

1. WHY WE SHOULD ADMIT PROPERTIES

The great deniers of properties and relations are of two sorts: those who put their faith in *predicates* and those who appeal to *sets* (classes). Some seem to take their comfort from both at once. The resort to predicates was, I suppose, given encouragement by the great Linguistic Turn, with its hope of solving philosophical problems by semantic ascent. This turn gained us some important insights at the cost of a fundamental misdirection of philosophical energy. The appeal to sets was one effect of the immense development of set theory in this century. This raised the hope of resolving all sorts of philosophical problems by a series of set-theoretical technical fixes.

To appreciate the utter implausibility of the attempt to evade properties by means of predicates it is perhaps sufficient to consider a case where a thing's property changes. A cold thing becomes hot. For one who puts his or her faith in predicates this is a matter first of the predicate 'cold', or its semantic equivalent, *applying to or being true of* the object, and, second, the predicate 'hot' becoming applicable after 'cold' loses applicability. Properties in the object are but metaphysical shadows cast on that object by the predicates.

But what have predicates to do with the temperature of the object? The change in the object could have occurred even if the predicates had never existed. Furthermore, the change is something intrinsic to the object, and has nothing to do with the way the object stands to language.

I think that one has to be pretty far gone in what might be called Linguistic Idealism to find predicates much of a substitute for properties. But sets are a somewhat more serious matter. After all, to substitute classes for genuine properties is at least to remain a realist, even if a reductionist realist, about properties. Even so, an account of properties in terms of classes is still full of difficulties.

First, there is what might be called the 'Promiscuity problem'—a fairly close relative of the grue problem. Sets abound, and only a very few of them are of the slightest interest. Most of the uninteresting ones are uninteresting because they are utterly heterogeneous, that is, the members of the set have nothing in common. In particular, for most sets there is no common property, *F*, such that the set is the set of *all the Fs*. The result is that mere sets are insufficient to give an account of properties: at best having a property is a matter of membership of a set of a *certain sort*.

Indeed, not only are most sets too poor to support properties, others, it seems are too prosperous, and support more than one property. This is

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PROPERTIES

D. M. ARMSTRONG

In the present climate of metaphysics nothing is more important, I think, than the recognition of properties and relations as fundamental constituents of reality. Once properties and relations are admitted, further questions can be raised. Should we, as our languages seem to urge us, admit alongside properties and relations, things, particulars, which have the properties and between which relations hold? Or should we instead try to construct particulars out of properties and relations, or even out of properties alone, or relations alone? Again, should we take properties and relations as *universals*, that is, should we take it that different particulars can have the very same property, in the full strict sense of the word 'same', and that different pairs, triples . . . *n*-tuples . . . can be related by the very same relation? Or should we instead hold that properties and relations are particulars (abstract particulars, tropes, moments) so that each particular has its own properties that no other particular can have, and pairs, etc. of particulars each their own relations? A third issue: should we allow that properties and relations themselves can be propertied and stand in relations? Or should we instead with Brian Skyrms allow nothing but a first level of properties and relations?¹

These issues, and others, about properties and relations are of the greatest interest. And because an answer to one of the questions does not in any obvious way pre-empt the answer to any of the others, we have here a sort of metaphysician's paradise in which philosophers can wander, arguing. But before these issues can be joined there must be established the fundamental point: that there are in reality properties and relations. In this paper, I will largely confine myself to properties.

¹ First published in *Language, Truth and Ontology*, edited by K. Mulligan (Dordrecht: Kluwer, 1992), 14–27. Reprinted by permission of Kluwer Academic Publishers and the author.
² Brian Skyrms, 'Tractarian Nominalism', *Philosophical Studies*, 40 (1981), 199–206.

the problem for a class account of properties that all philosophers are conversant with. It is the coextension problem, the problem of the renates and the cordates, the creatures with kidneys and the creatures with hearts.

Returning to the Promiscuity problem, which I judge to be a much more serious fundamental problem, there are various ways that an account of properties in terms of class might move under pressure. One solution, pioneered by Anthony Quinton, is to introduce a new, fundamental, and so not further analyzable, notion of a *natural class*.² Some classes are natural, most are not. The natural ones admit of degrees of naturalness, but no analysis of naturalness is possible.

