itself is not a truth-maker for this sentence because *F* might exist without a being *F*. Nor is the mereological sum of *a* and *F* a truth-maker for the sentence, for the sum might exist without *a* being *F*. So we seem to require the state of affairs, *a*'s being *F*, as a truth-maker for the sentence.

In §12 above, I pointed out that tropes mirror states of affairs. For example, where Armstrong has the state of affairs of *a*'s being *F*, the trope theorist has the trope, the *F*-ness of *a*. This mirroring suggests that tropes may play the role of truth-makers and that we may overturn Armstrong's indirect argument in favour of his universals.⁶⁰ For example, we might think that the trope, the *F*-ness of *a*, makes true the sentence "*a* is *F*". But this trope makes the sentence true just in case its existence entails the truth of the sentence. This can be so only if tropes are non-transferable, that is, if tropes cannot have instances other than their actual instances. For example, if it is possible for the *F*-ness of *a* to be instantiated by *b* rather than *a*, then the trope is not a truth-maker for "*a* is *F*". I know of no considerations that decide the issue of non-transferability.⁶¹

What is the connection between truth-making and ontological commitment? If we look at the definitions of a truth-maker for a sentence and of a sentence being ontologically committed to a particular entity, then we see that they are converses of one another. *T* is a truth-maker for the sentence *S* iff "*T* exists" entails "*S* is true". Sentence *S* is ontologically committed to *O* iff "*S* is true" entails "*O* exists". So there is no immediate link between the two. But a link can be forged. If we take the truth-maker principle to be a metaphysically necessary truth, then every sentence with which it *deals* must have a truth-maker. In which case, for any *S* of the appropriate type, "*S* is true" entails "a truth-maker for *S* exists". This last sentence is not specific because it does not attribute any particular ontological commitment to *S*; as the circumstances change, so might the truth-maker for *S*. But what matters to Armstrong is that, in general, a truth-

⁶⁰ Mulligan, Simons and Smith (1987) have tropes, under the name "moments", as truth-makers.

⁶¹ See Armstrong (1989b, pp. 117-8) for an unpersuasive rejection of non-transferable tropes which rests on the claim that such tropes would introduce "a rather mysterious necessity in the world" (p. 118).

maker for *S* will be a state of affairs, a constituent of which is a universal, and so, in a derivative sense, the predicate of *S* can be held to carry ontological commitment, there being some universal or other, not necessarily the same one in each case, which is the constituent of the state of affairs which makes true the sentence in which the predicate occurs.⁶²

This loose relationship between truth-makers and ontological commitment explains why Armstrong does not provide paraphrases of sentences such as “He has the same virtues as his father” in order to remove the apparent ontological commitment to properties, the virtues. For if his fundamental concern is with truth-makers, and not with ontological commitment, then he can argue that the truth-maker for “He has the same virtues as his father” will not contain such properties. Indeed, the passage I quoted in §22 ends with what we now recognise as an appeal to a truth-maker principle: “that range of properties and relations which make it true that a particular possesses a certain virtue” (1978a, p. 63).

The demand for truth-makers also does something to nullify the problem of instantiation which has been thought damaging for a theory of universals (see §11 above). Let us take our contingent truth “*a* is *F*”, where there is a universal *F* corresponding to the predicate “... is *F*”. One way to understand the problem of instantiation is as a demand for a truth-maker for “*a* is *F*”. Since the existence of *a* and *F* does not entail the truth of the sentence, one might posit a relation of instantiation which relates the two. But the existence of *a*, *F* and this relation does not entail the truth of the sentence. Obviously, positing another relation generates a regress. But the problem, so construed, can be side-stepped if we bring in the state of affairs, *a*'s being *F*, as the required truth-maker. Therefore I cannot see why Armstrong now thinks that he needs to admit a relation of instantiation (1989b, pp. 108–10).

Armstrong finds the truth-maker principle “fairly obvious once attention is drawn to it” (1989b, p. 89). Unfortunately, he does not know how to support it and does very little to explain its application. Moreover, the truth-maker principle is the backbone of Mellor's (1995) recent book on causation. Though he calls his truth-makers “*facta*”, they have many of the characteristics of Armstrong's states of affairs. Some are required to make true the sentences related in a sentence expressing singular causation, others to make law-sentences true. Again, very little is said in support of the principle and how it is to be applied. I shall end this section with some problems to be solved.

