Resemblance Nominalism *A Solution to the Problem of Universals*

Gonzalo Rodriguez-Pereyra

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To my mother,

Martha María Pereyra Gonzalez

Preface

This book fully develops and defends *Resemblance Nominalism* as a solution to the Problem of Universals. The basic idea of Resemblance Nominalism is that for a particular to have a property is a matter of its resembling other particulars. Thus that particular *a* is square is a matter of its resembling other square particulars. By avoiding to postulate universals or tropes to account for the properties of particulars Resemblance Nominalism opposes the philosophical tendency in the last twenty-five years or so. No doubt, other things being equal, a theory that avoids postulating universals or tropes is preferable to ones that do postulate such entities. But with Resemblance Nominalism other things were not equal. For Resemblance Nominalism was thought to succumb to an army of objections, problems, and difficulties. Indeed Carnap had proposed, in the *Aufbau*, a theory incorporating the basic insights of Resemblance Nominalism. But Carnap's attempt had been thought to collapse under the force of Goodman's famous imperfect community and companionship difficulties. Then Armstrong, in the course of developing his theory of universals, produced a battery of arguments against Resemblance Nominalism. The result of these two attacks was devastating: no one has defended Resemblance Nominalism since they were produced and the consensus has grown that the proper account of properties must postulate either universals or tropes.

Developing Resemblance Nominalism consists in showing how those objections and difficulties can be met and solved by Resemblance Nominalism. This is the first part of my defence of Resemblance Nominalism. The defence is completed by showing that Resemblance Nominalism is superior to theories postulating universals or tropes and, indeed, to any other solution to the Problem of Universals.

I have been working on the topics of this book for many years now and I am indebted to many philosophers for helping me to improve my philosophy. I thank them all. The greatest debt is to Hugh Mellor, who supervised the doctoral dissertation that is the origin of this book. For comments, criticisms, and conversations I am also indebted to Arif Ahmed, David Armstrong, John Bacon, Rosanna Keefe, Arnie Koslow, Isaac Levi, David Lewis, Jonathan Lowe, Penelope Maddy, David McCarty, Thomas Mormann, Alex Oliver, Peter Simons, Peter Smith, Juan Rodriguez Larreta, and Timothy Williamson. I am also indebted to Alexander Bird, Richard Holton, Rae Langton, and Dory Scaltsas, who read a whole version of the book and discussed it thoroughly in a series of seminars at the University of Edinburgh. Their interest in my book, and the calibre of their observations, comments, and objections was an important stimulus during the final stages of writing it.

Parts of the book have been tried out on different audiences in the universities of Brown, Cambridge, Cordoba (Argentina), Edinburgh, Leeds, and the Joint Session of the Aristotelian Society and Mind Association in Dublin, 1996. I thank those audiences for their contribution.

I should like to thank the Master and Fellows of Churchill College, Cambridge, for first giving me a studentship to do my Ph.D. and then electing me to a Junior Research Fellowship that allowed me to continue working on Resemblance Nominalism in the best academic environment. Thanks also to Silvina, my wife, who provided me with the best possible domestic environment. She was a source of constant love and support during the whole experience of writing the book. Without her things would have been much more difficult for me.

Some of the material in this book has already appeared in print. Parts of Chapters 1 to 3 use material previously published in my 'What is the Problem of Universals?' *Mind*, 109 (April 2000): 255–73. Copyright © Oxford University Press 2000. Section 1.1 contains significant new material. Most of Section 2.1 is new. Sections 1.2, 3.3, and 3.4 are new.

Chapter 6 reproduces material previously published in my 'Resemblance Nominalism and Russell's Regress', *Australasian Journal of Philosophy*, 79 (September 2001): 397–410. Copyright © Oxford University Press 2001. Section 6.5 contains significant new material.

Chapter 9, and Sections 4.6 and 8.2, use material previously published in my 'Resemblance Nominalism and the Imperfect Community', *Philosophy and Phenomenological Research*, 59 (December 1999): 965–82. Copyright © International Phenomenological Society 1999. There is significant new material throughout Chapter 9 and Section 8.2.

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G. R.-P.

Contents

Introduction

> *... generality consists in the resemblances of separate things, and this resemblance is a reality.*
>
> (G. W. Leibniz, *New Essays*, III.iii.11–12).

In this book I shall argue for a theory called *Resemblance Nominalism*. Resemblance Nominalism is a solution to an old ontological problem already discussed by Plato—the so-called *Problem of Universals*. I however take the problem to be really not about universals strictly so-called, but about properties, and only to maintain a link with tradition will I keep the name 'Problem of Universals'. Universals are part of a solution to the problem, not part of the problem itself. As I shall argue in Section 2.3, this is the problem of accounting for what makes true certain attributions of properties to particulars, like when we say that a rose has the property of *being red* or that a ring has the property of *being round* (as we shall see in Section 3.3, *being red* is not a good example of the properties for which the Problem of Universals arises, since this problem is a problem about lowest determinate properties, like *being scarlet*, *being crimson*, and so on. But just for the sake of example I shall occasionally use *being red* and other determinable properties as examples of relevant properties).

One solution to the Problem of Universals postulates universals and says that properties, like that of *being red*, are universals. These entities are universals because they can be wholly located in different places at the same time. Thus what makes it true that the rose is red is that the rose is duly related to, namely it instantiates, the universal *redness*. This solution I shall call *Universalism*.

Another solution to our problem denies that properties are universals. Properties, like the redness of the rose, are as particular as the rose itself—they cannot be wholly located in more than one place at the same time. Properties understood in this way are called *tropes*. Thus according to Trope Theory what makes it true that the rose is red is that the rose has a certain red trope.

Resemblance Nominalism is like Trope Theory in denying that there are universals. But Resemblance Nominalism also denies the existence of tropes. According to Resemblance Nominalism there are concrete particulars, that is, things like flowers, planets, persons, atoms, houses, animals, and stars. What makes true certain attributions of properties to particulars like these is that they resemble other particulars. For instance, what makes the rose red is that the rose resembles the other red particulars—other roses, tomatoes, apples, British post-boxes, etc.

What I said about Universalism and Trope Theory should have made clear that I do not use the word 'property' as synonymous with 'universal' or 'trope'. What I have said about Resemblance Nominalism should make clear that I do not use the word 'property' to refer to any entity over and above the particulars that are said to have them. All I am committed to when I say that different particulars share properties is that there is something that makes red particulars red, square particulars square, and so on. This something might be an entity, like a universal or trope, or simply that those particulars resemble each other. I shall expand on this in Section 1.1.

Solutions to the Problem of Universals are ontological theories. They are theories about what there is, about what kinds of entities exist. For Universalism there are particulars and universals; for Trope Theory there are only particulars, but these particulars are of two different kinds: tropes and particulars having those tropes; for Resemblance Nominalism there are concrete particulars but there are no universals and no tropes. This is why solving the Problem of Universals is an important philosophical task: solving it provides fundamental information about the basic contents and structure of the world.

As we shall see, Resemblance Nominalism admits not only concrete particulars, like the ones referred to above, but also classes,

ordered and unordered (by classes I just mean sets, the entities postulated by Set Theory). Classes are as particular as flowers and animals, since if they are located at all they cannot be wholly located in more than one place at the same time. But no doubt classes are a different kind of particular from what I have here called *concrete* particulars, for example, flowers, planets, persons, atoms, houses, animals, and stars. Indeed classes are generally taken to be *abstract* objects. Here I need to emphasize that the admission of classes is legitimate for Resemblance Nominalism. For all Resemblance Nominalism is committed to denying is universals and tropes. Resemblance Nominalism is not meant to deny the existence of abstract objects *per se*.

No doubt there is a considerably established sense of the word 'Nominalism' in which it means a doctrine that denies the existence of abstract objects. This sense of the word derives from work by W. V. Quine (1960: 233) and is active in certain philosophical areas like the Philosophy of Mathematics. But this is not the sense I give to the word in this work. By 'Nominalism' all I mean here is any theory that denies the existence of both universals and tropes. But my use of 'Nominalism' is not arbitrary. For this use of the word, deriving from work by David Armstrong (who, as far as I know, coined the expression 'Resemblance Nominalism' in his (1978*a*)), is also considerably established and is the most common use of the word in the area of Metaphysics with which I am here concerned, that is, discussion of the Problem of Universals. Indeed one of the theories discussed in this area is known as 'Class Nominalism'—and this is not intended to be an oxymoron.

I have said that Resemblance Nominalism denies that there are universals and I have given an Aristotelian characterization of universals, namely as entities capable of being wholly located at different places at the same time. But the Aristotelian characterization of universals, and the corresponding distinction between particulars and universals, has been called into question (Ramsey 1997; MacBride 1998).

In this book I shall not attempt to defend the Aristotelian distinction, I shall assume it. The reason for doing so is that even if the Aristotelian distinction does not work, and even if there is no sustainable distinction between particulars and universals, I can still express my Resemblance

Nominalist thesis clearly. For all I need to say is, roughly, that what makes any **F**-entity **F** is that it resembles the **F**-entities, and that to account for what makes **F**-entities **F** one just needs to postulate **F**-entities (and classes). So, for example, what makes red entities red is that they resemble each other, what makes yellow entities yellow is that they resemble each other, and so on; and to account for what makes red entities red, yellow entities yellow, and so on, one just needs to postulate, apart from classes, red entities, like apples and tomatoes, and yellow entities, like lemons and canaries. So if there is no sustainable distinction between particulars and universals, this is trouble for the Universalist, not the Resemblance Nominalist.

Thus if the Aristotelian distinction between particulars and universals is not sustainable, it does not really matter for my purposes, for my arguments in Chapter 12 that Resemblance Nominalism is superior to Universalism are independent of whatever the right characterization of a universal is. And if there is no sustainable distinction between particulars and universals, then so much the worse for my opponents, the Universalists. So by assuming the Aristotelian distinction, and thereby assuming a distinction between particulars and universals, I am not begging any question for Resemblance Nominalism.

As I said, Resemblance Nominalism rejects both universals and tropes. But Resemblance Nominalism is one of many different Nominalisms (see Sect. 1.2), all of which reject universals and tropes. What makes it *Resemblance* Nominalism is that it explains the properties of particulars in terms of their resemblances. Basically, what Resemblance Nominalism says is that what makes any particular scarlet is that it resembles all scarlet particulars, what makes any particular round is that it resembles all round particulars, and so on. In Chapters 9 to 11 we shall see what Resemblance Nominalism must add to this to obtain a completely satisfactory explanation of what makes particulars have the properties they have. But what is essential to Resemblance Nominalism is that it explains properties in terms of resemblance, which is taken as primitive or basic and is of course not accounted for in terms of shared properties (see Sect. 4.3).

Resemblance Nominalism is thus a Resemblance Theory. But not all Resemblance Theorists are Resemblance Nominalists. Arda Denkel

(1989), for instance, defends a Resemblance Theory, but in his theory the terms of the resemblance relation are *aspects* of particulars (Denkel 1989: 44). Thus Denkel's theory is a version of *Trope Theory* (see Sect. 1.2) and so Armstrong (1991*a*: 478) correctly interprets it. But in Resemblance Nominalism the terms of the resemblance relation are the particulars themselves—for example, roses, houses, people, stars, etc.—not their aspects, whatever these might be. (It is curious that Armstrong, who rightly takes Denkel's to be a version of Trope Theory, calls his article 'Arda Denkel's Resemblance Nominalism'. This incorrect characterization of Denkel's theory occurs only in the title of Armstrong's article.)

Resemblance Nominalism thus promises a solution to the Problem of Universals without postulating universals or tropes. Since both these kinds of entities are more dubious than concrete particulars it is no wonder that important philosophers have felt attracted to versions of Resemblance Nominalism. The most developed version so far has been Rudolf Carnap's in *The Logical Structure of the World*, or *Aufbau*, as I shall call it here after its German title, *Der logische Aufbau der Welt*. There Carnap attempted to account for, or 'construct', qualities on the basis of resemblance relations obtaining between particular *phenomenal* entities, the so-called *erlebs*, that is, momentary cross-sections of experience. It was because of Carnap's epistemological interests that he chose erlebs as his basic particulars (Carnap 1967: 88–9, 107–9). Similarly the most basic relation obtaining between his erlebs is not resemblance or similarity but what he calls 'recollection of similarity', which obtains between any two erlebs x and y if and only if x and y are recognized as similar 'through the comparison of a memory image of x with y' (Carnap 1967: 127). But from *recollection of similarity* Carnap derived a similarity relation which played a fundamental role in his construction of qualities (1967: 127–34).

There are many differences between Carnap's Resemblance Nominalism (which he did not call by that name) and the theory I shall develop and defend here. First, my Resemblance Nominalism is less restrictive than Carnap's since it permits its concrete particulars to be physical or mental, experiential or not. Secondly, since I do not have Carnap's epistemic concerns, the basic relation I use to account for properties is simply one of resemblance or similarity, not Carnap's relation of *recollection* of similarity. Thirdly, my Resemblance Nominalism is meant to be a solution to the Problem of Universals, a problem with which Carnap was not concerned. Fourthly, Carnap's Resemblance Nominalism was refuted by Nelson Goodman in *The Structure of Appearance*. Indeed Goodman showed that Carnap's project was subject to two formidable difficulties, the *imperfect community* and *companionship* difficulties (Goodman 1966: 160–4). And by solving these two important difficulties, in Chapters 9 and 10, I make my version of Resemblance Nominalism much stronger than Carnap's.

Another philosopher who saw the force and appeal of Resemblance Nominalism was H. H. Price (1953), whose views on it will be criticized in Chapter 7. Quine also felt attracted to a theory like Resemblance Nominalism, but since he only knew Carnap's version, which was beset by Goodman's imperfect community difficulty, he doubted Resemblance Nominalism's prospects (Quine 1969: 118–21). Then Armstrong produced a powerful battery of arguments against Resemblance Nominalism, principally in his (1978*a*) and (1989*b*). Goodman's and Armstrong's attacks seem to have buried Resemblance Nominalism to the point that today there are hardly any declared Resemblance Nominalists. Indeed Armstrong's (1997*c*: 22) judgement that today the two real contenders as alternative solutions to the Problem of Universals are theories postulating either universals or tropes is widely accepted.

This book has the following two aims: (*a*) to develop Resemblance Nominalism to the point where it can claim a place in the 'grand final' along with other proposed solutions, which is done in Chapters 4 to 11; and (*b*) to show that Resemblance Nominalism is the best solution to the Problem of Universals, which is done in the methodological Chapter 12. Since Resemblance Nominalism is a solution to the Problem of Universals, Chapters 1 to 3 are devoted to introducing, explaining, and defending my interpretation of this problem, namely as a problem about the truthmakers of sentences attributing properties to particulars.

The layout of the book is as follows. In Chapter 1 I first explain the way I use the word 'property' and why this use is compatible with the

doctrines of Resemblance Nominalism. I then argue that the Problem of Universals, understood as the One over Many, has the general form which Robert Nozick finds in many philosophical problems, namely: how is a certain thing possible given, or supposing, certain other things? (Nozick 1981: 9). After reviewing several solutions to the Problem of Universals I then argue that, since the Problem of Universals has Nozick's form, solutions to it must account for the truthmakers, as opposed to the conceptual content or ontological commitment, of any sentences from a list of six drawn from the literature. So the Problem of Universals is a problem about truthmakers—but truthmakers of what sentences? The answer to this question is given in Chapter 2.

In Chapter 2 I first attempt a clarification and explanation of the idea of truthmakers. Then I go on to propose, in a general manner, what the truthmakers of certain sentences, namely disjunctions, conjunctions, and existential generalizations, are. Given this I go on to specify, in Section 2.3, what sort of sentences the truthmakers of which solutions to the Problem of Universals must account for. I conclude that the sentences in question are those like '*a* is **F**' or '*a* has the property **F**'. As I explain there, finding the truthmakers of these gives *ipso facto* the truthmakers of other sentences which some have thought of as the proper concern of the Problem of Universals.

I start Chapter 3 by arguing against a truthmaker version of so-called Ostrich Nominalism, according to which the truthmaker of any sentences like '*a* is **F**' is just the particular *a*. This cannot be right because what makes *a* white, say, cannot be the same as what makes it hot and spherical. The multiplicity of properties of particulars means that Truthmaker Ostrich Nominalism is wrong. This also means that the proper understanding of the Problem of Universals is what I shall call the *Many over One* (how can a single particular have many properties?) rather than the traditional One over Many (how can many particulars have the same property?). I then argue that the properties with which Resemblance Nominalism is concerned as a solution to the Problem of Universals are lowest determinate, as opposed to determinable, and sparse, as opposed to abundant. In Section 3.4 I argue that disjunctive and conjunctive properties are not sparse, which makes me face the difficult problems dealt with in Chapters 9 and 11.

Chapters 4 to 11 are devoted to developing Resemblance Nominalism and showing how it can meet the many objections which have been advanced against it.

In Chapter 4 I explain in detail how Resemblance Nominalism answers the Many over One, what Resemblance Nominalism's theoretical apparatus is, and how it can meet several objections it faces. Resemblance Nominalism's answer to the Many over One is, in a nutshell, that a particular can have many properties by resembling different particulars, that is, it is **F** by resembling the **F**-particulars, it is **G** by resembling the **G**-particulars, and so on. The Many over One is also a problem about relations, for the same group of particulars can be related in different ways, as when *a* is bigger than *b* and to the right of *b*. Resemblance Nominalism's answer is that *a* and *b* can be doubly related in this way by the ordered pair $\langle a,b \rangle$ resembling different ordered pairs.

In Section 4.2 I discuss how Resemblance Nominalists *might* identify properties and relations with certain classes. But I then argue that Resemblance Nominalists *need not* identity properties and relations with any classes at all. Indeed, as I shall explain, the version of Resemblance Nominalism I prefer is one where properties are not identified with anything at all.

Chapter 4 also discusses several features of the notion of resemblance, like its objectivity, its primitiveness, the notion of degrees of resemblance, its adicity, and its transtemporality. I also discuss its formal properties, reflexivity, symmetry, and non-transitivity. In Section 4.5 I show how these formal properties of resemblance, as well as the formal properties of *exact* resemblance, can be derived from more basic axioms of Resemblance Nominalism.

After showing how Resemblance Nominalism can accept facts or states of affairs, I go on to show how Resemblance Nominalism can meet several objections, for example, that it cannot account for the internal character of resemblance, that it cannot account for properties having only one instance, that it cannot provide a correct paraphrase of sentences apparently making reference to universals, and the epistemological objection that Resemblance Nominalism makes perceiving that something is **F** require that one perceives that it resembles all **F**-particulars.