Of the difficulties that such an account faces, I shall here call attention to but one. (A problem concerning relations will be mentioned when the resemblance theory is discussed.) It is similar to the difficulty urged a moment ago against an account of properties in terms of predicates. It was said that when a thing changes temperature, it is the thing itself that changes. The change in the applicability of certain predicates is, fairly obviously, subsequent and secondary. In the same way, consider the natural class consisting of all and only the objects having temperature T . Let a be a member of this class. What have the *other* members of the class, or at any rate the other members that are wholly distinct from a , to do with a 's temperature? After all there would appear to be a possible world in which these other members do not exist, or where they exist but lack temperature T .

Somewhat more attractive than a Natural Class theory is a Resemblance account. According to one version of this view, talk about properties of a particular has as its ontological ground a suitable relation of resemblance holding between the particular in question and suitable paradigms. It might seem that such a view falls victim to the argument just advanced against Predicate and Class accounts. What have the paradigms to do with the *being* of the properties of things that suitably resemble the paradigms? I used to think that this was a good argument against a Resemblance analysis as well as Predicate and Class accounts. But I have recently come to think that the consideration that resemblance is an *internal* relation, based upon the nature of its terms, will block the argument in the case of a Resemblance theory.³ Details must be left aside here.

But it is worth noticing that the Resemblance theory, like a Class theory (and a Natural Class theory), is unable to distinguish between different but coextensive properties. In a paradigm version, for instance, it would

² Anthony Quinton, 'Properties and Classes', *Proceedings of the Aristotelian Society*, 38 (1957-8), 33-58; *The Nature of Things* (London: Routledge & Kegan Paul, 1973).

³ See my *Universals: An Opinionated Introduction* (Boulder, Colorado: Westview Press, 1989), chapter 3, §11.

not be possible to set up different paradigms for the different properties. In any case, the detail required to work out a Resemblance theory is considerable, and trouble may lurk in the elaborate constructions required. There is also trouble concerning relations. The problem is that when a has R to b , and c has 'the same' R to d , the resemblance has to hold between the way a stands to b , on the one hand, and the way c stands to d , on the other. This formulation already involves the notion of relation in the phrase 'stands to'. How to eliminate this? It seems that the Resemblance theory will have to use the same device that a Class theory uses, and identify the terms that resemble with the ordered sets $\langle a, b \rangle$ and $\langle c, d \rangle$. This still involves the relational notion of *order*, and if that is to be eliminated the device of Wiener or Kuratowski will have to be employed and each ordered pair identified with unordered classes of classes. This has a consequence that is also a consequence for a class theory: different classes of classes will each serve as a 's having R to b , and, much worse, the same class of classes can be used for different relations between a and b . Such arbitrariness strongly suggests that the classes in question do no more than represent, map, the state of affairs of a 's having R to b . The classes are not *identical* with the state of affairs, which is what is needed for metaphysical analysis.

A final criticism that I will make of the Resemblance theory leads us directly to the postulation of properties. I begin by noticing that a traditional argument against the Resemblance analysis is that the resemblance relation is not a two-termed but a three-termed affair. If a resembles b , in general, they resemble in certain *respects*, and fail to resemble in other *respects*. But respects are uncomfortably close to properties, which the Resemblance theory proposes to do without.

I do not think that this traditional objection is at all conclusive as it stands. The Resemblance theorist can argue that the metaphysically fundamental relation of resemblance is two-termed (though admitting of degrees like the relations of *being distant from* or *more massive than*). It can then be argued that respects and resemblance in respects supervene upon the network of two-term resemblances which are fundamental. But the Resemblance theorist remains in some embarrassment when he comes to explain the formal properties of his fundamental relation. He has to say that the two-termed relation is non-transitive. There is an exception: the limiting case of exact resemblance. But in general: if a resembles b to degree D and b resembles c to the same degree, the degree to which a resembles c can take any value. Why is this? The Resemblance theory, it seems, must take it as a primitive, not to be further analysed, fact. A Property theory, however, can derive this non-transitivity. It is a matter of

a resembling *b* in respect of a certain set of properties, *b* resembling *c* in respect of a *different* set of properties. This can naturally be expected to produce a different degree of resemblance between the pairs (*a, b*) and (*a, c*). The transitivity of exact resemblance is also explained, since in such a case the properties of *a*, *b*, and *c* are the same. Explanatory power is a virtue, and lack of explanation a defect, in metaphysics as much as science.