First, one must circumscribe the range of the truth-maker principle. For example, does it apply to all truths, whether necessary or contingent, or

⁶² Truth-makers and ontological commitments are run together by Armstrong in this passage: “We could put Quine's famous test for ontological commitment by saying that he requires a truth-maker for the referential component of true statements but not for any other component” (1989a, p. 41, fn. 3).

only to contingent truths?⁶³ The definition of truth-makers entails that a truth-maker for a given necessary truth is equally a truth-maker for every other necessary truth. If ontological economy is the name of the game then one should conclude that all necessary truths have one and the same truth-maker. But this conclusion runs against the idea that the truth of different sentences is grounded in different aspects of the world. On the other hand, if the truth-maker principle is held to apply to contingent truths only, then one wants to know what justifies its limited application. If contingent truths need truth-makers, why don't necessary truths?

Second, even if the truth-maker principle can be justifiably limited in its application to the contingent truths, there is a threat from a version of the slingshot argument which seeks to show that every true sentence has the same truth-maker. The slingshot uses two assumptions. First, that a truth-maker for a sentence *S* is equally a truth-maker for a sentence which is necessarily equivalent to *S*. This follows from the definition of truth-makers. Second, that a truth-maker for a sentence *S* is equally a truth-maker for a sentence which is derived from *S* by the substitution of a co-referring singular term. Here is how the slingshot might run. We start with a true sentence *S* which has a truth-maker *T*. By the first assumption, we infer that “{*x*: *x* is a natural number & *S*} = {*x*: *x* is a natural number}” is made true by *T*. By the second assumption, we infer that “{*x*: *x* is a natural number & *S**} = {*x*: *x* is a natural number}” is made true by *T*, where the only condition on the sentence *S** is that it is true. By the first assumption, we conclude that *S** is made true by *T*. I take it that no theory of truth-makers can accept this result for it does not preserve the idea that the truth of different sentences is grounded in different aspects of the world. The argument is valid, so at least one of the assumptions must be rejected. It cannot be dismissed as logical trickery, for it exposes a critical lacuna in the theory of truth-makers.⁶⁴

Third, one would like to know whether truth-makers are all of the same metaphysical kind. It seems not. “Socrates exists” and “Socrates = Socrates” need only Socrates to make them true. We need no special states of affairs or *facta* to make these sentences true.⁶⁵ Finally, even if the truth-maker principle is restricted in its application to contingent truths, some-

⁶³ Armstrong (1989b, p. 88) is undecided.

⁶⁴ See Menzies (1989, §5) for a recent discussion of a slightly different application of the slingshot to the idea that true sentences refer to situations. Situations are similar to Armstrong's states of affairs and Mellor's *facta*, though the latter pair say that true sentences are *made true* by these entities.

⁶⁵ Does this give us another reason to deny that there is a property of existence or relation of identity, namely, that no truth-makers are needed with this property or relation as constituents? See the discussion of Armstrong's theory of universals in §11 above.

thing needs to be said in support of its application to every contingent truth. For example, Lewis (1992) claims that negative existential sentences, such as “there are no talking donkeys”, need no truth-makers. Instead “they are true for lack of false-makers” (1992, p. 216). Once one starts to make distinctions between contingent truths which need truth-makers and those which do not, one will have to supply a justification for the unequal treatment. All of this is work to be done, so the theory of truth-makers is an avenue for future research.

25. The problem of universals: concluding thoughts

I have explored various ways to understand the metaphysical versions of the problem of universals. Armstrong holds that solving the problem of universals is one role for properties. Indeed he takes it to be an argument for his favoured system of candidates for properties, aristotelian universals. I have shown that the problem of universals bears three interpretations, each of which has its own problems. It can be interpreted as the demand for a conceptual analysis either of predication in general or of resemblance predicates. The first demand cannot be met. The second need not be met. But if it is met, there are limits on its success, and it cannot persuasively be argued that Armstrong’s universals are the best candidate for the properties talk of which features in the conceptual analyses.

The second interpretation of the problem of universals sees it as a demand for the ontological commitments of sentences such as “*a* is *F*”. I showed that Armstrong’s claim that predicates harbour ontological commitment must fail within his own framework. It was also argued that it seems to be impossible to interpret sentences featuring abstract singular terms and property-quantifiers so that the apparent ontological commitment to properties disappears. If one is impressed by this impossibility, then one will adopt an abundant theory of properties, but the nature of these properties is left undecided. Finally, the notion of ontological commitment and its relationship to semantic theory were shown to be problematic.

The last interpretation of the problem of universals sees it as a demand for the truth-makers of sentences featuring predicates. Truth-makers and ontological commitments are often confused, not least by Armstrong. The idea of a truth-maker and the principle that sentences need truth-makers is in urgent need of clarification and support. Until such work is done, we cannot evaluate Armstrong’s indirect argument for universals via their appearance in states of affairs which are truth-makers. And even when such work is done, it must be argued that states of affairs are better candidates for truth-makers than tropes.