As I said, according to Resemblance Nominalism a particular that is **F** and **G**, is **F** in virtue of resembling the **F**-particulars and is **G** in virtue of resembling the **G**-particulars. But suppose the **F**- and **G**-particulars are the same; then how can a particular have two different properties, **F** and **G**, in virtue of resembling the same particulars? This is the *coextension difficulty*, which I discuss in Chapter 5. In Section 5.2 I argue that the most famous examples of coextensive properties, *being cordate* and *being renate*, are really not such. Though 'being cordate' and 'being renate' are coextensive predicates, they apply in virtue not of properties but of relations, and not coextensive ones. But since, although I know of no examples of genuine coextensive properties, there may well be such properties, the coextension difficulty needs a solution. The solution I advocate consists in adopting Realism about Possible Worlds and making **F**-particulars be **F** in virtue of resembling all possible **F**-particulars. I then discuss the problem posed by necessarily coextensive properties and Resemblance Nominalism's commitment to Counterpart Theory, brought about by its commitment to Realism about Possible Worlds.

Chapter 6 deals with Bertrand Russell's famous objection that (*a*) Resemblance Nominalism cannot avoid postulating universals since resemblance is itself a universal and (*b*) a universal of resemblance makes it pointless to reject other universals. The reason why Russell thinks Resemblance Nominalism cannot avoid making resemblance a universal is that otherwise the Resemblance Nominalist embarks on a vicious regress. After discussing the regress in general and criticizing some proposed ways of blocking it, for instance, by invoking the supervenient character of resemblance or by invoking particular resemblances, I go on to argue, in Section 6.5, that the regress is fictitious, for the truthmakers of sentences like '*a* and *b* resemble each other' are just *a* and *b*. Thus there is no need to postulate extra entities, like a relation of resemblance, to account for facts of resemblance: the resembling entities suffice to account for them, and so no regress arises. And if resemblance is no entity, resemblance is no universal. After defending my view of the truthmakers of sentences like '*a* and *b* resemble each other' I go on to argue, in Section 6.6, that Russell was wrong also on his second point, for even if resemblance were a universal, this would not make it pointless to reject other universals.

Chapter 7 is about what I call *Aristocratic Resemblance Nominalism*, the version of Resemblance Nominalism first suggested by H. H. Price (1953), which is also the version current writers on the topic usually have in mind. According to Aristocratic Resemblance Nominalism what makes a particular have a property **F** is not that it resembles all **F**-particulars, as I have suggested here, but that it resembles certain selected **F**-particulars, the so-called *paradigms*. In this Chapter I first examine three prima-facie plausible versions of Aristocratic Resemblance Nominalism and show them to be seriously defective. Then I argue that Aristocratic Resemblance Nominalism lacks a sound philosophical motivation. This is for two reasons. The first is that the idea of paradigms does not make sense in the context in which Resemblance Nominalism would apply it. The second is that the argument for postulating paradigms does not work. Thus I reject Aristocratic Resemblance Nominalism and continue to develop Resemblance Nominalism in its Egalitarian form, according to which there are no paradigms and being **F** is a matter of resembling all **F**-particulars. But although being **F** is a matter of resembling all **F**-particulars, this cannot be the whole story about being **F**. Why not, and what needs to be added to it, is the subject of Chapters 8 to 11.

The object of Chapter 8 is to introduce the most formidable difficulties ever advanced against Resemblance Nominalism. These are Goodman's *imperfect community difficulty* and *companionship difficulty*, which have been supposed to make Resemblance Nominalism collapse. The imperfect community difficulty arises when we have a class or group of particulars such that every two of them resemble each other but there is no common property to all of them. So having a property is not just a matter of resembling certain particulars. The companionship difficulty arises when all **F**-particulars are **G**-particulars but not vice versa. Here we have every **G**-particular resembling all **F**-particulars, yet not all of them are **F**-particulars; so resembling all particulars having a certain property is not what makes a particular have that property.

These difficulties can be seen as showing that property classes, that is, classes whose members are all and only particulars having a certain

property **F**, cannot be defined in terms of certain resemblance conditions. In particular, from Carnap's work one might attempt to define property classes as maximal classes of resembling particulars. But the imperfect community difficulty shows that being a maximal resemblance class is not a sufficient condition for being a property class, while the companionship difficulty shows that being a maximal resemblance class is not a necessary condition for being a property class. The task is then to find necessary and sufficient resemblance conditions for property classes.

Goodman's difficulties are not solved by letting our particulars belong to different possible worlds, since imperfect communities and cases of companionship can arise even when the particulars involved belong to different possible worlds. So, unlike the coextension difficulty, these difficulties are not solved by recourse to Realism about Possible Worlds; they need other solutions, which I provide in Chapters 9 and 10 respectively. But before doing so, in Section 8.4, I distinguish clearly between the companionship and the coextension difficulties. This is important since most writers on the topic, including Carnap and Goodman, have failed to distinguish the two difficulties. But, as we shall see in Section 8.4, the two difficulties are different and so are the challenges they pose to Resemblance Nominalism.

In Chapter 9 I provide a solution to the imperfect community difficulty. This difficulty consists in distinguishing, in terms of resemblances, what I call *perfect communities*, that is, classes of particulars such that some property is shared by all of them, from *imperfect communities*, that is, classes of particulars such that, although every two of them share some property, no property is shared by all of them. After criticizing solutions by Goodman and others I go on to develop my own solution, the basic idea of which is to introduce a notion of resemblance which applies not only to particulars but also to pairs of particulars (and pairs of pairs of particulars, and so on). Then in Section 9.6 I define a perfect community as a class whose members resemble each other, the pairs of its members resemble each other, the pairs of these pairs resemble each other, and so on. Nothing in my solution requires going beyond the proper resources of Resemblance Nominalism. In Section 9.7 I discuss application of my solution to infinite classes. I end the chapter by showing why a certain alternative solution to the imperfect community difficulty cannot be accepted by Resemblance Nominalists (see Sect. 9.8).

But saying, in terms of resemblance, what a perfect community is, gives neither necessary nor sufficient resemblance conditions for property classes. And requiring perfect communities to be maximal gives only a sufficient condition for property classes for, as the companionship difficulty shows, there are some property classes that are proper subclasses of other property classes. Chapter 10 is where I solve the companionship difficulty, a difficulty that Carnap saw no way to solve, and so had to assume that it did not obtain (Carnap 1967: 113), and Goodman thought it could not be solved by theories like Resemblance Nominalism (Goodman 1966: 213). In my solution to this difficulty the notion of degrees of resemblance plays a fundamental role. For suppose that all **G**-particulars are **F**-particulars but not vice versa. Then the idea is, roughly, that the lowest degree to which any two **G**-particulars, or pairs of them, or pairs of pairs of them, etc., resemble each other is higher than the lowest degree to which any two **F**-particulars, or pairs of them, or pairs of pairs of them, etc., resemble each other. This idea allows me to introduce a condition that all property classes, even those which correspond to properties having companions, satisfy. In this way the companionship difficulty is solved.

But although at the end of Chapter 10 I have solved both the imperfect community and companionship difficulties, I have not yet found necessary and sufficient resemblance conditions for property classes. For the conditions I have proposed to solve Goodman's difficulties are also satisfied by certain intersections of property classes that are not property classes themselves. These intersections I call *mere intersections* and the problem of distinguishing, in terms of resemblance, property classes from mere intersections is what I call the *mere intersections difficulty*. The difficulty requires distinguishing, in terms of resemblances, those classes whose members are all and only particulars having a certain property from those whose members are all and only particulars having a certain conjunction of properties. Thus facing the mere intersections difficulty is a consequence of my rejecting sparse conjunctive properties in Section 3.4, for if conjunctive properties

were sparse then mere intersections would correspond to property classes of conjunctive properties. Chapter 11 is devoted to the mere intersections difficulty, where I provide a solution to it. By so doing I provide necessary and sufficient resemblance conditions for property classes.

Solving these difficulties provides a Resemblance Nominalist account of what makes particulars have their properties. It also shows that Resemblance Nominalism is a viable metaphysical theory that can solve the Problem of Universals at least as well as its main competitors do. Thus Chapters 4 to 11 realize the first aim of this book.

The second aim of the book, to show that Resemblance Nominalism is actually a better theory than its competitors, is realized in Chapter 12. In that chapter I compare Resemblance Nominalism and its competitors in respect of various methodological virtues, namely coherence, preservation of intuitions, ideological economy, quantitative and qualitative ontological economy, and avoidance of ad hoc ontology. Contrary to what might be expected I do not argue that Resemblance Nominalism's superiority to Universalism and Trope Theory consists in its being more ontologically economical. Instead, I argue that the superiority of Resemblance Nominalism lies in its avoiding to postulate ad hoc entities. I argue that Universalism and Trope Theory postulate ad hoc entities because they postulate entities, universals and tropes respectively, whose main or only claim to credence is that they provide a solution to the Problem of Universals.

I end the chapter by arguing that Resemblance Nominalism is superior to other Nominalistic theories. In particular, Resemblance Nominalism's superiority over its main Nominalistic competitor, Class Nominalism, is explanatory superiority. For Resemblance Nominalism gives a satisfactory explanation of what makes particulars have their properties, while Class Nominalism does not. Thus Resemblance Nominalism not only gets a place in the Problem of Universals' 'grand final', it wins the contest.

I end the book with an appendix where I answer an interesting question which arises in the course of my solution to the imperfect community difficulty.

The Problem of Universals: 1 A Problem about Truthmakers

Although the Problem of Universals is one of the oldest philosophical problems, and has been discussed at length for many centuries, philosophers have not always been clear about what the problem is, why it is a problem, what must be explained by solutions to it and what sort of solution the problem requires. In this and the next two chapters I shall clarify these matters.

1.1 Introduction

Here are some facts: a certain rose is red, a certain ring is round, a certain tile is square, a certain vase is cold. These and similar facts are completely uncontroversial. My favourite way of describing in a general way these facts is by saying that they consist of particulars—the rose, the ring, the tile, the vase—having certain properties—the property of *being red*, the property of *being round*, the property of *being square*, the property of *being cold*. So when confronted with two red roses I say, for instance, that they share a certain property, the property of *being red*. Similarly I say that two cold vases share the property of *being cold* and so on.

As I said in the Introduction, although to maintain a link with tradition I shall keep calling it the 'Problem of Universals', it is a problem not about universals but about properties. For usually the Problem of Universals is considered to be the problem of showing how *numerically different* particulars can have the *same* properties, as when red particulars share the property of *being red*, cold particulars share the property of *being cold*, square particulars share the property of *being square*, and so on. The same question arises about relations, when the members of different groups are related to each other in the same way. Thus the orbits of Mars, Jupiter, and Saturn, and those of Mercury, Venus, and the Earth, are both such that the second is spatially between the other two. For simplicity I shall from now on speak only about properties but shall assume that everything I say about them applies more or less directly to relations. Only when I think relations deserve special treatment shall I consider them separately.

As formulated, the Problem of Universals presupposes that particulars have properties and therefore that there are particulars and properties. That many different particulars can and do have the same properties I take to be an undeniable or, as others would say, a 'Moorean' truth or fact (Armstrong 1984: 250, 1997*a*: 102). The existence of particulars, or at least of concrete particulars—roughly those located in space and/or time and which have causes and/or effects—is not seriously denied and I shall take it for granted. And although it is equally undeniable and uncontroversial that a certain rose is red, properties, like the property of *being red*, are controversial and have been denied many times in the history of Philosophy. Furthermore, I am going to argue for Resemblance Nominalism, a view according to which there are neither universals nor tropes, as a solution to the Problem of Universals. But if there are no universals and no tropes, how can Resemblance Nominalism be a *solution* to a problem that presupposes properties? And if the Problem of Universals presupposes properties, is this not presupposing particular solutions to it? If so, does this not show that the present formulation of the problem is wrong?

The answer to these questions is simple—and important to understand what follows. I use the word 'property' in expressions like 'the rose has the property of *being red*' or 'different particulars share the same properties' without committing myself to the existence of any *entities* over and above roses and particulars in general. I use the word 'property' just to express what is general about facts like the ones quoted at the beginning of this section. Similarly by saying that *a* and *b* share a property all I commit myself to is to some pair of facts like that *a* is red and that *b* is red, or that *a* is round and that *b* is round, and so on.

Some might think that instead of talking about properties I should talk about predicates applying to particulars. That is, instead of describing our facts as facts of particulars having properties I should describe them as facts of predicates applying to particulars. Similarly, when confronted with two red roses, I should say that the same predicate, namely 'is red', applies to both of them. But talking of predicates applying to particulars would not be a satisfactory course to take, for there might be features of particulars that can be described by no actual predicate, simply because no one has discovered that feature or because no one has created a word to express that feature. Furthermore some predicates apply to different objects in virtue of different features of the objects in question. For instance, 'game', as Wittgenstein showed, applies to whatever it does in virtue of different features. But it is not the case that all games share a property. Or consider the predicate 'grue', that applies to all things examined before a certain time *t* just in case they are green but to other things just in case they are blue (Goodman 1983: 74). Clearly grue particulars need not share a property.

So perhaps we should invoke possible predicates of a possible expressively complete language in which predicates apply to particulars always in virtue of the same features? Not quite, because talking in that way would obscure the fact that it is something about those particulars in virtue of which the predicates of such (merely) possible language apply to them. And this is what my use of 'property' captures.

So with the word 'property' I do not mean a universal, nor do I mean a trope. Resemblance Nominalists, and others who deny both universals and tropes, can accept properties in my sense. Thus all my use of the word 'property' commits one to is the idea of an identity of nature between some different particulars. But this need not mean that

there are one or more entities, over and above the particulars that are identical in nature, which are present in those particulars. This may be the case, if universals or tropes exist; but it will not be the case if that identity of nature consists, for instance, simply in that the particulars in question resemble each other. My point here is that the idea of identity of nature between different particulars, or of different particulars sharing properties, does not commit one to the existence of any entities over and above those particulars—whatever else may happen to exist. All one is committed to by this idea is that there is something that makes red particulars red, something that makes square particulars square, something that makes cold particulars cold, and so on. But whatever it is that makes all red particulars red need not be an entity, like a universal or trope; it might simply be that the red particulars resemble each other. Similarly for square particulars, cold particulars, and so on.

So the fact that different particulars share properties is just the fact that some particulars are all red in virtue of the same, some particulars are all square in virtue of the same, and so on. This is, I submit, a Moorean fact that should not be denied by anyone. Yet there are those who would deny it. For them what makes *a* red is just *a* and what makes *b* red is just *b*. So there is no entity, fact, or feature that makes all red particulars red. These philosophers subscribe to a variety of Ostrich Nominalism, a position against which I shall argue in Section 3.1.

Now this Moorean fact about particulars having the same properties is only the beginning of wisdom, as Armstrong says (1984: 251). One has then to account for that fact. And here is where different solutions to the Problem of Universals disagree: some will account for particulars' having properties in terms of universals, others will account for that in terms of tropes, and others will deny both universals and tropes and account for particulars' having properties in terms of resemblances between particulars, and so on. But these accounts will all be accounts of the same facts—namely particulars having properties. This is why I need a neutral word that is used to formulate the problem and that begs no question in favour of any particular solution to our problem. And I have chosen the word 'property' to play such role.

But whether or not a particular solution to the Problem of Universals postulates distinctive *entities* like universals or tropes, all these solutions make claims about what exists. This is why the Problem of Universals is an *ontological* problem, a problem about what kinds of entities exist, not about how we know, think, or speak about such entities. And although a solution to the problem may have interesting consequences about how we know, think, or speak about the world, these will not be my main concern here (I shall discuss an epistemological objection to Resemblance Nominalism in Section 4.12). It is very important to keep this distinction in mind, since even philosophers who are generally aware of the ontological nature of the problem sometimes fail to observe it. Thus Keith Campbell says that the Problem of Universals is the problem of 'what ontological structure, what array of real entities, is necessary and sufficient to account for the likeness among different objects which *ground the use* on different occasions of the same general term, "round", "square", "blue", "black", or whatever' (Campbell 1981: 483; emphasis added).[1] This is not the Problem of Universals as I understand it, since our use of general terms does not require the particulars to which we apply them to be alike in any definite respects, as we have seen in the case of 'game' and 'grue'.

But what then is the Problem of Universals? As I said, it is usually taken to be the problem of accounting for how different particulars can have the same properties. But why is this a problem? What kind of problem is it? What sort of solution should we look for? Nozick finds that many philosophical problems have the following form: how is a certain thing, call it 'X', possible given (or supposing) certain other things? (Nozick 1981: 9). He gives many examples, some of which are the following:

- How is it possible for us to have free will, supposing that all actions are causally determined?
- How is it possible that we know anything, given that we may be brains in a vat?
- How is it possible that motion occurs, given Zeno's arguments?

[1] Nine years later, however, Campbell (1990: 28) is clearer that the Problem of Universals is primarily an ontological issue and only secondarily a semantical one.

- How is evil possible, supposing the existence of an omnipotent omniscient good God?

Nozick calls these things other than the thing X 'apparent excluders', which appear to exclude the obtaining of X. The force of these apparent excluders, I take it, is variable: some might appear to exclude X *logically*, others *metaphysically*, and others perhaps only *physically*. In any case the coexistence of X and its apparent excluders is puzzling in some way and needs to be understood. Explaining how X is possible is, I take it, showing that there are no *real* excluders for X and there are two ways of doing this: either one shows that the apparent excluders do not exist or else one explains why they are merely *apparent* excluders.

Although Nozick failed to include the Problem of Universals among his examples, this problem has the form of Nozick's problems. This is more clearly seen in Armstrong's nice formulation of the problem, for whom it is 'the problem of how numerically different particulars can nevertheless be identical in nature, all be of the same "type"' (Armstrong 1978*a*: 41). Here the occurrence of the contrastive adverb 'nevertheless' suggests that there is an apparent excluder and this is, I think, just the numerical difference among the particulars. The question which troubles the philosophers is: how can there be identity in the difference?, or how can there be oneness in the multiplicity? This is why the problem is also called 'The One over Many'.

Some may see an apparent *logical* incompatibility here, others a weaker one. Either way an explanation is called for, and this is what solutions to the Problem of Universals try to provide. But others may feel that the Problem of Universals does not have Nozick's form, for there seems not to be any incompatibility, of any sort, between *a* and *b* being the same *in kind* (or the same in a certain qualitative respect) and *a* and *b* being *numerically* different. But *there is* an incompatibility of some sort between being different and being the same, and distinguishing between numerical identity or difference and qualitative identity or difference is already an attempt to explain how particulars can be identical in spite of being different. And, of course, without an account of what kinds or properties are, merely saying that numerically different particulars can be identical in kind is an incomplete explanation. But, anyway, there is a more basic problem, for the sort of explanation involved in how different particulars can have the same properties is rarely clarified, as Alex Oliver (1996: 75) points out, but in Section 1.3 I shall say what it must be.