The above argument led us from resemblance to properties. But I believe that the explanatory power of a theory which gives real existence to properties (and relations) is seen most clearly in connection with *causation* and *natural law*. Suppose that the water in the kettle is heated by the fire. We surely want to deny that it is the whole fire, qua token, that causes the heating of the water. The fire, first of all, must be in the right *relations* to the kettle, say underneath, and the kettle must in turn *contain* the water. Still more importantly, the fire must be *hot*. Consider how this is explained by an account in terms of predicates. The predicate 'underneath' applies to the pair of the fire and the kettle, the predicate 'hot' to the fire and, eventually, to the water. But when we have said that these predicates apply, we have surely not said enough. The situation cries out for explanation. It is surely something definite *about* these three things that allows the predicates to apply. Must there not be something quite specific about the things which allows, indeed ensures, that these predicates apply? The predicates require *ontological correlates*. The predicate theory does have correlates indeed, but they are no more than the objects themselves, and so are far too coarse.

It is little better to appeal to classes, even natural classes. What has this fire's heating this water in this kettle, here and now, to do with the fire's membership of the class of hot things? A satisfactory correlate must be found 'within' the fire. A sophisticated Resemblance theory can, I think, appeal to the *natures* of the resembling things, natures from which the resemblances flow. The natures are suitably internal, but are as coarse as the things themselves (indeed, should perhaps be identified with the things themselves).

As with causes, so with laws. I am not speaking of *law-statements* but of the ontological correlates of true law-statements, that in the world which makes true law-statements true. Suppose it be a truth that gravitational force between bodies is equal to the product of their masses divided by the square of their distance. This appears to be a certain connection between the properties of massive things. One can try to translate the corresponding law-statements into statements of universal quantification where the subject-terms are nothing but first-order particulars. But although statements about first-order particulars may follow from law-statements,

the latter as is well known, say something more, a more that is plausibly a link between properties. And even if one denies this, perhaps because one thinks that properties are not universals but particulars, it still seems that the ontological correlates of true law-statements must involve properties. How else can one pick out the uniformities which the law-statements entail?

Why has there been such hostility to properties (and relations) among so many contemporary leaders of analytic philosophy? Is it just the Ockhamist spirit? Do without properties and relations if you can! Or is it the influence of Quine, with his doctrine that the predicate of a true statement carries no ontological implications? (Together with his nasty remarks about 'McX', the upholder of universals.)⁴ All these things, maybe, and others. But I think that upholders of properties and relations also have something to answer for. As so often happens, in philosophy and elsewhere, an excellent case has been ignored because its advocates overdid things and made exaggerated claims. Simply put, they found far too many properties.

What has happened is that for each distinct predicate, upholders of properties have been inclined to postulate, corresponding to it, a distinct property. Synonymous predicates, 'father' and 'male parent', were generally thought to apply in virtue of just one property. But for non-synonymous predicates, each its own property. To self-contradictory predicates, perhaps, no property corresponds. But for each of the rest, a property of its own.

As a very beginning one might eliminate from this monstrous regiment of properties all those where the corresponding predicate fails to apply, is not true of, anything. After all, the argument for properties that I advanced was for something in particulars which would allow the application of predicates. No application, no property. There is a tendency, whose rationale I do not really understand, to think of properties as necessary beings. A necessary being, if it is possible, exists, and so, if properties are necessary beings, all non-self-contradictory properties exist. But if, as I think we should, we take properties to be contingent beings, then it seems reasonable to deny that there are uninstantiated properties.

This is not to deny that it may be convenient from time to time to talk about, to make ostensible reference to, uninstantiated properties. No body is perfectly elastic, so there is no property of *being perfectly elastic*. But it may be useful to compare more or less elastic bodies in the degree to which they approach the unreachable perfect elasticity. A useful fiction, however, is still a fiction.