Solving the problem of universals is just one role for properties. As I pointed out in §8 above, there are several others. This does not mean that the discussion of the problem of universals is unrelated to those other roles. For example, Mellor's (1995) argument for properties from their role in theories of causation and law depends upon the idea that true sentences need truth-makers. So my worries about the problem of universals have a more general significance. Moreover, the three interpretations of the problem of universals are the only senses I can give to the elusive idea of metaphysical explanation which is often invoked but never clarified. But perhaps I am missing something.⁶⁶

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REFERENCES

- Alston, William 1958: "Ontological Commitments". *Philosophical Studies*, 9, 1–2, pp. 8–17.
- Armstrong, D.M. 1978a: *Nominalism and Realism: Universals and Scientific Realism* Volume I. Cambridge: Cambridge University Press.
- 1978b: *A Theory of Universals: Universals and Scientific Realism* Volume II. Cambridge: Cambridge University Press.
- 1980: "Against 'Ostrich Nominalism': A Reply to Michael Devitt". *Pacific Philosophical Quarterly*, 61, 4, pp. 440–9.
- 1983: *What is a Law of Nature?*. Cambridge: Cambridge University Press.
- 1986: "In Defence of Structural Universals". *Australasian Journal of Philosophy*, 64, 1, pp. 85–8.
- 1988: "Can a Naturalist Believe in Universals?", in Ullmann-Margalit 1988, pp. 103–15.
- 1989a: *A Combinatorial Theory of Possibility*. Cambridge: Cambridge University Press.
- 1989b: *Universals: An Opinionated Introduction*. Boulder, Colorado: Westview Press.
- 1991: "Classes Are States of Affairs". *Mind*, 100, 398, pp. 189–200.
- Bacon, John 1995: *Universals and Property-Instances: The Alphabet of Being*. Oxford: Basil Blackwell.

⁶⁶ For the past five years I have learned a great deal about metaphysics from conversations with Fraser Macbride. I would also like to thank Jeremy Butterfield for some last minute suggestions and for spotting a howler.

- Bacon, John, Campbell, Keith and Reinhardt, Lloyd (eds.) 1993: *Ontology, Causality and Mind: Essays in Honour of D.M. Armstrong*. Cambridge: Cambridge University Press.
- Barwise, Jon and Perry, John 1983: *Situations and Attitudes*. Cambridge, Mass.: MIT Press.
- Bealer, George 1982: *Quality and Concept*. Oxford: Clarendon Press.
- Benacerraf, Paul 1965: "What Numbers Could Not Be". *Philosophical Review*, 74, 1, pp. 47–73.
- Bigelow, John 1988: *The Reality of Numbers*. Oxford: Clarendon Press.
- 1990: "Sets are Universals" in Irvine 1990, pp. 291–305.
- Brand, M. and Walton, D. (eds.) 1976: *Action Theory*. Dordrecht: Kluwer.
- Campbell, Keith 1976: *Metaphysics: An Introduction*. Encino, California: Dickenson.
- 1981: "The Metaphysic of Abstract Particulars", in French, Uehling Jr and Wettstein 1981, pp. 477–88.
- 1990: *Abstract Particulars*. Oxford: Basil Blackwell.
- Carnap, Rudolf 1958: *Meaning and Necessity*, second edition. Chicago: University of Chicago Press.
- Chierchia, Gennaro, Partee, Barbara, H. and Turner, Raymond (eds.) 1989: *Properties, Types and Meaning* Volume 1. Dordrecht: Kluwer.
- Daly, Chris 1994: "Tropes". *Proceedings of the Aristotelian Society*, 94, pp. 254–61.
- Davidson, Donald 1984: "The Method of Truth in Metaphysics", in his *Inquiries into Truth and Interpretation*. Oxford: Clarendon Press, pp. 199–214.
- Devitt, Michael 1980: "'Ostrich Nominalism' or 'Mirage Realism'?". *Pacific Philosophical Quarterly*, 61, 4, pp. 433–9.
- Devitt, Michael and Sterelny, Kim 1987: *Language and Reality*. Oxford: Basil Blackwell.
- Dretske, Fred 1977: "Laws of Nature". *Philosophy of Science*, 44, 2, pp. 248–68.
- Fodor, Jerry A. 1976: *The Language of Thought*. Hassocks: Harvester Press.
- 1985: "Fodor's Guide to Mental Representation: The Intelligent Auntie's Vade-Mecum". *Mind*, 94, pp. 76–100.
- Forrest, Peter 1986: "Ways Worlds Could Be". *Australasian Journal of Philosophy*, 64, 1, pp. 15–24.
- 1993: "Just Like Quarks? The Status of Repeatables", in Bacon, Campbell and Reinhardt 1993, pp. 45–72.
- Foster, L. and Swanson, J.W. (eds.) 1970: *Experience and Theory*. Boston: University of Massachusetts Press.