There is an important, amply recognized, necessary connection between sharing properties and resembling. Indeed resemblance serves to ground the distinction between what Lewis (1986: 59–63, 1997: 191–3) calls *sparse* or *natural properties* and *abundant properties.* Here is what Lewis says about the difference between sparse and abundant properties (which applies also to relations):

> [The abundant properties] pay no heed to the qualitative joints, but carve things up every which way. Sharing of them has nothing do with similarity . . . There is one of them for any condition we could write down, even if we could write at infinite length and even if we could name all those things that must remain nameless because they fall outside our acquaintance. [They] are as abundant as the sets themselves, because for any set whatever, there is the property of belonging to that set. . . . The sparse properties are another story. Sharing of them makes for qualitative similarity, they carve at the joints, they are intrinsic, they are highly specific, the sets of their instances are *ipso facto* not entirely miscellaneous, there are only just enough of them to characterise things completely and without redundancy. (Lewis 1986: 59–60)

Thus, necessarily, if two particulars share a certain sparse property, say the property of *being white,* then they resemble each other, since they are both white. And, conversely, necessarily if two particulars resemble each other then they share some sparse property. For if they resemble each other they must be both white, or both hot, or both square, or . . . , and so share the property of *being white*, or that of *being hot*, or that of *being square*, or . . . This resemblance which accompanies sameness of sparse properties is ontological and objective: facts about resemblance between particulars are as objective as facts about particulars having properties, and have nothing to do with the language or system of representation we use. Resemblance is not, then, as Goodman (1972: 438) believes, relative, variable, and culture-dependent (although our *judgements* of resemblance may be). As we shall see in Section 3.4, solutions to the Problem of Universals are concerned with *sparse* properties and *sparse* relations, and from now on—unless otherwise indicated—when I

speak of properties and relations of particulars I have in mind *sparse* or *natural* ones.

Can we then rephrase the Problem of Universals in the following way: how is it possible that different particulars resemble each other? But what are the apparent excluders here? Why should the fact that different particulars resemble each other be more puzzling than the fact that different particulars, say, move towards each other? Presented in this way the puzzling nature of the problem disappears: it is an undeniable or Moorean fact that different particulars resemble each other, but hardly a puzzling one. Of course, *if* one assumes that resemblance *consists in* particulars having common properties, there is an 'apparent excluder', and the Moorean fact that different particulars resemble each other becomes puzzling and in need of explanation. For how can it be that *numerically different* things are nevertheless *identical* in some respect? But if so, asking 'how is it possible that numerically different particulars resemble each other?' is just a covert way of asking 'how is it possible that numerically different particulars have the same properties?'. Rephrasing the Problem of Universals in this way makes no real difference.[2]

But that resemblance is not part of the problem does not mean that it is not part of the solution, as I shall show in this work by arguing for Resemblance Nominalism as a solution to the Problem of Universals. Indeed Resemblance Nominalism takes the necessary connection between resemblance and common properties as the clue to solving the Problem of Universals. But there have been so many powerful objections to Resemblance Nominalism that nowadays most philosophers think it untenable. However, as we shall see in the following chapters, that is only an unfortunate and false impression, for Resemblance Nominalism, developed in a proper way, can adequately meet all those objections.

[2] Campbell also finds the label 'Problem of Universals' inapt. He proposes to call it 'The Problem of Resemblance' (1981: 483). But it should be clear now why this label is also unsuitable. 'The Problem of Properties' is, I think, a better name.

1.2 Brief review of solutions

Before discussing what sort of explanation is demanded by the Problem of Universals I shall set the scene with a brief review of the most famous solutions to the Problem of Universals. One of the many possible solutions to the Problem of Universals is the theory held, notably, by Armstrong, *Universalism*—as I call it in this book.[3]

According to Universalism there are two kinds of entities, *particulars* and *universals*. The former are those entities like tables, horses, planets, atoms, persons, which cannot be wholly located at different places at the same time. Universals, on the contrary, can be wholly located at different places at the same time, which is why they are sometimes called 'repeatables'. According to Universalism universals are what properties are. Universalism identifies properties with universals and says that for a particular to have a property is for it to instantiate a universal. Accordingly, for different particulars to share a property is for them to instantiate some one universal. What it is for a particular to instantiate a universal is difficult to explain, but I need not enter into this here, since the important thing is just that when we say, in a neutral way, that a particular *a* has a property **F**, Universalism says that the particular *a* instantiates the universal **F**, or **F**-*ness*. Thus the theory explains resemblance among particulars as a consequence of the identity of the universals they instantiate. Two particulars which share some universal thereby resemble each other in that respect, and if two particulars resemble each other in some way it is because they share a corresponding universal.

A different solution to the Problem of Universals is given by so-called *Trope Theory*. Trope Theory has been held in various forms by many diverse philosophers like Donald Williams (1997), Keith Campbell (1981, 1990), and Peter Simons (1994) among others. Trope Theorists agree that there are no universals: nothing is wholly located at different places at the same time. But besides ordinary concrete particulars like roses, tables, horses, planets, atoms, and persons, there

[3] Sometimes Armstrong's theory is called 'Realism about Universals'.

are the so-called *tropes*, abstract particulars like *the temperature of this table*, *the negative charge of this atom*, or *the whiteness of Socrates*.

For some Trope theorists tropes are the very 'alphabet of being' (Williams 1997: 115), that is, the entities out of which everything else is composed. On this view Socrates is less fundamental than his tropes—his whiteness, his height, his weight, etc.—for he is made out of them. Clearly, then, tropes are *not* repeatable and so are *not* universals; for though both Socrates and Plato are white, there is no third entity, namely *Whiteness*, which is possessed by both Socrates and Plato. On the contrary, the whiteness of Socrates and the whiteness of Plato are as numerically different from each other as Socrates and Plato themselves are. But although the whiteness of Socrates and the whiteness of Plato are numerically different they—like Socrates and Plato themselves—resemble each other.

Thus Trope Theory takes properties to be tropes and says that for a particular to have a property is for it to have a trope: for Socrates to be white is for him to have a white-trope. Now since tropes cannot be shared by different particulars, for several of them to share properties is for them to have resembling tropes. Thus both Socrates and Plato are white, because they have tropes that resemble each other, namely white-tropes. So instead of explaining resemblance among particulars in terms of the identity of the properties they have, Trope Theory explains it in terms of the resemblance between the properties they have (Campbell 1990: 40). If two particulars have resembling tropes then they thereby resemble each other, and if they resemble each other it is because they have some resembling tropes. So although the theory explains resemblance among concrete particulars, it treats the resemblance among tropes as a primitive notion (Campbell 1990: 31).

Universalism and Trope Theory are not the only possible solutions to the Problem of Universals. A third type of solution is provided by *Nominalism*, which comes in six different versions, clearly distinguished by Armstrong (1978*a*: 12–17). What all versions of Nominalism have in common is that they deny the existence of *both* universals and of tropes.

Among these versions, so-called *Ostrich Nominalism* (Armstrong 1978*a*: 16), specimens of which are Quine (1997), Michael Devitt

(1980), Bruce Aune (1984), and James van Cleve (1994), must be singled out since, strictly speaking, it is not a solution to the Problem of Universals, as it refuses to recognize it as a problem. This theory gains force from the Quinean semantic theory according to which '*a* is **F**' is true if and only if there is an *x* such that '*a*' designates *x* and '**F**' applies to *x*. Thus, according to Devitt (1980: 435), '*a* is **F**' commits one only to the existence of *a*, not of anything else. Now the Ostrich Nominalist paraphrases '*a* and *b* have the property **F**' as '*a* is **F** and *b* is **F**', which is true if and only if *a* is **F** and *b* is **F**. But given the Quinean semantics there need then be nothing in common between *a* and *b*. Thus the Problem of Universals is based upon a false presupposition. I shall discuss a version of Ostrich Nominalism in Section 3.1.

Two other versions of Nominalism are *Predicate Nominalism* and *Concept Nominalism*. According to Predicate Nominalism a particular *a* has a property **F** in virtue of the predicate '**F**''s applying to *a*. Similarly, Concept Nominalism says that a particular *a* has property **F** in virtue of *a*'s falling under the concept of **F** (Armstrong 1978*a*: 13–14). Accordingly these views say that for different particulars to share properties is for the same predicates to apply to them, or for them to fall under the same concepts. Thus for Socrates to be white is for 'white' to apply to Socrates, or for Socrates to fall under the concept of white. Correspondingly, for Socrates and Plato both to be white is for 'white' to apply to them both, or for them both to fall under the concept of white. These theories account for resemblance among particulars by reducing it to the fact that the same predicates apply to them, or that they fall under the same concepts.

The key fact in Predicate Nominalism's *solution* to the Problem of Universals, namely that '**F**' applies to *a*, occupies a central part in the Ostrich's argument that *there is no problem to be solved*. But Predicate and Ostrich Nominalism should not however be confused: the former takes the Problem of Universals seriously while for the latter it is a pseudo-problem.

A fourth version of Nominalism is *Mereological Nominalism*, which takes properties to be *mereological* wholes of particulars. Thus the property of *being white* is the sum of all and only white particulars, and similarly for any other property **F**. In general, for a particular to have a property is for it to be a part of some property whole and for different particulars to share properties is for them to be parts of the same property wholes. This theory explains resemblance among particulars as a consequence of their being parts of a single property whole: if they are part of such a whole then they thereby resemble each other, and if they resemble each other it is because they are parts of some one property whole.

A fifth version of Nominalism is *Class Nominalism*, which has been held, in different ways, by Anthony Quinton (1957) and David Lewis (1986: 50–3, 1997: 189–97).[4] Class Nominalism identifies properties with certain *classes* of particulars. Thus the property of *being white* is the class of all and only white particulars, and similarly for any other property **F**. Belonging to the class of white particulars and, of course, in general, belonging to the class of **F** particulars, is considered on this theory a primitive fact, not to be explained further. In Lewis's version the class includes also merely possible white particulars. In general, for a particular to have a property is for it to be a member of some property class and for different particulars to share properties is for them to be members of the same property classes. This theory explains the resemblance among particulars in terms of their membership of the same property classes: if they belong to some one property class then they thereby resemble each other, and if they resemble each other it is because they belong to some one property class.

Finally, there is *Resemblance Nominalism*, which says, roughly, that for a particular to have a property **F** is for it just to resemble all the **F**-particulars (we shall see in Chapters 5 and 9 to 11 what must be added to this statement if it is to avoid certain objections). Thus for two particulars to share the property **F** is for them both to resemble the **F**-particulars, and so, in general, for two particulars to share some property is for them to resemble each other. Thus for Socrates to be white is for him to resemble all the white particulars, and for both Socrates and Plato to be white is for them both to resemble the white particulars. Thus since Socrates resembles all white particulars he has the property

[4] In (1997: 189 n. 4) Lewis acknowledges both similarities and differences between his view of properties and what Armstrong calls 'Class Nominalism' in (1978*a*). But the similarities are enough, I think, to make Lewis's theory a version of Class Nominalism, and so does he (1997: 199).

of *being white*, and so does Plato as well. In short, in Resemblance Nominalism resemblance among concrete particulars is not *explained*, but is used to explain the properties of these particulars. In particular, it is the resemblances among concrete particulars, and not—as in Trope Theory—those among abstract particulars which is taken as primitive, basic, and fundamental.

1.3 A problem about truthmakers

The previous section shows how the way in which different theories account for particulars sharing properties depends on their accounts of what it is for a particular to have a property. This is especially clear in the case of Universalism, which says that for different particulars to share a property is for each of them to instantiate a specific universal, because for a particular to have a property *is* for it to instantiate a universal. The same goes for Resemblance Nominalism, which says that for different particulars to have the same properties is for them to resemble each other, since for a particular to have a property *is* for it to resemble other particulars.

This, however, is not the case in general, as Trope Theory shows. For although Trope Theory says that for different particulars to share some properties is for them to have some resembling tropes, it does not make resemblance constitutive of what it is for a particular to have a property. The reason is that a trope is what it is independently of any resemblance it may have to other tropes. Indeed Williams (1997: 117) explicitly acknowledges that a trope might not resemble any other trope, even if he finds this hard to imagine. And Campbell, in the following passage, urges us to distinguish two questions which may not have parallel answers:

> . . . 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 can ask of any *two* red things: what is it about these two things in virtue of which they are both red? Let that be the *B question* (Campbell 1990: 29; emphasis in original).

Campbell says that discussions of the Problem of Universals invariably take for granted that the two questions are to be given parallel answers. This leads philosophers to conflate the questions, and that in turn, according to Campbell, favours Universalism and begs the question against Trope Theory (Campbell 1990: 29).

Campbell is right to say that many philosophers conflate the two questions and indeed some philosophers, like Devitt (1980: 435), explicitly say that the problem is how to account for truths like '*a* is **F**' rather than truths like '*a* and *b* have the same property **F**' or '*a* and *b* are both **F**'. Others, however, are less clear about what the Problem of Universals demands an account of. The most notable example here is Armstrong himself, whom Oliver (1996: 49–50) has shown to vacillate between the following six sentences stating the facts to be accounted for by a solution to the Problem of Universals:

(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**.

However, as Oliver makes clear, Armstrong vacillates between (1) to (6) because he thinks that '*a* is **F**' is equivalent to '*a* has the property **F**', from which one can infer '*a* has a property'; similarly '*a* and *b* are both **F**' is equivalent to '*a* and *b* have a common property, **F**', from which one can infer '*a* and *b* have a common property'; finally from '*a* has the property **F**' and '*b* has the property **F**' one can infer '*a* and *b* have a common property, **F**' (Oliver 1996: 50).

Given what I have said about properties I shall take (2) and (3), and (5) and (6), to express the same facts. Some people may think that (2) and (3), and (5) and (6), cannot express the same facts. For consider the sentences '*a* is non-self-exemplifying' and '*a* has the property of *being non-self-exemplifying*'. Although the former may be true, the latter must be false because there cannot be, on pain of contradiction, a property of *being non-self-exemplifying*. To this my answer is double. First, given the way I use 'property', saying that something has a certain property does not commit me to any entity that is the property in question. So saying that *a* has the property of *being non-self-exemplifying* does not commit me to any entity that is that property. Second, even if there are entities that are properties, I am here only concerned with *sparse* properties (for more on this see Section 3.4). It is any *sparse* property that the property of *being* ***F*** is supposed to be. But the property of *being non-self-exemplifying* is not sparse—it is abundant.[5]

Taking (2) and (3), and (5) and (6), to express the same facts leaves us with four different facts: those expressed by (1), (2)/(3), (4), and (5)/(6). Which of these does the Problem of Universals demand an account of? This is not a trivial question, for since the facts are different there may not be a unified account of all of them. Indeed Lewis (1997: 201) thinks that (1) and (3) have different accounts, and we saw Campbell urging different accounts of (2) and (5). Unfortunately most philosophers have been unclear not only about what the Problem of Universals demands an account of, but also about the sort of account demanded, and before I can say in Section 2.3 what I think one must account for, I shall make clear what sort of account I think is required.

Oliver (1996: 50) points out that there are three views of what an account or explanation of (1) to (6) would be, and Armstrong seems to vacillate among them too. I take these views to be candidates for the sort of solution the Problem of Universals requires, and as such I shall show that only one of them is correct. These candidates are:

(*a*) a *conceptual* analysis of the *content* of (1) to (6);
(*b*) an account of the *ontological commitment* of (1) to (6); and
(*c*) an account of the *truthmakers* or *ontological grounds* of (1) to (6).

Candidate (*a*) tries to capture the content of some or all of (1) to (6). I agree with Oliver that 'capturing content' is vague. It is clear that material equivalence is too weak and strict synonymy too strong, but as he points out necessary equivalence is also too weak because 'if *Q* is necessarily equivalent to *P*, then so is *Q&R*, where *R* is any necessary truth' (Oliver 1996: 51). Whether or not this poses a problem for conceptual analysis, it does not matter here, since I think conceptual

[5] I am indebted to E. J. Lowe for having raised the point about the property of being *non-self-exemplifying*. It must be said that Lowe raised it with respect to my (2000), where I had not been so clear about the way I was using 'property'.

analysis is not what the Problem of Universals demands. For, as I noted in Section 1.1, the Problem of Universals is an ontological problem, an answer to which should tell us something about what there is, whereas all a conceptual analysis can tell us about is the content of the concepts and words we use to think and speak about what there is.

Candidates (*b*) and (*c*) must be carefully distinguished, since they are often confused, notably by Armstrong (1989*a*: 41 n.), probably because both ontological commitment and truthmaking are relations between sentences and entities. The ontological commitments of a sentence are those entities that must exist for the sentence to be true. More precisely, we can define ontological commitment as follows:

(OC) Sentence 'S' is ontologically committed to entity E if and only if 'S' entails 'E exists'.

The truthmaker of a sentence, on the other hand, is that *in virtue of* which it is true, or that which *makes* it true (Armstrong 1997*c*: 13; Bigelow 1988: 125). Although this intuitive explanation is not altogether clear, authors agree that 'making true' means not 'causing to be true' and many of them think that it means 'entailing'. Thus a truthmaker is often characterized like this (Bigelow 1988: 126; Fox 1987: 189; Oliver 1996: 69):

(T) Entity E is a truthmaker of sentence 'S' if and only if 'E exists' entails 'S'.

As Oliver (1996: 69) suggests, the necessity in the notions of entailment involved here is broadly logical or metaphysical. But whatever the notion of entailment, ontological commitment and truthmaking as defined by (OC) and (T) are converse entailment relations, running from language to world for ontological commitment and from world to language for truthmaking.[6] Thus both (*b*) and (*c*) tell us something about what exists. Neither can therefore be rejected on grounds that applying them to sentences (1) to (6) would tell us nothing about the world: both candidates are ontologically illuminating. But they are illuminating in fundamentally different ways, and this affects which of

[6] I shall work with *sentences* as truth-bearers. But nothing important should depend on this. All that I shall say about the sentences and their truthmakers should be readily applicable to other candidates for truth-bearers, like propositions.

them should be taken to be the sort of explanation demanded by the Problem of Universals.

Now, the nature of explanation is a highly controversial topic into which fortunately I need not go. I take it, however, that if 'S' entails but is not entailed by 'E exists', E's existence does not explain how the fact that S is possible.[7] For then E's existence is compatible with S's non-existence and therefore with S's *real* excluders and so E's existence is not enough to explain how the fact that S is possible. So since the Problem of Universals is the problem of giving a philosophical or metaphysical explanation of how the facts expressed by (1) to (6) are possible—that is, showing either that there are really no apparent excluders or that they are merely *apparent* excluders—the sort of account in question cannot be one about their ontological commitments, which rules out candidate (*b*) above.

On the other hand, one way of explaining how some fact S is possible is by invoking the existence of something which entails it. For if 'E exists' entails 'S' then E's existence *necessitates* the fact that S which means that, *given E*, the fact that S cannot fail to obtain, not that it obtains or exists necessarily. For then E's existence rules out the real excluders of the fact that S: what necessitates the fact that S thereby 'impossibilitates' its real excluders and so explains how S is possible. But if E is a truthmaker of 'S' then 'E exists' entails 'S'. And so I conclude that (*c*) above is the right candidate, that is, that the sort of account demanded for the Problem of Universals is an account of the truthmakers of sentences (1) to (6). Of the three candidates this is the only one which can provide us with an explanation of how the facts expressed by (1) to (6) are possible.[8]

In Section 2.1 we shall see, among other things, that (T) is inadequate as a definition of truthmakers and that only one of its component conditionals holds. But, as will be clear, none of this affects my argument in this section that a solution to the Problem of Universals must give an account of *truthmakers*, for this argument is based on the legitimate conditional.