⁴ [See 'On What There Is', chapter V of this volume.]

Property-realism, whether the properties be taken as universals or particulars, should be an *a posteriori*, a scientific, realism.

If we combine an *a posteriori* or scientific realism about properties (and relations) with the speculative but attractive thesis of physicalism, then we shall look to physics, the most mature science of all, for our best predicates *so far*. Physics (perhaps it will have to be a cosmological physics as well as the physics of the very small) shows promise of giving an explanatory account of the workings of the whole space-time realm, and thus, perhaps, the whole of being. And it shows promise of doing this in terms of a quite restricted range of fundamental properties and relations. These properties and relations are for the most part quantitative in nature, and the laws that govern them are functional in nature. I will just note that quantities and functions seem to me to involve rather deep problems for the property-realist. (Happily, though, the problems for the alternative positions, such as Predicate and Class Nominalism, seem to be far worse.)

Keith Campbell has suggested, in his new book *Abstract Particulars*, which puts forward a trope metaphysics, that a metaphysics of this physicalist sort is not particularly economical with properties.⁵ For suppose that some fundamental quantity such as length is really continuous. We will then be faced with the necessity to postulate continuum-many lengths-properties corresponding to each different length taken as a type. Some lengths may not be instantiated, but that will not bring the number down.

Continuum-many properties is a lot of properties, to be sure. But let us remember a remark that Mr Reagan made when he was Governor of California. Speaking of the Sequoia tree, he said 'seen one, seen them all.' If you have seen one length, then given only some mathematics, which is topic-neutral, you can grasp the notion of lengths of any length. The class of length-types is a unitary thing, and in taking lengths to be fundamental properties, if you do so, you are making a quite economical postulation. And it may be that a relatively small number of quantities such as length are the only fundamental quantities that physics requires us to postulate.

2. UNIVERSALS VS. TROPEs

So much in defense of properties, although much more could be said. In the second part of my paper I will take up an issue *within* the theory of properties, an issue that has enjoyed quite a lot of recent discussion. It is the question whether we should take properties to be universals or particulars. There are those who admit both universal and particular properties

⁵ Keith Campbell, *Abstract Particulars* (Oxford: Blackwell, 1990), p. 13.

If predicates actually apply to, are actually true of, things, then, of course, it is perfectly legitimate to introduce a *sense* in which the things automatically have a property corresponding to just that predicate. Indeed, this is a very useful sense, a point that I have in the past tended to overlook. To make use of Carnap's phrases, the *material mode* is much less fatiguing to the imagination and the intellect than is the *formal mode*. Such properties, however, cut no ontological ice. The properties that are of ontological interest and which we are concerned with here, are those constituents of objects, of particulars, which serve as the ground in the objects for the application of predicates. And concerning these properties, the true properties I am inclined to say, there is no reason to think that to each distinct predicate that has application corresponds its own distinct property in the object. Indeed, there is much reason to think the opposite.

Instead of approaching the matter of such properties directly, it may be helpful to think in the first place in terms of 'good' or 'bad' predicates, where good and bad are to be assessed in terms of our purely theoretical interests: the sort of predicates that the spectator of all time and eternity might find attractive. And here, I think, we are led on to Plato's marvellous image of carving the beast (the great beast of reality) at the joints. The carving may be more or less precise. But as the carving is the more and more precise, so we reach predicates that are of greater and greater theoretical value, predicates more and more fit to appear in the formulations of an exact science. At the limit, monadic predicates apply in virtue of strict properties. An upholder of universals will conceive of these properties as strictly identical in their different instances. A believer in particularized properties, in tropes, will deny identity but allow the symmetrical and transitive relation of exact similarity. It is properties thus conceived that serve as the ontological foundation for the application of predicates, most predicates at any rate, to first-order particulars.