- Fox, John F. 1987: "Truthmaker". *Australasian Journal of Philosophy*, 65, 2, pp. 188-207.
- Frege, Gottlob 1980: "Function and Concept", in Geach and Black 1980, pp. 21-41. An address given in 1891.
- French, Peter A., Uehling Jr, Theodore E. and Wettstein, Howard K. (eds.) 1981: *Midwest Studies in Philosophy Volume VI: The Foundations of Analytic Philosophy*. Minneapolis: University of Minnesota Press.
- Geach, Peter and Black, Max (eds.) 1980: *Translations from the Philosophical Writings of Gottlob Frege*, third edition. Oxford: Basil Blackwell.
- Goodman, N. 1970: "Seven Strictures on Similarity", in Foster and Swanson 1970, pp. 19-29.
- 1986: "Nominalisms" in Hahn and Schilpp 1986, pp. 159-61.
- Hahn, L.E. and Schilpp, P.A. (eds.) 1986: *The Philosophy of W.V. Quine*. La Salle, Illinois: Open Court.
- Hirsch, Eli 1993: *Dividing Reality*. New York: Oxford University Press.
- Irvine, A.D. (ed.) 1990: *Physicalism in Mathematics*. Dordrecht: Kluwer.
- Jackson, Frank 1977: "Statements About Universals". *Mind*, 86, pp. 427-9.
- Johnston, Mark 1987: "Is There a Problem About Persistence?". *Aristotelian Society Supplementary Volume*, 61, pp. 107-35.
- Jubien, Michael 1989a: "On Properties and Property Theory", in Chierchia, Partee and Turner (eds.) 1989, pp. 159-75.
- 1989b: "Straight Talk About Sets". *Philosophical Topics*, 17, 2, pp. 91-107.
- Kim, Jaegwon 1976: "Events as Property Exemplifications", in Brand and Walton 1976, pp. 159-77.
- Kripke, Saul A. 1982: *Wittgenstein on Rules and Private Language*. Cambridge, Mass.: Harvard University Press.
- Leonard, Henry and Goodman, Nelson 1940: "The Calculus of Individuals and Its Uses". *Journal of Symbolic Logic*, 5, 2, pp. 45-55.
- Lewis, David 1968: "Counterpart Theory and Quantified Modal Logic". *Journal of Philosophy*, 65, 5, pp. 113-26.
- 1973: *Counterfactuals*. Cambridge, Mass.: Harvard University Press.
- 1983a: "General Semantics", in his *Philosophical Papers* Volume 1. Oxford: Oxford University Press, pp. 189-232.
- 1983b: "New Work for a Theory of Universals". *Australasian Journal of Philosophy*, 61, 4, pp. 343-77.
- 1986a: "Against Structural Universals". *Australasian Journal of Philosophy*, 64, 1, pp. 25-46.