[7] I take facts rather than sentences, statements, or propositions as the *relata* of explanation. See Mellor (1995: 63–4).

[8] Nothing here commits me to the dubious claim that explanation is entailment, if only because I am speaking about a specific kind of explanation, namely explanation of how, given some apparent excluders, a certain fact is possible.

2 The *Explananda* of the Problem of Universals

2.1 The idea of truthmakers

In the previous chapter I argued that the Problem of Universals is a problem about truthmakers. But are sentences *made* true by anything? Is the notion of truthmakers coherent? My interpretation of the Problem of Universals presupposes a positive answer to these questions. The philosophical coherence of the notion of truthmakers is threatened by the so-called *Slingshot argument*, which tries to show that the notion is empty or useless. I am not going to argue against the Slingshot because that would take me too far away from my present purposes and because I have done it elsewhere (Rodriguez-Pereyra 2001). In this section I shall concentrate on the notion of truthmakers and I shall briefly say what my grounds for believing in truthmakers are.

As Simons (1992: 159) says, the question about truthmakers arises as soon as one recognizes that truth is the joint outcome of two largely independent factors: that about the language which determines what a sentence means and that about whatever it is in the world which determines that the sentence, meaning as it does, is true or false. My reason for believing in truthmakers is simply that I think that there is no primitive propositional or sentential truth, and that truths are fixed by and grounded on the existence of something.

The idea of a truthmaker is thus the idea of that which *makes* something true, or that *in virtue of which* a certain truth is true. This requires that given the truthmaker, the truth is thereby determined. The idea is that all you need for a sentence to be true is the truthmaker. The truthmaker thus suffices for the truth of the sentence in question. That is, there cannot be the same truthmakers but different truths. Otherwise truthmakers would not suffice for the truth they make. We can also say that the truthmakers necessitate the truth they make. Thus one way of showing that some entities do not necessitate or do not suffice for a truth is by showing that the existence of those entities is compatible with the falsity of the sentence expressing the truth.

Sometimes the idea that truths have truthmakers is put in terms of supervenience: truth supervenes on being. John Bigelow thinks this is the central core of the idea of truthmaking and he therefore proposes the following formulation of the idea that truths have truthmakers: 'If something is true, then it would not be possible for it to be false unless either certain things were to exist which don't, or else certain things had not existed which do' (Bigelow 1988: 133). That truth supervenes upon being is a fine idea but, I think, it is not the central core of the idea of truthmaking. For being also supervenes upon truth. Indeed if something exists then it is not possible for it not to exist unless certain truths were false. But this supervenience of being on truth does not indicate that truths are being-makers. Thus what is fundamental in the idea of truthmaking is not supervenience but the idea that truths are true *in virtue of* entities. That truth supervenes upon being is a consequence of the fact that truths are true in virtue of entities, and this is why the supervenience of truth on being is important but the supervenience of being on truth is not.

The idea that truth supervenes on being is sometimes cashed out in terms of possible worlds. So that truth supervenes upon being is taken to mean or at least to entail that there cannot be two possible worlds with the same entities but different as to what is true in them. This idea of there being no possible worlds alike with respect to entities but different with respect to truths is true and useful, because it allows one to show that a certain entity E is not a truthmaker of a sentence 'S' by showing that E exists in a world in which 'S' is false. But, again, the

idea that there cannot be two possible worlds with the same entities but different as to what is true in them is not the core or essence of truthmaking. For, equally, there cannot be two possible worlds exactly alike with respect to what is true in them but different with respect to what exists in them.

The fundamental insight in the idea of truthmaking is that being and truth are importantly and asymmetrically related by a relation of grounding. Truth depends on being in that it is grounded on being—being is the ground of truth. That there cannot be two possible worlds with the same entities but different as to what is true in them is a simple and useful consequence of the more basic idea that truth is grounded on being, or that truths are true in virtue of certain entities.

This idea of truth being grounded on being is the idea that (T) (see Sec. 1.3) is meant to capture. But although the idea that truths have truthmakers sounds plausible, some may wish to reject it in an unrestricted version. First of all, some may wish to restrict the idea of truthmakers to *non-analytic* truths, even if they agree that certain meaning relations necessitate analytic truths. And others may wish to restrict it to *contingent* truths, excluding even synthetically necessary truths, on grounds that (T) implies that a truthmaker of any necessary truth is equally a truthmaker of every necessary truth. Even worse, (T) makes every entity a truthmaker for every necessary truth. For (T) says that E is a truthmaker of 'S' if and only if 'E exists' entails 'S'. But if 'S' is necessarily true then every entity E is such that 'E exists' entails 'S'. Thus both Socrates and the fact that Socrates is white are truthmakers for 'Snow is white or snow is not white' and '4 > 3'. This seems wrong, for whether or not necessary truths have truthmakers, any notion of truthmakers which has as a consequence that contingent entities are truthmakers for necessary truths is clearly wrong. For how can it be that Socrates *makes* it true that, say, the number 4 is greater than the number 3? How can it be that '4 > 3' is true *in virtue of* Socrates?[1] The notions of *making true* and *being true in virtue of* are felt not to be completely clear and this is why a clarification in terms of the relatively clearer notion of

[1] But notice that the notion of truthmakers as what makes truths true, or in virtue of which they are true, admits Socrates as the truthmaker of *some* necessary truths, e.g. 'Socrates exists or does not exist'.

entailment is usually proposed. But any such proposal implying that Socrates is the truthmaker of '4 > 3' tergiversates rather than clarifies the notion of truthmaking.

Thus I reject (T).[2] I propose the following as a definition of truthmakers:

(T′) Entity E is a truthmaker of 'S' if and only if E is an entity *in virtue of* which 'S' is true.

(T′) does not have the problems associated with (T): for even if E is such that it cannot exist without a sentence 'S' being true, it might still be the case that 'S' is true in virtue of something else, not E. This does not mean that there is no connection between truthmaking and entailment. But I think the entailment condition should be preserved only as a necessary, but not sufficient, condition for truthmaking:

(T*) If E is a truthmaker of 'S' then 'E exists' entails 'S'.

The language of possible worlds helps to clarify the meaning of (T*). Thus all (T*) requires of truthmakers is that in every possible world in which they exist the truth they make true be true. That is, if E makes true 'S' then there is no possible world where E exists but 'S' is not true. The rationale of this idea lies in the notion of truthmakers. For a truthmaker is something that suffices for a truth and something that can coexist with the falsity of 'S' is not sufficient for its truth.

(T*) is a particular case of (T**) (see Sect. 2.2), a more general principle that allows for joint truthmaking. It was this connection between truthmaking and entailment expressed by (T*) that I used in my argument in Section 1.3 that the Problem of Universals is a problem about truthmakers. Note also that (T*) has a quite limited use. It cannot be used to show that something is a truthmaker of a certain sentence but

[2] One way to define truthmakers in terms of entailment would be by using an alternative notion of entailment, say a relevant logic one. Greg Restall (1996: 338–9) introduces one such notion of entailment ('real entailment') which might support our pre-theoretic notions of truthmaking. But this notion of entailment cannot serve to account for our notion of truthmaking, since real entailment is defined in terms of truthmaking: '*A really* entails *B* if and only if, in every world *W*, every truthmaker for *A* is a truthmaker for *B*' (Restall 1996: 339). But we do not need to look for a definition of truthmakers in terms of any non-classic notion of entailment since the definition I shall propose, (T′), does not appeal to any notion of entailment.

can only be used to show that something is *not* the truthmaker of a certain sentence.

Going back to (T′), some may object that it is not a helpful definition because 'being true in virtue of' is too close in meaning to 'being made true by'. If this is so (T′) involves some kind of circularity. But perhaps there is no non-circular definition of truthmaking. This is certainly the case with other concepts. But this need not be a problem provided we have a fairly clear understanding of the concept in question. Do we have a fairly clear understanding of the notions of 'making true' or 'being true in virtue of'? Some will think they are obscure concepts—perhaps for the wrong reason that no clearly non-circular or non-trivial analysis of those concepts has been found. But we do have a fairly clear understanding of 'making true' and 'being true in virtue of'. This understanding is made explicit by stating what the truthmakers of different sentences are. In the next section I shall say what the truthmakers of disjunctions, conjunctions, and existential generalizations are. Knowing what makes true these kinds of sentences will give us the clue as to what the *explananda* of the Problem of Universals are.

2.2 Disjunctions, conjunctions, and other sentences

A traditional problem for truthmaker theory is posed by true negative and universal sentences, the truthmakers of which are a hotly debated topic. I shall say nothing about them here and refer to the work of Armstrong (1997*c*: 134–5), Hochberg (1992: 102–3), Russell (1994: 211–16), and Simons (1992: 163–6). In this section I shall concentrate on the truthmakers of only certain kinds of sentences, since what I say about them will be useful both in the next section and other chapters.

First, let us consider singular existential sentences and identity sentences. By a 'singular existential sentence' I mean any sentence containing only an individual constant and the predicate 'exists'. And by an 'identity sentence' I mean any sentence composed of an identity sign flanked by occurrences of individual constants. Thus 'Socrates exists' and 'Socrates = Socrates' are examples of singular existential and identity sentences respectively, and both of them are made true by Socrates himself. In general particulars are the truthmakers of singular existential sentences and identity sentences. Simons (1992: 162) says that there is another plausible story about the truthmakers of identity sentences, namely that they have none. But there is a reason to prefer the view that the truthmaker of an identity sentence is the particular referred to by the singular terms flanking the identity sign. For, as Simons says, (1992: 163), 'a false identity [sentence] is most plausibly made false conjointly by the two objects named (which thereby make true the . . . [sentence saying that] they are two objects)'. And this makes it more plausible that a true identity sentence is made true by the particular named in it.[3]

The significance of these kinds of sentences is that they show that not all truthmakers are of the same kind. Many if not most truthmakers are facts, for example, that a particular has a property, or stands in a relation to other particulars, but some of them, like Socrates in the present examples, may be just particulars.

The case of singular existential and identity sentences also shows that the truthmaking relation is not one–one. Indeed it is many–many, as can be clearly seen from disjunctions. For on the one hand some truthmakers make true more than one sentence, for example, the fact that Socrates is white makes true both 'Socrates is white or Socrates is round' and 'Socrates is white or Plato is white'. On the other hand, some sentences, like 'Socrates is white or Plato is white', have more than one truthmaker, that is, the fact that Socrates is white and the fact that Plato is white, because the existence of either fact entails the truth of the sentence. In this case the facts that Socrates is white and that Plato is white are *separate* truthmakers for 'Socrates is white or Plato is white', since each of them suffices on its own to make the whole sentence true.

This shows that disjunctive facts, if there are any, should *not* be postulated as the truthmakers of disjunctive sentences. For it is clear enough that a disjunction is true *in virtue of* the truth of either of

[3] As Kevin Mulligan, Peter Simons, and Barry Smith notice, taking Socrates as the truthmaker of 'Socrates = Socrates' commits one to non-existent particulars *if* one believes that this sentence can be true even if Socrates does not exist (Mulligan *et al.* 1984: 301).

its disjuncts, and that what *makes* true a disjunction is the truth of either of them. This is, of course, compatible with disjunctions being made true *also* by disjunctive facts, *if* there are any. But my point is simply that there is no reason to posit them as such truthmakers, given that that role is already played by the facts which make true any of the true disjuncts. Thus I shall take as truthmakers of disjunctions the truthmakers of any of the disjuncts.[4,5]

What are the truthmakers of existential generalizations? This case is of course similar to that of disjunctions, as existential generalizations also have separate truthmakers. To take the simplest case '$(\exists x)(\mathbf{F}x)$' is made true by whatever makes true '$\mathbf{F}a$', '$\mathbf{F}b$', '$\mathbf{F}c$' etc. Indeed '$(\exists x)(\mathbf{F}x)$' is true in virtue of the truth of any of '$\mathbf{F}a$', '$\mathbf{F}b$', '$\mathbf{F}c$' etc. and so each of the truthmakers of '$\mathbf{F}a$', '$\mathbf{F}b$', '$\mathbf{F}c$' etc. suffices to make '$(\exists x)(\mathbf{F}x)$' true. Thus the facts that Socrates is white and that Plato is white separately make true the sentence 'There is something white'. In general an existential generalization is made true by whatever makes true any of its true instances.[6] Thus, as in the case of disjunctive facts and disjunctions, existential facts—if there are any—should not be postulated as

[4] There might be exceptions to this, for in *some* theories of vagueness, for example, *Supervaluationism*, a disjunction might be true although neither disjunct is. Thus, given that 'is tall' is a vague predicate, if Ted is a borderline case of it, then 'Ted is tall or Ted is not tall' is true though neither 'Ted is tall' nor 'Ted is not tall' are. But not even in these theories should disjunctive facts be postulated as truthmakers. Thus supervaluationists should say, instead, that what makes 'Ted is tall or Ted is not tall' true is that Ted has a certain precise height, which makes him count as tall on some precisifications of 'is tall' and as short on other such precisifications.

[5] Stephen Read (2000: 74–5) has recently made a case against the contention that all that makes a disjunction true are the truthmakers of the true disjuncts. However Read's case depends on a postulate, which he calls 'The Entailment Thesis (ET)' (Read 2000: 69), according to which truthmaking is closed under entailment. (ET) follows from (T) above; but I rejected (T), and (ET) can and must be rejected on some of the grounds I rejected (T), namely that it makes every truthmaker a truthmaker for every necessary truth. Moreover (ET) does not follow from (T′) or (T*), which are the principles I accept.

[6] There might be exceptions to this since '$(\exists x)(\mathbf{F}x)$' might be true though it has no true instances because, for instance, no **F**-particular has a name. One then should say that '$(\exists x)(\mathbf{F}x)$' is made true by whatever makes any **F**-particular be **F** or else that '$(\exists x)(\mathbf{F}x)$' is made true by what would make true any of its instances had at least one **F**-particular a name. But since nothing in what follows depends on assuming that all particulars have names, I shall, for the sake of simplicity, continue to assume so.

the truthmakers of existential generalizations, since that role is already played by other facts.[7]

How about conjunctions? The situation here is different, since there is a prima-facie cogent principle about the truthmakers of conjunctions which has no analogue in the case of disjunctions. I call the principle (Conj) and it says that whatever makes a conjunction true makes its conjuncts true also:

(Conj) If E makes 'P&Q' true then E makes 'P' true and makes 'Q' true.

Clearly no analogue of (Conj) would be true of disjunctions, for since 'P∨Q' may be true while 'Q' is false, a truthmaker of 'P∨Q' need not be a truthmaker of 'Q'. That is, the truth of a disjunction does not entail the truth of all its disjuncts. And so one may suppose that to account for the truthmakers of conjunctions like '**F***a*&**F***b*' one needs to postulate conjunctive facts, for what can make true *both* '**F***a*' and '**F***b*' if not the conjunctive fact that **F***a*&**F***b*?

But if the conjunctive fact that **F***a*&**F***b* is a truthmaker of '**F***a*', does this mean that '**F***a*' has more than one truthmaker? This in itself should not be a problem, since we have seen that disjunctions often have more than one truthmaker. But '**F***a*' is not a disjunction. And surely, '**F***a*' is true in virtue of the fact that **F***a*, not of the fact that **F***a*&**F***b*, if there is any such thing. For let $\mathbf{F}_{\&}$ = **F***a*&**F***b*. If $\mathbf{F}_{\&}$ did not have as one of its constituents the fact that **F***a* then '$\mathbf{F}_{\&}$ exists' would not entail '**F***a*' and so this might not be true even if $\mathbf{F}_{\&}$ existed. But then '**F***a*' is true in virtue of **F***a*, not of $\mathbf{F}_{\&}$, that is, not of **F***a*&**F***b*.

But perhaps conjunctive facts are truthmakers of conjunctions but not of their conjuncts? Perhaps so but since one already has the facts that **F***a* and that **F***b* as truthmakers of '**F***a*' and '**F***b*' respectively, there is a simpler, less committing, and so better way to account for the truthmakers of conjunctions. This consists in, following Mulligan, Simons, and Smith (1984: 313), making '**F***a*&**F***b*' made true by the facts that **F***a* and that **F***b*, not *separately* of course, but *jointly*. In general, on this view,

[7] Vagueness might be a problem here again, since in Supervaluationism an existential generalization can be true without any of its instances being true (Keefe and Smith 1996: 32; Sanford 1976: 206–7). Again this should not lead one to postulate existential facts as truthmakers of existential generalizations.

conjunctions are jointly made true by the truthmakers of their conjuncts.[8] Thus the truthmakers of 'Socrates is white and Plato is white' are *both* the facts that Socrates is white *and* that Plato is white, that is, the facts that Socrates is white and that Plato is white make 'Socrates is white and Plato is white' true *jointly*.[9]

So, it seems, we should reformulate (Conj) to read that if $E_1, \ldots, E_n$ *jointly* make true '$P_1\& \ldots \&P_n$' then $E_1, \ldots, E_n$ *jointly* make true 'P_1' and . . . and 'P_n'. But what makes true each of the conjuncts of a conjunction is not the coexistence of their various truthmakers! Indeed '**F***a*' is no more made true by *both* the fact that **F***a* and the fact that **F***b* than it is made true by the *conjunctive* fact that **F***a*&**F***b*. And so (Conj) is wrong even if reformulated in this way. But how can (Conj) be wrong, if the truth of a conjunction entails the truth of each of its conjuncts? But entailment, as we saw, is only a necessary condition of truthmaking and does not exhaust it. (Conj) can only seem cogent if confused with the following undeniable principle about truthmaking, which should replace it:

(Conj*) If $E_1, \ldots, E_n$ *jointly* make true '$P_1\& \ldots \&P_n$' then 'E_1 exists & . . . & E_n exists' entails 'P_1' and . . . and 'P_n'.

But conjunctions are not the only sentences that are made true jointly. I, like Armstrong (1997*c*: 87, 89) and Simons (1992: 163), think that sentences like '*a* and *b* are numerically different' are also made true jointly, in this case by *a* and *b*. And, as I shall argue in Section 6.5, '*a* and *b* resemble each other' is also made true by *a* and *b* jointly. Thus I put forward the following general principle of joint truthmaking, (T**):

(T**) If $E_1, \ldots, E_n$ are joint truthmakers of 'S' then 'E_1 exists & . . . & E_n exists' entails 'S'.

All (T**) means is that it is impossible that a group of joint truthmakers of 'S' coexist while 'S' is false. In the language of possible

[8] Since 'jointly' suggests plurality there are, of course, exceptions to this rule, like the conjunctions '**F***a*&**F***a*', '**F***a*&(**F***a*∨**F***b*)' etc., but they are degenerate cases, special treatment of which is unnecessary here.