How do we determine what these ontological properties are? The answer, in part, is the same as the answer to the question 'How do kangaroos make love?'. With difficulty. In the epistemic state of nature, the only predicates to which we can give much trust are those suggested by ordinary experience and ordinary life. We cannot but take it that these predicates carve out properties that approximate to some of the joints to some extent. In that state of nature, we cannot but think that blue is better than grue. But in the present age we take ourselves to have advanced beyond the epistemic state of nature, and to have sciences that we speak of as 'mature'. There we will find the predicates that constitute our most educated guess about what are the true properties and relations.

exactly the same charge. But 'same' means identical does it not? Yet the trope theory denies identity.

However, I have become convinced that in our ordinary usage 'same' does not always mean identical. There is what Bishop Butler so brilliantly characterized as a 'loose and popular' sense of the word 'same'.⁶ Butler was thinking about the replacement over time of particles in an object such as a human body. We say the *same* body but we don't really mean it. It is only a loose and popular identity. By itself, even if we accept it, Butler's point is rather frustrating. What rules are we going by when we use 'same' in the loose and popular way? Here I am indebted to a Sydney student, Peter Anstey. He suggested that we are prepared to use 'same' in this relaxed way only if the things said to be the same are both members of a relevant equivalence class. Though different, the things said to be the same must both be members of the same class, where 'same class' is, of course, taken in the *strict* sense.

If one takes *portions of the lives of organisms* as a field, then it seems that they fall into equivalence classes, where the members of any one class constitute the totality of the life of a single organism (fission, fusion, and so on being neglected). It is of course difficult to spell out just what the equivalence relation is: 'identity over time' is a puzzling subject. But, if Anstey is right, it must be in virtue of this equivalence relation that we assert 'identity', and assert it even though we believe that *strict* identity is not involved. (A further suggestion by Anstey. Is this relevant to the topic of 'relevant identity'? When *a* and *b* are 'the same *F*' but not 'the same *G*', is this because the identity is loose and popular, and two different equivalence relations are involved?)

This is, alas, good news for the tropes. When we say that two electrons have the very same charge, then according to the Trope theory *strictly* the tropes involved are not identical. But the two tropes are both members of a relevant equivalence class, where the equivalence relation is exact similarity, and so can be said to be 'the same' in a loose and popular sense.

Unfortunately, this is not all the good news for the Trope theory. A very important topic in the theory of properties (and relations) is that of their *resemblance*. Particulars resemble: that is clear enough. But so do properties. The colors all resemble each other, so do the shapes, the masses, the lengths. One property can resemble another more than it does a third. Redness is more like orange than it is like yellow. A kilo is more like a pound than it is like an ounce.

⁶ Joseph Butler (1736), 'Of Personal Identity' in *Personal Identity*, edited by John Perry (Berkeley: University of California Press, 1975), 99-105.

into their ontology. Perhaps Aristotle and even Plato were among them. But I think that this position *sins against economy*. If you have *universals*, you can do without the *particularized properties*, and *vice-versa*. So for me, and I think for most contemporary metaphysicians, the question is which should we choose.

I was brought up by my teacher, John Anderson, to reject the Particularist position. (He used to criticize G. F. Stout's view.) I still favor the Universalist view, but recently I come to think that tropes have more to be said for them than I have allowed previously. In particular, I now see more clearly how tropes can serve as substitutes for universals in many respects.

A Trope theory is best combined with a resemblance theory, and developed as a sophisticated Resemblance Nominalism. Of particular importance here is the notion of *exact resemblance*. If we work with ordinary particulars, then, with the possible exception of such things as fundamental particles, exact resemblance is a theoretical ideal. We all remember Leibniz's unfortunate courtiers searching vainly for identical leaves in the garden. But if we move to the much thinner *tropes*, then exact resemblances may be achievable. Two tropes that are constituents of different things might resemble exactly in mass, in length, in charge, and so on. The plausible examples are again found at fundamental levels. Thus, it is at present believed that the charge on each electron is exactly the same. 'Exactly the same' appears to assume *identity* of charge in different electrons. But it can be rendered in the language of tropes by saying instead that the different charge-tropes associated with the different electrons are all exactly similar. The interesting thing about exact similarity is that it is symmetrical *and transitive*. (Less than exact similarity is not transitive, even for tropes.) As a result, the relation of exact similarity is an equivalence relation, partitioning the field of tropes into equivalence classes. Tropes will then do much the same work as universals. Suppose that a believer in universals and a believer in tropes have co-ordinated their views in the following way. For each universal property postulated, the trope theorist postulates a class of exactly similar tropes, with universals and tropes properties of the very same class of things. For each class of exactly similar tropes postulated, the Realist postulates a class of thing which all have the same property, with tropes and universals properties of the very same class of things. What inferiority is there in the Trope theory?