- 1986b: “Comment on Armstrong and Forrest”. *Australasian Journal of Philosophy*, 64, 1, pp. 92–3.
- 1986c: *On the Plurality of Worlds*. Oxford: Basil Blackwell.
- 1991: *Parts of Classes*. Oxford: Basil Blackwell.
- 1992: Critical Notice of D.M. Armstrong’s *A Combinatorial Theory of Possibility*. *Australasian Journal of Philosophy*, 70, 2, pp. 211–24.
- Maddy, Penelope 1990: *Realism in Mathematics*. Oxford: Clarendon Press.
- Martin, C.B. 1980: “Substance Substantiated”. *Australasian Journal of Philosophy*, 58, 1, pp. 3–10.
- Mellor, D.H. 1995: *The Facts of Causation*. London: Routledge.
- Menzies, Peter 1989: “A Unified Account of Causal Relata”. *Australasian Journal of Philosophy*, 67, 1, pp. 59–83.
- Montague, Richard 1974: “On the Nature of Certain Philosophical Entities”, in Thomason 1974, pp. 148–87. Originally published in 1969 in *The Monist*, 53, 2, pp. 159–94.
- Mortensen, Chris 1987: “Arguing for Universals”. *Revue Internationale de Philosophie*, 41, 160, pp. 97–111.
- Mulligan, Kevin, Simons, Peter, and Smith, Barry 1984: “Truth-Makers”. *Philosophy and Phenomenological Research*, 44, 3, pp. 287–321.
- Nerlich, Graham 1976: “Universals: Escaping Armstrong’s Regresses”. *Australasian Journal of Philosophy*, 54, 1, pp. 58–64.
- Oliver, Alex 1992: “The Metaphysics of Singletons”. *Mind* 101, 401, pp. 129–40.
- 1993: “Classes and Goodman’s Nominalism”. *Proceedings of the Aristotelian Society*, 93, pp. 179–91.
- Pap, Arthur 1959: “Nominalism, Empiricism and Universals: I”. *Philosophical Quarterly*, 9, 37, pp. 330–40.
- Price, H.H. 1953: *Thinking and Experience*. London: Hutchinson.
- Putnam, Hilary 1975: “The Meaning of ‘Meaning’”, in his *Mind, Language and Reality*. Cambridge: Cambridge University Press, pp. 215–71.
- Quine, W.V.O. 1951: “Ontology and Ideology”. *Philosophical Studies*, 2, 1, pp. 11–5.
- 1960: *Word and Object*. Cambridge, Mass.: MIT Press.
- 1969: “Natural Kinds”, in his *Ontological Relativity and Other Essays*. New York: Columbia University Press, pp. 114–38.
- 1970: *Philosophy of Logic*. Englewood Cliffs, New Jersey: Prentice Hall.
- 1980: “On What There Is”, in his *From a Logical Point of View*, second edition, revised. Cambridge, Mass.: Harvard University Press, pp. 1–19. Originally published in 1953.

- Quine, W.V.O. and Goodman, Nelson 1947: "Steps Towards a Constructive Nominalism". *Journal of Symbolic Logic*, 12, 4, pp. 105–22.
- Quinton, Anthony 1958: "Properties and Classes". *Proceedings of the Aristotelian Society*, 58, pp. 33–58.
- 1973: *The Nature of Things*. London: Routledge and Kegan Paul.
- Resnik, Michael 1981: "Mathematics as A Science of Patterns: Ontology and Reference". *Nous*, 15, pp. 529–50.
- 1982: "Mathematics as A Science of Patterns: Epistemology". *Nous*, 16, pp. 96–105.
- 1988: "Mathematics from the Structural Point of View". *Revue Internationale de Philosophie*, 42, 167, pp. 400–24.
- Russell, Bertrand 1912: *The Problems of Philosophy*. London: Oxford University Press.
- Shapiro, Stewart 1983: "Mathematics and Reality". *Philosophy of Science*, 50, 4, pp. 523–48.
- 1989: "Structure and Ontology". *Philosophical Topics*, 17, 2, pp. 145–71.
- Simons, Peter 1994: "Particulars in Particular Clothing: Three Trope Theories of Substance". *Philosophy and Phenomenological Research*, 54, 3, pp. 553–75.
- Skyrms, Brian 1981: "Tractarian Nominalism". *Philosophical Studies*, 40, 2, pp. 199–206.
- Taylor, Barry 1993: "On Natural Properties in Metaphysics". *Mind*, 102, 405, pp. 81–100.
- Thomason, Richmond (ed.) 1974: *Formal Philosophy: Selected Papers of Richard Montague*. New Haven, Connecticut: Yale University Press.
- Tooley, Michael 1977: "The Nature of Law". *Canadian Journal of Philosophy*, 7, 4, pp. 667–98.
- 1987: *Causation: A Realist Approach*. Oxford: Clarendon Press.
- Ullmann-Margalit, E. (ed.) 1988: *Science in Reflection*. Dordrecht: Kluwer.
- Urmson, J.O. 1986: "Russell on Universals", in Vesey 1986, pp. 245–58.
- Vesey, Godfrey (ed.) 1986: *Philosophers Ancient and Modern*. Cambridge: Cambridge University Press.
- Wiggins, David 1984: "The Sense and Reference of Predicates: A Running Repair to Frege's Doctrine and a Plea for the Copula". *Philosophical Quarterly*, 34, 136, pp. 311–28.
- Williams, D.C. 1953a: "On the Elements of Being: I". *Review of Metaphysics*, 7, 1, pp. 3–18.
- 1953b: "On the Elements of Being: II". *Review of Metaphysics*, 7, 2, pp. 171–92.

—1986: “Universals and Existents”. *Australasian Journal of Philosophy*, 64, 1, pp. 1–14. Dates from about 1959.