[9] But this leaves open the possibility that apparently simple facts like the fact that Socrates is white, or the fact that Plato is white, be in reality conjunctive facts. This, as we shall see in Section 4.8, is what Resemblance Nominalism maintains.

worlds this means that there is no possible world where a group of joint truthmakers coexist but 'S' is false. This must be so—otherwise those truthmakers would not suffice to make 'S' true. (More on truthmaking in Section 6.5, where we shall see that (T**) is a particular case of an even more general principle.)

2.3 The *explananda* of the Problem of Universals

It is one thing to know how to solve the Problem of Universals, and another to know exactly what facts this solution should explain. In looking for the truthmakers of (1) to (6), should we concentrate upon some of (1) to (6) and then extend our results more or less directly to the others? If so, on which of them should we concentrate first? Or are their truthmakers independent of each other?

What I have said about the truthmakers of conjunctive and disjunctive sentences in the previous section suffices to single out the basic facts the Problem of Universals demands an account of. Consider again sentences (1) to (6):

(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**.

(4) says that *a* has a property but does not specify which one; it says, in other words, that it has some property or other. Thus I take (4) to be a covert disjunction, something like '*a* is (has the property) **F**, or *a* is (has the property) **G**, or *a* is (has the property) **H** . . .'. Alternatively (4) might be seen as an existential generalization saying that there is something (some property) which *a* is (has). Either way what makes sentences like (4) true are the truthmakers of sentences like (5) and (6).

Similarly for (1), which can be taken either as a covert disjunction like '*a* is (has the property) **F** and *b* is (has the property) **F**, or *a* is (has the property) **G** and *b* is (has the property) **G** . . .', or else as an existential generalization like 'There is something (some property) which

both *a* and *b* are (have)'. Either way what makes sentences like (1) true are the truthmakers of sentences like (2) and (3).

But sentences like (2) and (3) are short for conjunctive sentences like '*a* is (has the property) **F** and *b* is (has the property) **F**'. Thus sentences like (2) and (3) are made true jointly by the truthmakers of sentences like '*a* is (has the property) **F**' and '*b* is (has the property) **F**'. That is, the truthmakers of sentences like (5) and (6) jointly make sentences like (2) and (3) true. Therefore an account of the truthmakers of sentences like (5) and (6) will thereby give us an account of the truthmakers of all the other sentences the Problem of Universals has been thought to demand an account of. In short, then, given that the Problem of Universals is a problem about truthmakers, to solve it one needs to give the truthmakers of sentences like (5) and (6).

Thus Campbell (1990: 29) is wrong in saying that his A-questions (namely, what is it about *a* in virtue of which it is red?) and his B-questions (namely, what is it about *a* and *b* in virtue of which they are both red?) may not have parallel answers. Campbell says that '*a* is red' is true in virtue of *a*'s having a red trope and similarly '*b* is red' is true in virtue of *b*'s having a red trope, and that it is in virtue of the likeness of the tropes in question that it is appropriate to use resembling word tokens, each a case of 'red', in describing *a* and *b* (Campbell 1990: 31). But if Campbell's questions are taken as questions about truthmakers, as they must be, then either Campbell has got the notion of truthmaking wrong, or else in his theory resemblance plays no role in truthmaking. For, obviously, the answer to his B-questions is dictated by the answers to his A-questions: how can what makes it true that *a* and *b* are red fail to be that *a* is red and *b* is red? Thus what makes both *a* and *b* red cannot be that they have resembling tropes unless their resemblance is what makes each of those tropes red-tropes, otherwise the only role of resemblance in the theory is to be that which makes us apply the predicate 'red' to both *a* and *b* rather than what makes the resulting sentences true.

But whatever is wrong with Campbell's theory, what is important here is that to solve the Problem of Universals one just needs to provide the truthmakers for sentences like (5) and (6). And for these sentences different theories will offer different truthmakers, for example, particulars resembling each other, particulars instantiating universals, or particulars having resembling tropes. Thus Resemblance Nominalism answers the Problem of Universals by saying, roughly, that the truthmaker of (5) and (6) is that *a* resembles the **F**-particulars, which is also a truthmaker of (4); and that *a* resembles the **F**-particulars and that *b* resembles the **F**-particulars are the joint truthmakers of sentences (2) and (3) and therefore of (1) too.

The Many over One 3

3.1 Against Truthmaker Ostrich Nominalism

What are the truthmakers of sentences like (5) and (6) (see Sect. 2.3)? Some may be tempted to give too simple an answer: the truthmaker of such sentences is just the particular *a*. Some philosophers may be inclined to this idea because they endorse semantic theories according to which a sentence like '*a* is **F**' is committed to the existence of the particular *a* and nothing else. Devitt, for instance, thinks that (6) has to be paraphrased by (5) and that this commits one to the existence of *a*, not of the property of *being* ***F***, for he endorses a Quinean semantics according to which '*a* is **F**' is true if and only if there is an *x* such that '*a*' designates *x* and '**F**' applies to *x* (Devitt 1980: 435).

Devitt's *Ostrich Nominalism* may be satisfactory, provided one is concerned with the ontological commitment of sentences like (5) or (6). But this is of little importance for us since, as we saw in Section 1.3, the Problem of Universals is concerned not with the ontological commitments but with the truthmakers of sentences like (5) and (6).[1]

Yet why believe that something else besides *a* is necessary to make sentences like (5) and (6) true? Maybe all that makes them true is just

[1] In a later work Devitt reverses the order of his argument, since there he does not argue from a semantics for sentences like '*a* is **F**' to an ontological conclusion that there are only particulars, but says that the reason for preferring the Quinean semantics is indeed ontological (Devitt 1991: 58). Another philosopher endorsing Ostrich Nominalism for no semantic reasons is van Cleve (1994). He believes that any other solution to the Problem of Universals is wrong. This book should be a refutation of that position.

the particular *a*? For is it not the case that, given that *a* is **F**, *a*'s existence suffices to make '*a* is **F**' true? Is it not possible to reproduce the Ostrich's strategy about truthmakers? No, for even if Ostrich Nominalism works for ontological commitments, the truthmaker version is untenable, as we shall now see.

One might think that the truthmaker version of Ostrich Nominalism fails only because a sentence like '*a* is **F**' may be *contingently* true. If so, then *a* does not suffice to make it true that it is **F**, since '*a* exists' does not entail '*a* is **F**', for the former may be true and the latter false. Therefore *a* is not the truthmaker of '*a* is **F**'.

Persuasive as this might be, there are reasons why some may remain unpersuaded by it. First, Counterpart theorists, according to whom no particulars exist in more than one possible world, may want to have Socrates as the sole truthmaker of a contingent predication like 'Socrates is white'. For although they accept this sentence as contingently true, they believe that 'Socrates exists' is true in only one possible world and so 'Socrates exists' does entail the truth of 'Socrates is white'. And, as we shall see in Section 5.4, Resemblance Nominalism is committed to Counterpart Theory.

But Counterpart Theory provides no reason to make Socrates the truthmaker of 'Socrates is white', unless one assumes that entailment is sufficient for truthmaking. But we saw in Section 2.1 that this tergiversates our idea of truthmaking and entailment is only necessary, not sufficient, for it. Thus Counterpart Theory does not help the Ostrich Nominalist about truthmakers.

Maybe a better way to make Socrates the truthmaker of 'Socrates is white' is to claim that all true sentences like '*a* is **F**' predicate something essential of their subjects. Indeed some hold that particulars are the truthmakers of any sentences predicating something essential to them (Bigelow 1988: 128). Thus if Socrates is essentially human and essentially moral, Socrates is the truthmaker of both 'Socrates is human' and 'Socrates is moral'.

Now it will certainly be difficult to argue convincingly that all true sentences like '*a* is **F**' are essential predications. But whether or not that can be done, assuming that Socrates is essentially human and essentially moral, can 'Socrates is human' and 'Socrates is moral', predicating such different characteristics of Socrates, both have the same truthmaker? Can those two sentences be true in virtue of the same thing when 'is human' and 'is moral' are not even coextensive predicates? Only if one thinks all there is to truthmaking is entailment, for 'Socrates exists', given the essentiality of his humanity and morality, entails both 'Socrates is human' and 'Socrates is moral'. But as we now know, entailment is only a necessary condition, not a sufficient one, for Socrates to be the truthmaker of 'Socrates is human' and of 'Socrates is moral'. Thus not even essential predications of Socrates have Socrates as their sole truthmaker.

And this, of course, is a general point which applies independently of whether the predications in question are assumed to be essential. This general point is also independent of any considerations about what entails what, and constitutes my reason for denying that particulars are the sole truthmakers of sentences like '*a* is **F**'. For take any true sentence predicating something of *a*, '*a* is white' for instance. There will then be other truths about *a*, like '*a* is spherical' and '*a* is hot'. And now the idea that *a* is the only truthmaker of these truths must be seen as seriously deficient. For how can the same thing make true '*a* is white', '*a* is spherical', and '*a* is hot'? In general, what makes *a* **F** must be something different from what makes it **G**, if **F** and **G** are different properties. Thus it takes more than just *a* to make those sentences about *a* true. So whatever one believes about whether being white, spherical, or hot is essential to *a*, and whatever one believes about '*a* exists' entailing those three sentences, an account of what makes them true must include something more than merely *a*. And then it is obvious what this extra is in each case, namely the facts that *a* is white, that *a* is spherical, and that *a* is hot.

There must therefore be some complexity or multiplicity involving *a* that accounts for the truth respectively of '*a* is white', '*a* is spherical', and '*a* is hot'. But then one has to take those facts seriously, since it leads nowhere to say, as van Cleve does, that 'the fact that *a* is **F** has *a* as its sole constituents, and the difference between this fact and the fact that *a* is **G** is not a difference in their constituents' (van Cleve 1994: 589). Unfortunately van Cleve does not explain how, if not in their constituents, do those facts differ. But if both facts have *a* as their sole constituent, then why does the fact that *a* is **F** not also make it true that *a* is **G**? Thus there must be some multiplicity about *a* that enters into the facts that *a* is white, that *a* is spherical, and that *a* is hot.

In other words, Truthmaker Ostrich Nominalism fails because it cannot do justice to the multiplicity of properties particulars have. Accepting this multiplicity of properties imposes only a rejection of Truthmaker Ostrich Nominalism. It does not commit one to any particular solution to the Problem of Universals. Resemblance Nominalism explains this multiplicity of properties in terms of the many different particulars *a* resembles. But other theories explain it in a different way. For instance, Universalism explains this multiplicity about *a* in terms of the many different universals it instantiates; Trope Theory explains it in terms of the many different tropes *a* has; Class Nominalism explains it in terms of the many different property classes *a* belongs to and so on.

3.2 The Many over One

So what solutions to the Problem of Universals must do is to give the truthmakers of sentences like '*a* is **F**' and '*a* has the property **F**'. If particulars had only one property then perhaps the particulars mentioned in sentences like those could be their truthmakers. But given the multiplicity of properties particulars have, the particular *a* alone cannot be the truthmaker of '*a* is **F**' or '*a* has the property **F**'. So what solutions to the Problem of Universals explain, by giving the truthmakers of sentences like (5) and (6), is how a single particular can be white, spherical, hot, etc. In general, what they explain is how a single particular can have a multiplicity of properties.

Thus the Moorean fact or truth to be accounted for by a solution to the Problem of Universals is what I call the 'Many over One', that is, that single, numerically one particulars have many different properties. The One over Many requires an explanation of oneness given its apparent excluder—multiplicity. Correspondingly, the Many over One requires an explanation of multiplicity given its apparent excluder—oneness. The question posed by the Many over One—exactly the

opposite of that posed by the One over Many—is then 'How can there be multiplicity in the oneness?', that is, 'How can a particular be in some sense multiple, given that it is numerically one?' The Many over One is indeed puzzling, for given that the particular is one, where does its multiplicity come from?

That the Problem of Universals is the Many over One, that is, that the Many over One rather than the One over Many is the phenomenon to be explained, should not be surprising. For the One over Many has as its starting-point facts about a multiplicity of particulars sharing some property or other, facts expressed by sentences like '*a* is **F** and *b* is **F**'. But given that the Problem of Universals is one about truthmakers, and that the truthmakers of these conjunctive sentences are the truthmakers of their conjuncts and that, given the multiplicity of properties had by particulars, there are many such conjuncts for each particular, the One over Many vanishes into the Many over One.[2]

The explanation of how it is possible for single particulars to have a multiplicity of properties can obviously take two forms: either one denies that there are any numerically one particulars or else one shows that the numerical oneness of particulars is merely an *apparent* excluder of their having a multiplicity of properties. The latter is done by explaining how this multiplicity of a particular's properties is compatible with its being one. And in this sense solutions to the Problem of Universals are theories of properties: they explain in virtue of what a single particular can have many of them. And some such theories, as Resemblance

[2] It has been suggested to me that the Problem of Universals can be put as follows: it cannot be true that *a* is Moses and *b* is Moses, but it can be true that *a* is round and *b* is round; how is this so? But, it is then argued, it is not obvious how appeal to truthmakers of conjunctions answers this question and so it is not entirely true that the One over Many vanishes into the Many over One. I agree that it is not obvious that appeal to truthmakers of conjunctions answers that question, but this is, I take it, because it is not *obvious* that solutions to the Problem of Universals must account for truthmakers of any sentences. Indeed I had to give an *argument* to show that this is so in Section 1.3. But once one sees that the Problem of Universals is a problem about truthmakers it is clear that the answer to the question of how can '*a* is round and *b* is round' be true is by citing the truthmakers of its conjuncts. But can sentences like '*a* is round' be true just in virtue of *a*? The answer to this is, as we saw, negative, for *a* alone cannot account for the multiplicity of truths like '*a* is round', '*a* is white', etc. It remains then to account for how it is possible for a single particular to have many properties and this is how the Problem of Universals, even if put in the suggested form, vanishes into the Many over One.

Nominalism does, may very well account for the Many over One without postulating universals or tropes.

3.3 Determinates and determinables

What are the properties for whose attribution to particulars we need truthmakers? Specifically, is our problem about the truthmakers of sentences attributing determinate or determinable properties? The distinction between *determinate* and *determinable* properties, drawn by W. E. Johnson (1921: 173–85), is relative: some properties are determinates with respect to some properties and determinables with respect to others. Thus the property of *being red* is a determinate of the property of *being coloured* but a determinable of the property of *being scarlet*. Another example: the property of *being hot* is determinate with respect to the property of *having a temperature*, but determinable with respect to the property of, say, *being 451° F*.

That the distinction is relative does not rule out properties that are determinate, but are not determinable with respect to any other properties (*lowest determinates*), and properties that are determinable, but are not determinates of any other properties (*highest determinables*). What the lowest determinates and highest determinables are is not always easy to say, but for the sake of subsequent examples I shall assume that *being scarlet* is a lowest determinate and *being coloured* a highest determinable.

There are many interesting features about the determinate/determinable distinction that need to be explained, like the incompatibility of determinates of the same determinables (i.e. if a particular is red, then it is not white, nor green, nor yellow etc., if it is scarlet, then it is not crimson, nor purple, nor vermilion etc., if it is round, then it is not square, nor triangular etc.). But here I want to concentrate upon two specific features of the relation between determinates and determinables, namely that having a determinate property entails having the determinable property of which it is a determinate and that having a determinable property entails having one of the properties that are its determinates. Thus, as Armstrong (1997*c*: 48) says, '[I]f a particular is

of length one metre exact, [or] of mass one kilogram exact or of some absolutely precise shade of red, then it is entailed that it has length or mass or colour'. Similarly, if a particular is coloured it must be either red, or green, or yellow, or blue etc., and if it is red it must be either scarlet, or crimson, or purple, or vermilion etc., if it is massive it must be either of one kilogram, or two kilograms, or three kilograms etc., and if it has length it must be either one metre long, or two metres long, or three metres long etc.

I suggest that the explanation of this is that determinables are disjunctions of their determinates, that is, to have a determinable property is to have either of its determinates. Thus the property of *being coloured* is the property of *being white or being red or being green or being yellow or being blue*, say. And similarly the property of being red is the property of *being scarlet or being crimson or being purple or being vermilion*, say. Viewing determinables as disjunctions of their determinates in this way makes it clear why if a particular has a determinate then it has the corresponding determinable and if it has a determinable then it has one of the corresponding determinates.

This also explains nicely why the determinate/determinable distinction is not the same as the *species/genus* distinction. For if a determinable is just a disjunction of its mutually incompatible determinates then the latter cannot be defined in terms of the determinable *plus* a further independent property, a so-called *differentia*.

Thus since there is no more to having a disjunctive property than having any of its disjuncts, having a disjunctive property is in reality a disjunctive fact: the fact that *a* is red is just the fact that *a* is crimson, or *a* is scarlet, or *a* is vermilion, etc. And what makes it true that *a* is red is that it is crimson if it is crimson, that it is scarlet if it is scarlet, that it is vermilion if it is vermilion, etc. Thus, in general, the truthmakers of any sentence attributing a determinable to a particular *a* is that *a* has some lowest determinate, for if a particular has a determinable, or a determinable predicate applies to it, then this is so in virtue of its having some (lowest) determinate. And so solutions to the Problem of Universals are theories of *lowest determinate properties*. Thus I shall develop Resemblance Nominalism as a theory of lowest determinate properties and so, in what follows, when I speak of properties I shall have in mind—unless otherwise indicated—*lowest determinate properties*. Similarly my bold letters '**F**', '**G**', '**H**' etc. should be taken to stand for lowest determinate properties and when occasionally I use determinables in my examples these should be understood as really being about lowest determinates.

3.4 Sparse properties

The above has important consequences for the properties of which solutions to the Problem of Universals are theories. It shows that the correspondence between predicates and properties is not one–one, but many–many, and so the properties I am concerned with here are not the meanings of certain predicates and certain abstract singular terms, for there are properties that ground the application of many different predicates, like the property of *being scarlet* grounds the application of the predicates 'is red' and 'is coloured'. And there are predicates whose application is grounded in different properties, like 'is red', whose application to some particulars is grounded in their being scarlet while its application to others is grounded in their being crimson. This of course does not mean that 'is coloured' and 'is red' are ambiguous: only that, as Mellor (1997: 263, 265, 267) would say, there need be no single property in virtue of which they apply to particulars and those properties are not part of their meaning.

Solutions to the Problem of Universals are theories of sparse or natural properties, as opposed to abundant ones. As we saw in Section 1.1, abundant properties are such that 'there is one of them for any condition we could write down, even if we could write at infinite length and even if we could name all those things that must remain nameless because they fall outside our acquaintance' (Lewis 1986: 59–60). Indeed, as Lewis (1986: 60) says, for any set whatever, there is an abundant property of belonging to that set.