I used to think that the Universals theory had an important advantage here. Where we have what the trope theorist thinks of as exact similarity of tropes, we do not scruple to speak of *sameness* of property. Even a trope theorist will allow that by the lights of our present physics electrons have

We may think of the whole field of properties as arranged in a multi-dimensional order. This order appears to be largely objective, and is to be interpreted as a resemblance-order. For properties to stand near to each other in the order is for them to resemble each other quite closely.

If these properties are universals, then it will be natural to construe these resemblances between properties in accordance with the old slogan 'all resemblance is partial identity'. That is how I construe it myself. Resembling universals have common constituents, with either one of the properties containing all the constituents of the other universals and more besides, or else a mere overlap in constituents. I say 'constituents' rather than 'part' because I think that this partial identity is not the simple sort of partial identity envisaged by the mereological calculus, the calculus of whole and part. (A point that confused me for many years.) I cannot go further into the matter here. To do so would involve getting into a huge new topic: the theory of facts or states of affairs.⁷

But however all this may be, an upholder of tropes can deal with the resemblance of properties in a way that parallels the treatment of the topic by an upholder of universals. We have seen the potential to set up a one-one correlation between properties taken as universals, on the one side, and equivalence classes of exactly similar tropes, on the other. To make the matter vivid, select just one trope from each of these equivalence classes and range each of these tropes opposite to its corresponding universal. This structure of tropes will exactly reflect the multi-dimensional resemblance structure of the universals.

How resemblance is interpreted will presumably differ in the two structures. The Trope theory is not under pressure to interpret resemblance between tropes as partial identity, a move that is indeed against the spirit of trope theory, although that option would be open. (Similarly, it is an option for the Universals theory to treat resemblance between *universals* as primitive and unanalyzable, although that goes against the spirit of a Universals theory.) A Trope theory, with exact resemblance already treated as a primitive, will presumably embrace the view that, in fundamental cases at least, lesser degrees of resemblance between tropes are also primitive and unanalyzable. But the point I want principally to make here is that the Trope theory is in as good a position as the Universals theory to deal with the difficult topic of resemblance of properties. The friends of the tropes can say to the friends of the universals: 'Anything you can do, I can do better, or at least equally well'.

But I finish now by saying I do not believe in the tropes. First, there is the question, already touched upon, of the Axioms of Resemblance. The

⁷ See my *Universals: An Opinionated Introduction*.

trope theorist requires such axioms. *First*, there is symmetry. If *a* resembles *b* to degree *D*, then *b* resembles *a* to degree *D*. *Second*, there is failure of transitivity. If *a* resembles *b* to degree *D*, and *b* resembles *c* to degree *D*, then it is not normally the case that *a* resembles *c* to degree *D*. This holds for tropes as much as for ordinary particulars. However, *third*, transitivity is restored for a special case. If *a* exactly resembles *b*, and *b* exactly resembles *c*, then *a* exactly resembles *c*. This transitivity is a particular case of a more general principle: if *a* resembles *b* to degree *D* and *b* exactly resembles *c*, then *a* resembles *c* to degree *D*. Resemblance to degree *D* is preserved under the substitution of exact resemblers.

For the trope theorist these necessities are *brute* necessities, fundamental necessities that cannot be explained further. The Universals theory need carry no such ontological baggage. The symmetry of resemblance is simply the symmetry of identity. The transitivity of exact resemblance is the transitivity of identity. The non-transitivity of ordinary resemblance is the non-transitivity of partial identity. The Axioms of Resemblance are but particular cases of the axioms that govern identity.