On the other hand sparse or natural properties are such that '[s]haring of them makes for qualitative similarity, they carve at the joints, they are intrinsic, they are highly specific, the sets of their instances are *ipso facto* not entirely miscellaneous, there are only just enough of them to

characterise things completely and without redundancy' (Lewis 1986: 60). But note that there may be an infinite number of sparse properties. For mass and temperature are good examples of sparse or natural properties and there is an infinite number of determinate temperatures and masses that particulars may have. But, of course, no single particular can have all of those masses and/or temperatures, which contrasts with abundant properties, of which particulars have indeed infinitely many.

That solutions to the Problem of Universals are theories of sparse properties does not mean, of course, that Resemblance Nominalism and the other solutions deny abundant properties. They need not deny abundant properties—it is just that what those solutions try to account for are *sparse* properties.

It is important to note that negative, disjunctive, and conjunctive properties are not sparse. Negative and disjunctive properties have no connection with resemblance. Both black and white particulars are both *black or white* and *not blue*, but it would be preposterous to suggest that all black and white particulars thereby resemble each other. Disjunctive and conjunctive properties are also such that particulars have more of them than is necessary to characterize them completely and without redundancy. For what makes something have a disjunctive property is that it has any of its disjuncts and what makes something have a conjunctive property is that it has each of its conjuncts. Thus since the Problem of Universals is about the truthmakers of sentences attributing sparse properties and relations to particulars and groups of them, I shall therefore not be concerned with negative, disjunctive, and conjunctive properties.

That negative, disjunctive, and conjunctive properties are not sparse will have important consequences. On the one hand, it makes it possible for the Resemblance Nominalist to measure degrees of resemblance in the way I shall propose in Section 4.4. On the other hand, as we shall see in Sections 8.2 and 11.1, that disjunctive and conjunctive properties are not sparse makes Resemblance Nominalism face arduous problems like the *imperfect community difficulty* and what I shall call the *mere intersections difficulty*.

But my rejecting conjunctive properties from the domain of sparse ones is not completely uncontroversial, since some authors include conjunctive properties among the sparse ones. Thus Armstrong, whose universals correspond one-to-one with sparse properties, allows conjunctive universals (Armstrong 1978*b*: 32–6). Armstrong has two arguments for conjunctive sparse properties. One says that the causal powers derived from having both properties **P** and **Q** may be more or less than the sum of causal powers bestowed by **P** and **Q** taken separately (Armstrong 1978*b*: 35). But this, as Mellor says, is a *non sequitur*, for it does not show that **P&Q** is a property, but 'merely that laws of the form "All **P&Q**s are . . ." need not follow from laws of the form "All **P**s are . . ." and "All **Q**s are . . ." ' (Mellor 1997: 265).

Armstrong's other argument is that 'it is logically and epistemically possible that all properties are conjunctive properties' (Armstrong 1978*b*: 32). But this, as Mellor (1997: 265) says, begs the question.

Furthermore the supposition that all sparse properties are conjunctive is false. For if all sparse properties were conjunctive then every particular with at least one sparse property would have infinitely many. But, first, the properties of which particulars have infinitely many are abundant properties, not sparse ones. And secondly, sparse properties are supposed to be those, the sharing of which accompanies similarity or resemblance. But resemblance is subject to degrees and so the more sparse properties two particulars share the more they resemble each other. But if all sparse properties are conjunctive then every two particulars sharing any number of properties will share infinitely many and so all resembling particulars will share the same number of properties. Sharing more or less sparse properties would not then accompany a greater or lesser degree of resemblance between particulars. Thus a world in which all sparse properties were conjunctive would be a world with no sparse properties at all, which resembles what Armstrong says about a world in which all properties were disjunctive (Armstrong 1978*b*: 35). Therefore not all sparse properties can be conjunctive, which undermines Armstrong's argument for the admission of sparse conjunctive properties. Thus, for the reasons given above, conjunctive properties are not sparse and so I shall not be concerned with them in this book. In what follows when I speak of properties I have in mind sparse or natural ones—unless otherwise indicated—and so my bold letters '**F**', '**G**', '**H**', etc. should be taken to stand for sparse or natural properties.

Resemblance Nominalism 4

4.1 Resemblance Nominalism and the Many over One

Resemblance Nominalism takes the necessary connection between resemblance and sharing properties to be the clue to solving the Problem of Universals, that is, to explaining how a single particular can have many different properties. The answer given by Resemblance Nominalism is, in a nutshell, that a particular can have many different properties by resembling many different groups of particulars. What makes a particular *a* have property **F** is that it resembles all the **F**-particulars, what makes it have property **G** is that it resembles all the **G**-particulars, and so on. For example, what makes Socrates white is that he resembles all the white particulars, and what makes him wise is that he resembles all the wise particulars. In general, what makes **F**-particulars have property **F** is that they resemble each other, what makes **G**-particulars have property **G** is that they resemble each other, and so on. The multiplicity involved in the Many over One is thus a multiplicity of groups of particulars that a certain particular resembles.

This account of what makes a particular have a certain property provides, as it should, a parallel and direct account of what it is for particulars to lack a property, namely to fail to resemble certain particulars. Thus what makes Socrates lack the property of *being crazy* is that he does not resemble the crazy particulars.

Notice that Resemblance Nominalism is a relational theory of properties in the sense that, since resemblance relates particulars, it makes the having of a property a relational matter, since for a particular to have any property is for it to resemble other particulars. There are other such theories, like versions of Universalism which account for instantiation in terms of some *relation* linking particulars and universals. Resemblance Nominalism is of course significantly different from any theory like that, for here the entities a particular resembles are other particulars. Some philosophers, like van Cleve (1994: 580), think that no relational theory of properties works. But we shall see in what follows that van Cleve is wrong, for Resemblance Nominalism does work.

Is Resemblance Nominalism's a good answer to the Many over One? In particular, does it not presuppose what it seeks to explain, namely that a single particular can be in some way multiple? For in saying that *a* is **F** in virtue of resembling the **F**-particulars, **G** in virtue of resembling the **G**-particulars, and so on, it explains the multiplicity of *a*'s properties by invoking a multiplicity of resemblance relations.

But is this multiplicity of *a*'s relations really puzzling? If it is, it is not puzzling in the way in which the multiplicity of *a*'s properties is. The Many over One puzzle is how the *same* particular can have *different* properties. But that puzzle is not raised by the fact that *a* resembles *b* but not *c*, that *a* is to the right of *b* but to the left of *c*, etc. Since *b* and *c* are different particulars, there is no mystery in *a*'s bearing different relations to them: the multiplicity of *a*'s relations is grounded in the multiplicity of the particulars to which it bears them. In other words, the relations between *a* and *b* and between *a* and *c* are not so much facts about *a* as facts about the pairs *a* and *b*, and *a* and *c*, respectively. But since the pair of *a* and *b* is not the pair of *a* and *c*, there is no problem with *a* and *c* not being related to each other as *a* and *b* are.

This does not stop of course the Many over One problem, and Resemblance Nominalism's solution to it, applying to relations as well as to properties. *a*'s being both to the right of *b* and bigger than *b* is puzzling in the same way as *a*'s being both white and round. How can *a* and *b*, the *same* pair of particulars, be related to each other in two different ways? This problem is of course not peculiar to *pairs*, but arises for any *n*-tuples of particulars, for every *n*. For example, suppose that *a* is between *b* and *c* and also jealous of *b* on account of *c*: how then can *a*, *b*, and *c*, the same triple of particulars, be related to each other in two different ways?

The answer is parallel to the answer for properties. There are ordered pairs of particulars such that the first member is to the right of the second, and other ordered pairs of particulars such that the first member is bigger than the second, and the ordered pair of *a* and *b* resembles the ordered pairs of particulars *x* and *y* such that the first is to the right of the second and also resembles those such that the first is bigger than the second. Similarly in the case of Jupiter, Saturn, and Mars: there are ordered triples, like <Venus, Earth, Mercury>, such that the first member is between the other two, and ordered triples, like <Uranus, Pluto, Neptune>, such that the first is bigger than the other two, and the ordered triple <Jupiter, Saturn, Mars> resembles both kinds of ordered triples. In general, then, what makes *n* particulars be related in a particular way is that some ordered *n*-tuple whose members are those *n* particulars resembles certain other ordered *n*-tuples. Thus in invoking resemblances to solve the Many over One problem Resemblance Nominalism neither presupposes what it seeks to explain nor prevents its solution applying to relations as well as to properties.

So far I have sketched Resemblance Nominalism's doctrine about properties and relations; but what about relational properties? How can a single particular, say *a*, have different relational properties, like *being a son of b* and *being taller than b*? Relational properties, sometimes called *extrinsic* properties, are those had by particulars in virtue of the relations in which they stand. Thus if *a* is a son of *b* then *a* has this relational property *in virtue of a* and *b* standing in the son-of relation. So the relations in which a particular is involved are metaphysically prior to its relational properties in that it is facts about particulars entering into relations which make sentences attributing relational properties true (compare Armstrong 1978*b*: 79). But if it is this relational fact which makes it true that *a* is a son of *b*, the supposition that there is some property of *a* which is the property of *being a son of b* becomes idle. Relational monadic predicates apply in virtue of relational facts, and so Resemblance Nominalism gives no account of what makes a particular have a relational property over and above its account of what makes particulars be related to each other. This, as we shall see, will be of particular importance in Section 5.2, in connection with the problems posed by coextensive and necessarily coextensive properties.

4.2 Properties and relations as classes

In the previous section we saw that Resemblance Nominalism answers the Many over One by saying that what makes *a* have the property **F** is that it resembles all the **F**-particulars, what makes it have the property **G** is that it resembles all the **G**-particulars, and so on. That is, the truthmaker of a sentence attributing a property to a particular is that the particular in question resembles the other particulars of which it is also true that they have the property in question. But this does not say what properties are.

One answer to this is that properties are classes of resembling particulars. Similarly, this answer takes relations to be classes of resembling ordered *n*-tuples. Thus *a* and *b* share a property if and only if they both belong to some class of resembling particulars, and they are related by the same relation as *c* and *d* are if and only if both these ordered pairs belong to some class of resembling ordered pairs.

Now, not every class of resembling particulars (or ordered *n*-tuples) will do as a property (or relation). Socrates and Plato are white and so {Socrates, Plato} is a class of resembling particulars, but what property, if any, is the class {Socrates, Plato}? None, and therefore not every class of resembling particulars is a property. But then what kind of class of resembling particulars is a property? Obviously those which are *property classes*, that is, classes whose members are all and only particulars sharing a certain property. But how can we specify these property classes in terms of resemblances? Following Price (1953: 21–2) one might say that a property class is one whose members sufficiently resemble certain specific particulars, the so-called *paradigms* of the class. But we shall see in Chapter 7 that this answer and its variants face serious difficulties. One might then decide to follow Carnap (1967: 113) and say that a property class is a *maximal* class of resembling particulars, that is, a class such that every two members resemble each other and nothing outside the class resembles everything inside

it. But this is also wrong for, as Goodman has shown (1966: 160–4), it is subject to the imperfect community and companionship difficulties. But this, however, should not prevent one identifying properties with classes since, as we shall see in Chapters 9 to 11, these and other difficulties can be solved and property classes can be specified in terms of resemblances.

Meanwhile it is important to note that taking properties to be classes does not make Resemblance Nominalism subject to a fatal objection to Class Nominalism. Class Nominalism takes the property of *being white* to be the class of white particulars, the property of *being square* the class of square particulars, and so on, and takes membership of these classes as a primitive and ultimate fact. But, as Armstrong (1978*a*: 36), Mellor (1997: 262), and others have argued, that Socrates is white is what makes him a member of the class of white particulars, not the other way round.

This objection does not apply to Resemblance Nominalism, which does not take Socrates' membership of the class of white particulars as a primitive fact, but rather makes it consist in the fact that Socrates *resembles* the other members of this class. Thus even if for Resemblance Nominalism the class of white particulars is the property of *being white*, and belonging to this class is having that property, what *makes* something white, that is, have the property of *being white*, is *not* belonging to the class (i.e. having the property!) but *resembling* the other members of the class. Thus what makes it true that *a* is **F** is not that *a* belongs to the class of **F**s, but that it resembles the other members of that class.

Armstrong thinks that the identification of relations with classes of ordered *n*-tuples is problematic, for he says that the notion of order is still a relational notion and so, presumably, by taking relations to be classes of ordered *n*-tuples one has not eliminated all relations (Armstrong 1989*b*: 31, 1997*b*: 163). But I find this a very weak point, for two reasons.

First, the notion of order involved in that of ordered *n*-tuples is not that of a genuine relation. Indeed, to say that $\langle a,b \rangle$ is an *ordered* pair is *only* to say that $\langle a,b \rangle = \langle c,d \rangle$ if and only if $a = c$ and $b = d$. This simple condition exhausts the notion of order involved in that of an ordered pair (and similarly for ordered *n*-tuples, for every *n*). In other words, that $\langle a,b \rangle$ is an *ordered* pair only means that it need not be identical to $\langle b,a \rangle$: there is then no relation of order between a and b implicit in $\langle a,b \rangle$. Secondly, even if there were a genuine relation of order implicit in the condition that $\langle a,b \rangle = \langle c,d \rangle$ if and only if $a = c$ and $b = d$, this would not be a relation which Resemblance Nominalism is concerned with, since it would not be a sparse or natural relation.

One might think that there is a better line to take on the problem of whether an implicit relation is involved in the notion of an ordered n-tuple, namely that ordered n-tuples can be reduced to *un*ordered ones and so relations can be identified with *un*ordered classes. Thus, according to Casimir Kuratowski, the ordered pair $\langle a,b \rangle$ comes out as $\{\{a\},\{a,b\}\}$. But Armstrong, who thinks that Resemblance Nominalists will take this line of argument, thinks it is open to objection for

> 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. (Armstrong 1997*b*: 163)

Armstrong gives no examples, but this passage reminds one of Paul Benacerraf's argument that numbers could not be sets because there is no more reason to think that, say, the number 2 is identical to $\{\{\varnothing\}\}$ rather than to $\{\varnothing,\{\varnothing\}\}$ or to the set of all two-membered sets (Benacerraf 1983: 285). Similarly, one might think, there is no non-arbitrary reason to identify $\langle a,b \rangle$ with $\{\{a\},\{a,b\}\}$ (Kuratowski) as opposed to $\{\{\varnothing,\{a\}\},\{\{b\}\}\}$ (Wiener), $\{\{a,c\},\{b,d\}\}$, where c and d are two particulars different from a and b (Hausdorff), or many of the other classes which serve well enough as surrogates for $\langle a,b \rangle$.

But, actually, there *is* a non-arbitrary reason not to identify the relation **R** with the class of Wiener pairs or the class of Hausdorff pairs. For, surely, for every x and y, the empty class and any other particulars u and w are extraneous to the fact that **R**xy, and so to say that $\varnothing$ or other particulars enter into **R**ab is unreasonable.

But although the class of Kuratowski pairs might have a better claim to be identified with **R** than the classes of Wiener or Hausdorff pairs,

there are infinitely many other classes with claims as good as that of Kuratowski pairs to be identified with **R**. One of these is the class of pairs $\{\{\{x\}\},\{\{x,y\}\}\}$ such that **R**xy. Another is the class of singletons $\{\{\{x\},\{x,y\}\}\}$ such that **R**xy. A further one is the class of pairs $\{\{y\},\{y,x\}\}$ such that **R**xy. Thus it is arbitrary to identify relations with unordered classes. So perhaps one should desist from identifying relations with *un*ordered classes?

Yes. Furthermore, identifying relations with classes of *un*ordered classes in order to eliminate the relation implicit in an *ordered* n-tuple is not well motivated. For since $\langle a,b \rangle = \langle c,d \rangle$ if and only if $a = c$ and $b = d$, $\langle a,b \rangle$ can only be identified with, say, $\{\{a\},\{a,b\}\}$ because $\{\{a\},\{a,b\}\} = \{\{c\},\{c,d\}\}$ if and only if $a = c$ and $b = d$. But if this condition makes $\langle a,b \rangle$ invoke an implicit relation it also makes $\{\{a\},\{a,b\}\}$ invoke an implicit relation, thus making the latter as objectionable as the former. Conversely, if the fact that $\{\{a\},\{a,b\}\} = \{\{c\},\{c,d\}\}$ if and only if $a = c$ and $b = d$ does not make $\{\{a\},\{a,b\}\}$ invoke such a relation, then no such relation is invoked by $\langle a,b \rangle$. For, as we saw, what makes $\langle a,b \rangle$ an *ordered* pair is just that $\langle a,b \rangle = \langle c,d \rangle$ if and only if $a = c$ and $b = d$.

I think therefore that *if* Resemblance Nominalists are to identify properties and relations with classes, they can and should identify relations with classes of *ordered* n-tuples. However, that the class of pairs $\{\{y\},\{y,x\}\}$ such that **R**xy has as good a claim as that of Kuratowski pairs to be identified with **R** shows that even identifying relations with classes of *ordered* n-tuples is arbitrary to some extent. For there are no more grounds for identifying relation **R** with the class of ordered pairs $\langle x,y \rangle$ such that **R**xy than for identifying it with the class of ordered pairs $\langle y,x \rangle$ such that **R**xy. And this means not only that different classes can be identified with the same relation, but also that the same class can be identified with different relations, for there are no more grounds for identifying the class of ordered pairs $\langle x,y \rangle$ such that **R**xy with the relation **R** than there are for identifying it with the converse of **R**. This is Armstrong's point applied to *ordered* pairs and it is of course generalizable to all n-tuples.

It *is* arbitrary to identify relation **R** with the class α of ordered pairs $\langle x,y \rangle$ such that **R**xy rather than with the class β of ordered pairs $\langle y,x \rangle$ such that **R**xy. But this situation is not as bad as it looks. For, first, notice that the arbitrariness here is less than that involved in identifying the number 2 with $\{\{\varnothing\}\}$, say, rather than with $\{\varnothing,\{\varnothing\}\}$. For while those two classes have equal claims to be the number 2, only one of them can be that number. Thus identifying the number 2 with $\{\{\varnothing\}\}$ means rejecting the identity of $\{\varnothing,\{\varnothing\}\}$ with any number. But in our case α and β have equal claims to be identified with *two* relations, namely **R** and its converse, so that identifying **R** with one of them just means identifying its converse with the other, each identification being as good as the other.

Secondly, its being arbitrary to identify **R** with α rather than β does not mean that **R** is not identical with either class, merely that we have no reason to think that it is α rather than β (or β rather than α). We may still have a reason to think that it must be one of them. For if Resemblance Nominalism is a good solution to the Many over One, *and* relations *are* classes of ordered *n*-tuples, what other classes could **R** and its converse be if not α or β?

Thirdly, even if the arbitrariness involved means that relations are *not* classes, this fact, contrary to what Armstrong suggests, is not really important. For the way in which Resemblance Nominalism tries to solve the Many over One does not make *a*'s membership of the class of **F**s part of the truthmaker of '*a* is **F**' or '*a* has the property **F**'. Its truthmaker for this is that *a* resembles the other (members of the class of) **F**s. Similarly, Resemblance Nominalism does not make $\langle a,b\rangle$'s (or $\langle b,a\rangle$'s) membership of any class part of the truthmaker of '**R***ab*' or '*a* bears **R** to *b*'. Its truthmaker for this is that certain ordered pairs, of one of which *a* and *b* are the members, resemble each other. Whether $\langle a,b\rangle$'s resemblances to other pairs is what makes it true that *a* bears **R** to *b* and $\langle b,a\rangle$'s resemblances to other pairs is what makes it true that *b* bears **R**'s converse to *a*, or the other way round, is a dispute that need not concern Resemblance Nominalism. For either way, what makes *a* bear **R** to *b* and *b* bear **R**'s converse to *a* is that certain ordered pairs, among which there are some whose members are *a* and *b*, resemble each other.[1]

[1] These three points, of course, also hold for relations other than dyadic ones and for ordered *n*-tuples when $n > 2$.

Thus Resemblance Nominalists need not identify properties and relations with any classes at all. But if Resemblance Nominalists do not identify properties and relations with classes, with what do they identify them? The answer to this is that Resemblance Nominalism need not identify properties with anything at all. As I said in Section 1.1, I am using 'property' in a way that does not commit one to any thing over and above the particulars that have properties. So the way is open not to identify properties with anything at all.

This version of Resemblance Nominalism, the one where properties are not identified with anything at all, is the version I prefer. This version just says that what makes it true that a particular has a property is that it resembles other particulars and what makes it true that certain particulars stand in a certain relation is that certain ordered *n*-tuples resemble each other. This does not mean that this version of Resemblance Nominalism is able to get rid of classes—as we shall see in Chapter 9 Resemblance Nominalism postulates classes and, anyway, ordered *n*-tuples are very similar to classes. One might think that by refusing to identify properties with classes this version of Resemblance Nominalism at least escapes some of the grave problems accruing from such identification, like the problem posed by coextensive properties. But, as we shall see in Section 5.1, this problem is independent of any identification of properties with classes and, anyway, it can be solved even if properties are identified with classes, as we shall see in Section 5.3.

Then why do I prefer not to identify properties with classes? Because I think the identification brings no considerable theoretical benefits and, furthermore, it is difficult to justify. After all, what we know about classes we know from Class or Set Theory, and nothing there says that some classes are properties. Furthermore by avoiding identifying properties with classes we avoid questions that seem to have only dubious answers, for instance: if properties are classes and their members are their instances, what are their subclasses?, what is the relation between properties and the empty class, which is a subclass of every class? etc. Perhaps one could devise coherent and plausible answers to these questions, but this would amount to unnecessarily complicating the theory given that there is a version of Resemblance Nominalism that does well without identifying properties with classes. It is for this reason that I prefer the latter version of Resemblance Nominalism, which is the one I shall have in mind in what follows. However, since the two versions of Resemblance Nominalism are similar in almost every other respect, much of what I shall say will apply to both, and when it does not, I shall make this explicit.

4.3 The objectivity and primitiveness of resemblance

What is the resemblance invoked by Resemblance Nominalism? It is an objective, ontological, primitive, reflexive, symmetrical, non-transitive, and transtemporal 'relation' that comes by degrees and can obtain between no more than two entities. In this and the following four sections I shall discuss these features of resemblance (in Section 5.3 we shall see another feature of resemblance).

I put the word 'relation' in quotes because, as we shall see in Section 6.5, although there are resembling particulars, there is no entity over and above them that is their resemblance. Strictly speaking, then, what I say is that the Resemblance Nominalist invokes objective, ontological, primitive, reflexive, symmetrical, and non-transitive facts of no more than two entities, that may or may not exist at the same time, resembling to a greater or lesser degree. But for ease and simplicity of exposition I shall talk throughout the book about resemblance as if it were an entity, that is, a relation.

That resemblance is ontological and objective means that resemblance facts, for example, that *a* resembles *b*, obtain independently of any system of representation which human beings or any other cognizers might happen to use. Resemblance facts are as objective and ontological as facts about particulars having properties are. Indeed, as I said in Section 1.1, it is recognized on all sides that resemblance necessarily accompanies sharing of properties. What Resemblance Nominalism does is to explain this necessary accompaniment by saying: particulars have properties *in virtue of* resembling each other.

That resemblance is ontological and objective does not mean that resemblance is a sparse or natural relation, like the relation of *exerting gravitational attraction* is. Sparse relations are also ontological and objective. But resemblance is not a sparse relation. Thus resemblance is not a relation whose existence in general—as opposed to its holding between specific pairs of particulars—is discovered a posteriori by natural science, as the sparse relations we must account for are. Rather resemblance is recognised a priori as a necessary accompaniment to any such relation, as to any such property. In this respect, Resemblance is like the so-called instantiation relation that some Universalists posit to link particulars to their universals, a relation which is also not discovered a posteriori, but is rather postulated on the basis of a priori considerations.

Some might think that Resemblance Nominalism must take resemblance as sparse because if Resemblance Nominalism is true then one can characterize particulars completely and without redundancy in terms of resemblance. And sparse properties are those of which there are enough of them to characterize particulars completely and without redundancy (Lewis 1986: 60). But this would be a mistake. One can give a complete and non-redundant characterization of particulars in terms of resemblance because resemblance is what accounts for sparse properties. Resemblance is not a sparse relation, for it is the relation in terms of which Resemblance Nominalism accounts for sparse properties and relations. And for this very reason resemblance is not an abundant relation either—for no abundant relation accounts for sparse properties and relations. Thus resemblance has a special status (and in this it is also comparable to the instantiation relation postulated by some versions of Universalism).

Let me now consider the primitiveness of resemblance. By calling it 'primitive' all I mean is that Resemblance Nominalism does not account for the facts of resemblance it invokes in terms of any other, more basic kinds of facts. If *a* and *b* resemble each other, there is no other fact to which the resemblance between *a* and *b* reduces.

Resemblance is not primitive in all theories of properties. Universalism reduces the resemblance of particulars to their instantiating the same universals, just as in Trope Theory resemblance between particulars is reduced to resemblance between tropes. But Resemblance Nominalism admits no universals or tropes to facts about which the resemblance of particulars could be reduced. Indeed Resemblance Nominalism admits nothing else to which facts of resemblance could be reduced. (This is not to say that sentences like '*a* and *b* resemble each other' have no truthmakers. What these are will be discussed in Section 6.5.)

An important consequence of the primitiveness of resemblance is that it must be a relation of *overall resemblance*, not of *resemblance-in-a-respect*. For in Resemblance Nominalism what makes it true that *a* is **F** cannot be that *a* resembles the **F**-particulars *in respect of property* ***F***. For then their having the property **F** would be the ontological ground of the resemblance and not vice versa. That is, what would make it true that *a* resembles all the **F**-particulars would be that they all have property **F**, instead of the resemblance of all these particulars to each other making it true that they have property **F**. The resemblances that the Resemblance Nominalist invokes are too basic to be distinguished into different respects in which they are resemblances.

This is not however to deny that whenever two particulars resemble each other, they do resemble in some specific respect. It is only to insist that this resemblance-in-a-respect is not basic, but is itself based on a prior and basic relation of overall resemblance. This is what makes Resemblance Nominalism such a radical and difficult philosophical project, for in it respects—that is, properties—are not given, but must be accounted for from particulars and a single relation of overall resemblance. Thus *a* and *b* resemble in being red and in being square because they have the properties of *being red* and *being square*. But they have these properties, respectively, because they both overall resemble the red particulars and overall resemble the square ones.

Between what particulars does this primitive resemblance hold? It holds between any particulars that share some sparse property. But given that Resemblance Nominalism accounts for sparse properties in terms of resemblance, is it not this account of resemblance circular? No, for the Resemblance Nominalist's account of sparse properties in terms of resemblances is (only) ontological, and to say that resemblance holds between any two particulars sharing some sparse property is merely to fix the extension of the predicate '__ resembles __' in terms of the independently known extension of the predicate '__ and __ share a sparse property'. And besides the fact that what is ontologically prior need not be conceptually so, there is in fact no need to use the phrase 'sparse property' in introducing the predicate '__ resembles __': doing so is just a matter of convenience. For as the interpretation is only extensional, it is simply a matter of making the predicate correspond to a certain set of pairs of particulars and ordered *n*-tuples, namely those of which it is true to say that they resemble each other. Thus to introduce the concept of resemblance as that which holds between any two particulars sharing some sparse property is not circular, nor does it affect the ontological primitiveness of resemblance (compare Goodman's remarks in his 1966: 147).

4.4 Degrees of resemblance

An important feature of resemblance is that it comes by degrees. All this means is that pairs of resembling particulars may resemble more or less closely. It is important to recognize that this does not mean merely that some pairs of particulars resemble each other more or less closely than other pairs do, but that the same particular may resemble some particulars more or less closely than it resembles others. This is an uncontroversial thing to accept, since surely any two apples resemble each other more closely than either resembles Socrates or a camel.

That resemblance comes by degrees has played an essential role in what I call *Aristocratic Resemblance Nominalism*, the version of Resemblance Nominalism according to which what makes particulars have a property is their sufficiently resembling certain paradigmatic particulars. Although I shall argue against this version of Resemblance Nominalism in Chapter 7, I shall make substantial use of the fact that resemblance comes by degrees when solving the so-called *companionship difficulty* in Chapter 10.

To what degree do a given pair of particulars resemble each other? My answer to this question is:

(D) *x* and *y* resemble each other to degree *n* if and only if they share *n* properties.

Note that (D) makes degrees of resemblance depend on the *number* of properties shared, not on which those properties are. Thus imagine three particulars, *a*, *b*, and *c*, having only shape and colour, and such that they all are perfectly circular, but *a* is French blue, while *b* is carmine and *c* is vermilion. One is tempted to say that, on our ordinary notion of resemblance, *b* and *c* resemble each other more closely than either of them resembles *a*. However, since *b* and *c* share only one property, i.e. *lowest determinate* property (see Sect. 3.3), that of *being circular*, which is the only property each of them shares with *a*, my way of measuring degrees of resemblance dictates that every two of *a*, *b*, and *c* resemble each other to the same degree, namely 1.

Does not this show that I am wrong in measuring degrees of resemblance in the way I do? No. There is indeed a notion of resemblance on which carmine and vermilion particulars, other things being equal, resemble each other more closely than any of them resembles any French blue particular. Such resemblances may be used to account for determinables.[2] But this is not the resemblance with which I am concerned, since my aim here is to use resemblances between particulars to account for lowest determinate properties. If, as Resemblance Nominalists, we want to say that what makes a particular *a* carmine, as opposed to vermilion, is that *a* resembles the carmine particulars but not the vermilion ones, we must neglect any resemblances between carmine and vermilion particulars.

But even so, it might be thought, (D) is useless. For did Satosi Watanabe not *prove*, with his *Theorem of the Ugly Duckling* (1969: 376–7), that if we take the number of shared properties to measure resemblance degrees then 'any two objects are equally as similar to each other as any other two objects'? If so then there is no use to something like (D), since all objects would share the same number of properties.[3] But what Watanabe proved is not a problem for my (D). For it

[2] Alexander Bird has pointed out to me that these resemblances may not even be needed to account for determinables. One may say, for instance, that what unifies all determinates of a certain determinable is that they occur in parallel laws of nature.

[3] Strictly speaking what Watanabe shows, and claims to show (1969: 377), is that the number of predicates satisfied or properties shared by any two objects 'belonging to different types' is the same. By 'objects belonging to different types' he means, roughly, discernible objects, that is, those that do not have the same properties. So it is not the case that

is essential to his proof that the properties in question (or 'predicates' to use his terminology) are the members of the smallest complete Boolean lattice of a given set of properties (1969: 364). No doubt any Boolean lattice of certain *sparse* properties would contain some non-sparse or abundant properties. Thus if the properties of *being red* and *being square* are among the given sparse properties, their Boolean lattice will contain properties like being *red and square*, *being red or not being square*, *being neither red nor square*, etc. In general the lattice will contain negative, disjunctive, and conjunctive properties. But these are not sparse or natural properties (see Sect. 3.4). But it is sparse properties that (D) explains resemblance in terms of. Thus Watanabe's proof shows no defect or lack of utility in (D).

Yet (D) may still be felt to be too simple. For does not the degree to which two particulars resemble each other depend not only on how many properties they share but also on how many they do *not* share? This gives rise to the following two accounts of degrees of resemblance, the first of which is proposed by Oliver (1996: 52):

(D_1) x and y resemble each other to degree n if and only if $m/p = n$, where m is the number of properties shared by x and y and p the number of properties unshared by them.

(D_2) x and y resemble each other to degree n if and only if $m/q = n$, where m is the number of properties shared by x and y and q the number of properties had by them.

Notice that (D_1) presupposes that no two particulars share all the properties there are, otherwise the number of properties unshared by them would be 0 and so they would resemble to degree $n = m/0$, which does not exist. But this presupposition is not difficult to justify, as it is impossible for any particular to have (at the same time) different determinates of the same determinable, and hence all the properties there are.

But there are problems with (D_1). One is that the number of properties unshared by two particulars may be infinite. But even if we ignore this possibility, as Oliver (1996: 52 n.) does, my problem with (D_1) is

a particular resembles itself as closely as it resembles any other particular—but every particular resembles each of any two particulars with which it does not share all its properties as closely as it resembles the other.

that it is not clear why the total number of unshared properties should be relevant to the degree to which any two particulars resemble each other. For suppose that particulars have only three properties: colour, shape, and temperature; and suppose there are five lowest determinate colours, five lowest determinate shapes, and five lowest determinate temperatures. Imagine then that particulars *a* and *b* share all their properties, that is, share their colour, shape, and temperature, and so there are twelve (lowest determinate) properties that they do not share. (D_1) would then make *a* and *b* resemble to degree $3/12 = 1/4$. But what do all the unshared properties of *a* and *b*, that is, the properties they *lack*, have to do with the degree to which they resemble each other? Surely the properties *a* and *b* lack cannot make any difference as to how closely they resemble each other: if there had been, say, three lowest determinate colours, three lowest determinate shapes, and three lowest determinate temperatures, *a* and *b* would have resembled as closely as they do. Yet according to (D_1) they would then have resembled much more closely, namely to degree $3/6 = 1/2$.

(D_2) is, I think, better than (D_1), but is still not free of problems, since it cannot be applied generally unless we presuppose something which seems false, namely that all particulars have the same number of properties.

Thus (D_1) and (D_2) face problems which (D) does not, and so (D) should be adopted. But what I want to emphasize here is the crucial point of agreement between (D), (D_1), and (D_2), namely that on each of them *x* and *y* resemble each other to a greater (equal, smaller) degree than *w* and *z* do if and only if they do so on the other two. For suppose (D), (D_1), and (D_2) assign the following degrees of resemblance respectively to *a* and *b*, and *c* and *d*, as in Table 4.1. Then n is greater, equal, or smaller than n' if and only if n_1 is greater, equal, or smaller than n_1', and n_2 is greater, equal, or smaller than n_2'. For let p be the difference between the total number N of properties and the number of properties shared by *a* and *b*, and let p' be the difference between N and the number of properties shared by *c* and *d*. But n (i.e. the number of properties shared by *a* and *b*) equals n' (i.e. the number of properties shared by *c* and *d*) if and only if p equals p' and so, since $n_1 = n/p$ and $n_1' = n'/p'$, n equals n' if and only if n_1 equals n_1'. And n is greater

TABLE 4.1

	(D)	(D_1)	(D_2)
a and *b* resemble to degree	n	n_1	n_2
c and *d* resemble to degree	n'	n_1'	n_2'

(smaller) than n' if and only if p is smaller (greater) than p', and so if and only if n_1 is greater (smaller) than n_1'. And so n is greater, equal, or smaller than n' if and only if n_1 is greater, equal, or smaller than n_1'.

Similarly, n is greater, equal, or smaller than n' if and only if n_2 is greater, equal, or smaller than n_2'. For assuming that there is a fixed number q of properties that all particulars have, n_2 ($= n/q$) will be greater, equal, or smaller than n_2' ($= n'/q$) if and only if n is greater, equal, or smaller than n'.

Thus judgements of *comparative* resemblance, that is, that a pair of particulars resemble more, equally, or less closely than another pair of particulars, based on (D), (D_1), and (D_2), will always agree. And since these are the only judgements that matter here we may as well use the simplest measure (D).

An important feature of taking (D)—or (D_1) or (D_2)—as the measure of degrees of resemblance is that it disposes of the belief that degrees of resemblance are a 'vague, spotty and imprecise matter', as Armstrong (1989*b*: 42) says. He doubts that it is always the case that given two pairs of particulars the first resemble each other more closely, or less closely, or to the same degree as the second pair (Armstrong 1989*b*: 42). But if degrees of resemblance depend on the number of shared properties then it is clear that this will always be the case (provided having a property is not a vague matter).

4.5 The formal properties of resemblance

I have said that *resemblance* is a reflexive, symmetrical relation which is not, of course, transitive. *Exact* resemblance, however, is transitive. These formal features of resemblance and exact resemblance, sometimes called the 'axioms of resemblance' (Armstrong 1997*c*: 23), are commonly taken for granted. But not always: some, like Armstrong (1978*b*: 91–3) and Guido Küng (1967: 165), reject reflexive relations and therefore the reflexivity of resemblance. Thus Küng (1967: 165) follows a traditional line which says that a reflexive relation is not a real relation, but is rather a relation of reason based on the conceptual duplication of an entity that in reality is a single entity. But we shall see in what follows that the reflexivity of resemblance is as real as its symmetry.

Let us turn to Armstrong: on what basis does he reject the reflexivity of resemblance in his (1978*b*)?[4] He gives two arguments, the first of which is that making relations like resemblance reflexive clashes with the a posteriori character of the knowledge that a particular has a property or bears a relation to something, since in many cases we know a priori that a particular is reflexively related, for example, we know a priori that a particular is *identical* with itself, *resembles* itself, is *the same size* as itself etc. (Armstrong 1978*b*: 92). But that we can know only a posteriori that a particular has a property or bears a relation to something is true only of *sparse* properties and relations. And, as we saw in Section 4.3, resemblance is not a sparse or natural relation and so facts of resemblance need not be known a posteriori. So this argument does not require us to reject the reflexivity of resemblance.

Armstrong's second argument is that reflexive relations like resemblance bestow no causal powers upon the particulars which are said to have them (1978*b*: 92). But again, this surely does not apply to a relation whose existence is not discovered a posteriori and is used to account for what makes particulars have other properties and relations which are so discovered. Thus neither of Armstrong's arguments suffices to show that resemblance is irreflexive.