Explanation is a virtue in metaphysics, as elsewhere. I submit that this startlingly easy deduction of the properties of resemblance from the entirely uncontroversial properties of identity is a major advantage of the Universals theory. It enables one to see the intuitive force behind the old, inconclusive, criticism brought against Resemblance Nominalisms that resemblance is resemblance *in identical respects*.

My second reason for rejecting the Trope theory is more controversial, depending as it does on views that would be contested by many. It is that I think that universals are required to get a satisfactory account of laws of nature.

I note again that by laws of nature I mean not true law statements, but that entity, state of affairs, in the world that makes true law statements true. I believe that the contemporary orthodoxy on laws of nature—that basically they are mere regularities in the four-dimensional scenery—is in a similar position to that enjoyed by the regimes in power in Eastern Europe until a few months ago, if 'enjoyed' is the right word. No doubt the end to Regularity theories of law will not come so suddenly, though, because inside their own subject philosophers are great conservatives.

Regularity theories of laws face the grue problem. That, I think, can only be got over by introducing properties, sparse properties, into one's ontology. However, the properties could, I think, be tropes as well as being universals, so there is no advantage to universals here. More to the present point, even with properties given, Regularity theories make laws into *molecular* states of affairs. These tokens of a certain phenomenon

behave in a certain way, so do all instances of the phenomenon. There is here no *inner connection* between, say, cause and effect in the individual tokens that fall under the causal law. This conclusion can, I think, be enforced by noting with Reichenbach and others that only some cosmic regularities are manifestations of law; by the difficulty in seeing how such a molecular state of affairs could 'sustain counterfactuals'; and by the incredible shifts that are necessary to accommodate probabilistic laws within a regularity approach.

Only a higher-order fact about the universals involved in the individual positive instances falling under the law can, as far as I can see, provide the atomic state of affairs that will solve these difficulties. If *being an F* ensures or makes probable to some degree that the *F*, or something related to it, is a *G*, with *F* and *G* universals, then I think that an internal connection is provided. More controversially, I think it can also be seen that such a connection automatically, analytically, and yet non-trivially provides for a regularity or statistical distribution to flow from the connection. Indeed, I think that, although postulating such a connection does not cure wooden legs or halt tooth decay, it does go a great way to help us with the problem of induction.⁸

So: my idea is that a Universals theory can provide us with a satisfactory account of laws of nature, while a Trope theory cannot. It is a controversial and complex argument, which cannot be assessed in any hurry. But even without this, the Trope theory still needs its Axioms of Resemblance, and that is a clear-cut disadvantage. I know of no such compensating disadvantage for the view that properties are universals.

⁸ For all this see my *What is a Law of Nature?* (Cambridge: Cambridge University Press, 1983).

XIII

MODAL REALISM AT WORK: PROPERTIES

DAVID LEWIS

We have frequent need, in one connection or other, to quantify over properties. If we believe in possible worlds and individuals, and if we believe in set-theoretic constructions out of things we believe in, then we have entities suited to play the role of properties.

The simplest plan is to take a property just as the set of all its instances—all of them, this- and other-worldly alike. Thus the property of being a donkey comes out as the set of all donkeys, the donkeys of other worlds along with the donkeys of ours.

The usual objection to taking properties as sets is that different properties may happen to be coextensive. All and only the creatures with hearts are creatures with kidneys; all and only the talking donkeys are flying pigs, since there are none of either. But the property of having a heart is different from the property of having a kidney, since there could have been an animal with a heart but no kidneys. Likewise the property of being a talking donkey is different from the property of being a flying pig. If we take properties as sets, so it is said, there is no distinguishing different but accidentally coextensive properties.

But according to modal realism, these 'accidentally coextensive' properties are not coextensive at all. They only appear so when we ignore their other-worldly instances. If we consider all the instances, then it never can happen that two properties are coextensive but might not have been. It is contingent whether two properties have the same this-worldly instances. But it is not contingent whether they have the same instances *simpliciter*.

It is a mistake to say that if a property were a set, then it would have its instances—its members—essentially, and that therefore it never could be contingent whether something has or lacks it. Consider the property of being a talking donkey, which I say is the set of all talking donkeys throughout the worlds. The full membership of this set does not vary from

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