But is resemblance reflexive? It seems to me it is, for how could a particular fail to resemble itself? Only by failing to share its properties

[4] The rejection may indeed be peculiar to his (1978*b*), since in (1997*c*: 23) Armstrong explicitly says that resemblance and exact resemblance are reflexive. In (1989*b*: 41), while he is silent about the reflexivity of resemblance, he says that it is convenient to say that exact resemblance is reflexive, since this 'satisfies the demands of the logicians'. But, as we shall see in note 6 below, the reflexivity of exact resemblance entails the reflexivity of resemblance.

with itself, which is impossible. But since I have taken resemblance to be that which accompanies sharing of sparse properties, it seems that particulars having no sparse properties at all need not resemble themselves. Could there be such 'bare' particulars, with no sparse properties? I do not see how to refute that possibility but, fortunately, I need not do so. For since I am concerned with the Problem of Universals, solutions to which are theories of sparse properties, the only particulars with which I am concerned here are those which have sparse properties. Thus by the reflexivity of resemblance all I mean here is that every particular which has some sparse property resembles itself.

Armstrong has put Resemblance Nominalism under pressure to explain the formal features of resemblance and exact resemblance. He says in many places that if resemblance is primitive then the fact that resemblance and exact resemblance have the formal features they have must be a primitive, unexplained fact, as must be the fact that they differ in one of these features (Armstrong 1978*a*: 49, 1989*b*: 57, 1991*a*: 482, 1997*b*: 163–4, 1997*c*: 23). For if resemblance is primitive then, Armstrong (1997*c*: 23) says, 'there seems to be no prospect of explaining them by deducing them from anything else'. Whereas his own Universalism, which makes resemblance derive from shared universals, does explain the formal features of resemblance and exact resemblance, which follow directly from those of *sharing some universal with* and *sharing all universals with*. And since, as Armstrong (1997*b*: 164) says, '[E]xplanatory power is a virtue and lack of explanation a defect, in metaphysics as much as in science', it would be better if Resemblance Nominalism could explain these formal features of resemblance and exact resemblance.

Now, as noted by Campbell (reported by Armstrong 1978*a*: 49), there is a quick way to put Resemblance Nominalism and Universalism on a par in this respect by deriving identity from resemblance, that is, by equating identity with *exact* resemblance. Then even if Resemblance Nominalism could not explain the formal properties of resemblance, it could at least explain the formal properties of identity, which Universalism must leave as primitive. This, however, would commit Resemblance Nominalism to the Principle of Identity of Indiscernibles, something which is very likely to be false. And even if it is not, I think that the less committed to other controversial theses a metaphysical theory is, the firmer it is.

Fortunately, however, Resemblance Nominalism can explain the formal properties of resemblance by deriving them from more basic claims. What does Resemblance Nominalism derive the formal properties of resemblance from? It derives them from the following basic Resemblance Nominalist claims or axioms:

(1) If x resembles y then resembling y, among other particulars, makes x have some property X_i.
(2) Resembling the X_i-particulars is what makes a particular X_i.
(3) The particulars whose resemblance to which makes any particular X_i are the particulars whose resemblance to which makes any other particular X_i.
(4) If X_i and X_j are different properties then the particulars whose resemblance to which makes a particular X_i are not the same as the particulars whose resemblance to which makes a particular X_j.
(5) If x resembles y to degree n then resembling y, among other particulars, makes x have properties $X_1\& \ldots \& X_n$, where $1 \leq n$.
(6) There is no x which any particular y resembles to degree n and degree m, where $n \neq m$.

One of these axioms, (6), is uncontroversial and should be admitted by Resemblance Nominalists and others equally. The other five axioms embody some of the most basic claims of Resemblance Nominalism. The most basic claim of Resemblance Nominalism is that to resemble particulars is what makes particulars have their properties. This means two things. One is that if a particular resembles some particular then the former has thereby some property. This is what (1) says in a general way. The other thing it means is that if a particular is **F**, this is so in virtue of its resembling the **F**-particulars; if it is **G**, this is so in virtue of its resembling the **G**-particulars, and so on. This is what (2) says in a general way.

(3) and (4) are Resemblance Nominalist versions of general principles respected by every sensible solution to the Problem of Universals. (3) is the Resemblance Nominalist version of the principle that what makes a particular *a* **F** must be the same as what makes any

other particular **F**. Thus although what makes *a* **F** is that *a* resembles the **F**-particulars and what makes *b* **F** is that *b* resembles the **F**-particulars, resembling the **F**-particulars is the common factor here. There would be something seriously wrong in Resemblance Nominalism if this theory had it that what makes *a* **F** is that it resembles the **F**-particulars while what makes *b* **F** is that it resembles *other* particulars, say the **G**-particulars, or a group of particulars consisting of some **F**-particulars and some non-**F**-particulars. Similarly, there would be something seriously wrong in Universalism if it said that what makes *a* **F** is that it instantiates the universal **F**-ness while what makes *b* **F** is that it instantiates the universal **G**-ness. But the theory does not say this: it says instead that what makes both *a* and *b* **F** is the same, namely to instantiate **F**-ness. Other solutions to the Problem of Universals also respect this general principle.[5]

(4) is the Resemblance Nominalist version of the principle that what makes something have a property cannot be what makes something have a different property. If what makes something **F** is the same as what makes it **G**, why is *being F* not the same as *being G*? Thus since what makes something **F** is that it resembles certain particulars, what makes something **G** is that it resembles *other* particulars. This is also a sensible principle respected by every respectable solution to the Problem of Universals. For instance, Universalism has it that what makes something **F** is that it instantiates the universal **F**-ness but what makes something **G** is that it instantiates the universal **G**-ness. Something similar is true of Trope Theory and other solutions to the Problem of Universals. It was failure to respect the insight that what makes something **F** must be different from what makes it **G** that proved Truthmaker Ostrich Nominalism wrong in Section 3.1.

Finally, (5) is what (1) becomes when degrees of resemblance, measured by (D), are taken into account. (5) should be accepted by anyone who accepts (1) and (D).

[5] Does Trope Theory not violate the principle? After all, what makes *a* **F** is that it has *this* trope and what makes *b* **F** is that it has *that* trope. But having *this* trope makes *a* **F** because *this* is an **F**-trope and having *that* trope makes *b* **F** because *that* trope is an **F**-trope. So, what makes *a* and *b* **F** is the same, namely to have an **F**-trope. Trope Theory therefore does not violate the requirement in question.

Let us see how Resemblance Nominalism can derive the formal properties of resemblance from these six axioms.

Suppose *a* resembles *b*. From (1) it follows that, in virtue of resembling *b* among other particulars, *a* has some property, say, **F**. Since *a* is **F** in virtue of resembling *b*, it follows from (2) that *b* is **F** as well. But since *a* is **F** and *b* is **F** it follows from (2) that *b* resembles *a*. So, if *a* resembles *b*, *b* resembles *a*. Resemblance is thus symmetric.

Is this sufficient? So far I have only shown that if *a* resembles *b* then *b* resembles *a*, which does not show that if *a* resembles *b* to degree *n* then *b* resembles *a* to degree *n*. Yet similar considerations enable us to show this too. For suppose *a* resembles *b* to degree *n*. Then it follows from (5) that resembling *b*, among other particulars, makes *a* have certain properties, say properties $\mathbf{F}_1\& \ldots \&\mathbf{F}_n$. From this and (2) it follows that *b* has properties $\mathbf{F}_1\& \ldots \&\mathbf{F}_n$. But since *a* is $\mathbf{F}_1\& \ldots \&\mathbf{F}_n$ it follows from (2) that what makes *b* have those properties is its resembling the $\mathbf{F}_1$-particulars and . . . and the $\mathbf{F}_n$-particulars, one of which is *a*, and so *b* resembles *a at least* to degree *n*.

But could *b* resemble *a* to a degree higher than *n*? In that case, it follows from (5), there are $m > n$ properties $\mathbf{F}_1\& \ldots \&\mathbf{F}_m$ that *b* has in virtue of resembling, among others, *a*. But if resembling *a* is part of what makes *b* $\mathbf{F}_1\& \ldots \&\mathbf{F}_m$, it follows from (2) that *a* has properties $\mathbf{F}_1\& \ldots \&\mathbf{F}_m$. If *a* has properties $\mathbf{F}_1\& \ldots \&\mathbf{F}_m$ it follows from (2) that what makes *a* have them is that it resembles the $\mathbf{F}_1$-particulars and . . . and the $\mathbf{F}_m$-particulars, one of which is *b*, so that *a* resembles *b* to a degree *m* higher than *n*. But from (6) and our assumption that *a* resembles *b* to degree *n*, it follows that *a* resembles *b* to no degree other than *n*. Thus if *a* resembles *b* to degree *n* then *b* resembles *a* to a degree neither lower nor higher than *n*: in general, then, if *a* resembles *b* to degree *n* then *b* resembles *a* to degree *n*.

It is now easy to see why resemblance is reflexive. For suppose that *a* and *b* resemble each other. Then, according to (1), this makes *a* have some property, say **F**. But then, according to (2), *a* is **F** because it resembles the **F**-particulars. But since *a* is one of the **F**-particulars, *a* resembles itself. But what if *a* is the only **F**-particular? The reflexivity of resemblance is in this case also derived from (2)—for if *a* did not resemble itself then resembling the **F**-particulars would not be what made it **F**

(for more on the possibility that there is only one **F**-particular see Sections 4.10 and 5.3). In general, then, resemblance is reflexive.

It might be objected that this derivation of the reflexivity of resemblance does not prove the full reflexivity of resemblance but the weaker thesis that particulars resemble themselves *if* they resemble other particulars. But this should not be considered a defect, since after all my interest in deriving the axioms of resemblance is to meet an objection to Resemblance Nominalism, which is a theory that tries to account for the truthmakers of attributions of properties to particulars. These particulars will typically be particulars that resemble other particulars. And so resemblance's weak reflexivity—namely that every particular that resembles some particular resembles itself—is all I need.

But is this so? Does the possibility that there is only one **F**-particular not show that the particulars, attributions of properties to which I need to account for, need not resemble other particulars? As we shall see in Section 5.3, even when there is only one **F**-particular in the world, resembling other particulars will still play a part in the account of its being **F**.

How does Resemblance Nominalism derive the non-transitivity of resemblance? The non-transitivity of resemblance lies in the fact that even if *a* and *b* resemble each other and *b* and *c* resemble each other, *a* and *c* need not resemble each other. But the transitivity of resemblance would make it an equivalence relation, in which case (4) above would be violated. For then every particular would resemble the same particulars resembled by each of the particulars it resembles, and resembling certain particulars could not be that in virtue of which particulars have the properties they have, for resembling any particulars would make a particular have every property it has. Let us see in more detail how the non-transitivity of resemblance can be derived.

Assume that resemblance is transitive, that *a* is **F** and **G**, where these are different properties, and that *a* resembles only *a*, *b*, and *c*. Given (4) it follows that what makes *a* **F** is that it resembles some of these particulars, while what makes it **G** is that it resembles others of them. Assume that what makes *a* **F** is that it resembles *a* and *b*, and what makes it **G** is that it resembles *a* and *c*. If resemblance is transitive, given the symmetry of resemblance it follows that b and c resemble each other. If resemblance is transitive, given this and our assumption that a resembles *only* a, b, and c it follows that nothing else resembles any of them at all. From this it follows from (3) that if resembling any of these makes a **F**, resembling them makes all of them **F**. Similarly, if resembling any of these makes a **G**, resembling them makes all of them **G**. So all of a, b, and c are **F**- and **G**-particulars. So resembling a, b, and c makes a both **F** and **G**. This violates (4). Therefore resemblance is non-transitive.

I have derived the reflexivity, symmetry, and non-transitivity of resemblance, but I can also derive another important feature of it. This is that even resemblance to the same degree is non-transitive, that is, even if a and b, and b and c, both resemble each other to degree n, a and c need not resemble each other to degree n. For suppose resemblance to the same degree is transitive and there is an x such that a resembles x to degree n. Given the symmetry of resemblance it follows that x resembles a to degree n and so, by transitivity of resemblance to the same degree, a resembles a to degree n. But now suppose there is a y such that a resembles y to degree m, where $n \neq m$. Then by the symmetry and the assumed transitivity of resemblance to the same degree it follows that a resembles itself to degree m. But then there is an x, namely a, to which a resembles to degree n and degree m, where $n \neq m$, which violates (6). Therefore, if resemblance to the same degree is transitive and there is an x such that a resembles x to degree n, then there is no y such that a resembles y to a different degree m. In general, then, if resemblance to the same degree is transitive, no particular can resemble different particulars more or less closely, and so resemblance *tout court* is transitive, which we have seen it is not. Therefore resemblance to the same degree is non-transitive.

Having derived the formal features of resemblance let us now derive those of *exact* resemblance. What exactly is exact resemblance? In the previous section I adopted (D) as the measure of resemblance:

(D) x and y resemble each other to degree n if and only if they share n properties.

(D) implies that exact resemblance cannot be identified with a particular degree of resemblance. For there is no degree of resemblance n such

that x resembles y to degree n if and only if x exactly resembles y. For a may have more properties than b, so that, if a exactly resembles another particular it resembles it to a higher degree than b resembles any particular, including b itself. But b, of course, resembles itself exactly. Thus exact resemblance is not a specific degree of resemblance and so Armstrong's suggested way of deriving its transitivity is wrong. In effect, he thinks that the transitivity of exact resemblance is a substitution instance of a more general principle: if a resembles b to degree n, then a will resemble to degree n anything that b resembles exactly (Armstrong 1991*a*: 482), the relevant substitution instance of which—'if a resembles b exactly, then a will resemble exactly anything that b resembles exactly'—presupposes that exact resemblance is a particular degree of resemblance.

The right way to define exact resemblance is, of course, as the relation that holds between particulars which share *all* their properties. This also shows that exact resemblance is not a specific degree of resemblance, since a may resemble b and c to degree n but resemble exactly only one of them. For suppose a and b have only properties **F** and **G**, while c has properties **F**, **G**, and **H**. In this case a both exactly resembles b and resembles it to degree 2, but although a also resembles c to degree 2 it does not resemble it exactly.

From exact resemblance defined in this way, it is easy to derive its formal features, namely its reflexivity, symmetry, and transitivity. But that derivation would not be good enough, since it appeals to the identity of the properties that are shared—and, as I said in Section 4.3, to say that resemblance holds between any two particulars sharing some properties only fixes the extension of the predicate '__ resembles __': it does not say what makes sentences like 'a resembles b' true. Similarly, although I could easily have derived the formal features of (inexact) resemblance from the fact that resembling particulars are those that share some properties, I did not do so. Instead I derived them from six basic Resemblance Nominalistic claims having to do with resemblance being what makes particulars have their properties. And so now I should try to derive the formal features of exact resemblance without relying on exact resemblance being a matter of sharing all properties.

To this end I offer the following principle, from which to derive the formal features of exact resemblance:

(ER) x exactly resembles y if and only if there is some particular w that x resembles and for all particulars z, x and z resemble each other to degree n if and only if y and z resemble each other to degree n.

How do I know (ER) captures a feature of exact resemblance and not of other resemblance relations? The reason is that any particulars satisfying the right-hand side of (ER) must share all their properties, which only exactly resembling particulars do. For suppose a and b are such that for all particulars z, a and z resemble each other to degree n if and only if b and z resemble each other to degree n. Suppose also that a resembles itself to degree n. It follows that a and b resemble each other to degree n and b resembles itself to degree n. Since a shares all its properties with itself it follows that it has n properties and so, since it resembles b to degree n, it follows that all of a's properties are b's. Similarly, since b shares all its properties with itself it follows that it has n properties and so, since it resembles a to degree n, it follows that all of b's properties are a's. Thus a and b share all their properties. So what (ER) defines is, indeed, exact resemblance. Let us now see how the formal features of exact resemblance follow from (ER).

Suppose a exactly resembles b, and b exactly resembles c. Since a exactly resembles b, it follows from (ER) that for all z, a and z resemble each other to degree n if and only if b and z resemble each other to degree n. And since b exactly resembles c, it follows from (ER) that for all z, b and z resemble each other to degree n if and only if c and z resemble each other to degree n. Therefore, for all z, a and z resemble each other to degree n if and only if c and z resemble each other to degree n. Therefore, a exactly resembles c. So if a exactly resembles b, and b exactly resembles c, a exactly resembles c. Thus exact resemblance is transitive.

The symmetry of exact resemblance is also easily derived. For suppose a exactly resembles b. Then, according to (ER), for all particulars z, a and z resemble each other to degree n if and only if b and z resemble each other to degree n. But then, by reversing the order of

the biconditional, for all particulars z, b and z resemble each other to degree n if and only if a and z resemble each other to degree n. Therefore, b exactly resembles a. So if a exactly resembles b, b exactly resembles a. Thus exact resemblance is symmetrical.

And from the symmetry and transitivity of exact resemblance, there follows the weak reflexivity of exact resemblance, namely that every particular x exactly resembles itself *if* x exactly resembles some other particular. As I said above, to derive the weak reflexivity of resemblance is not a problem because the particulars I am interested in are particulars that resemble other particulars. But deriving the weak reflexivity of exact resemblance may not be enough, since although the particulars I am interested in are particulars that resemble other particulars there is no guarantee that they will *exactly* resemble *other* particulars.

Fortunately I can derive from (ER) another version of the reflexivity of exact resemblance that will do given my purposes. This is the thesis that every particular x exactly resembles itself if x resembles some particular. For suppose there is a particular, say a, which does not exactly resemble itself. Then, if a resembles some particular y (whether $y = a$ or not), it follows from (ER) that a and some particular z resemble each other to a degree n and do not resemble each other to degree n, which is impossible. Therefore, every particular that resembles some particular exactly resembles itself. Thus exact resemblance is reflexive in the intended sense.[6]

Thus the Resemblance Nominalist can derive the formal properties of resemblance and exact resemblance. The Resemblance Nominalist can therefore explain the so-called axioms of resemblance and exact resemblance. As Armstrong says, explanation is as much a virtue in metaphysics as in science, but a virtue that the Resemblance Nominalist practises.

[6] One might think that there is an alternative way of deriving the reflexivity of resemblance. For since necessarily for all x and for all y, if x exactly resembles y, then x resembles y, the reflexivity of exact resemblance entails the reflexivity of resemblance. But I would not count this as a *derivation* of the reflexivity of resemblance, for the reflexivity of resemblance was assumed in my argument to justify (ER).

4.6 The adicity of resemblance

There is no doubt that the *predicate* of resemblance is *at least* dyadic. Although resemblance is reflexive, there seems to be no way to express the fact that *a* resembles *a* without referring to *a* twice. It does not follow from this however that resemblance itself is *at least* dyadic, that is, that whenever any particulars resemble each other those entities are at least two. The mere reflexivity of resemblance shows that this is not the case since, when a particular resembles itself, there is only one particular involved. In other words there is a sense in which resemblance is not a *dyadic* relation, if this means one which only links *pairs* of particulars. And of course, in this sense it is not a *monadic* relation either, since many *pairs* of particulars resemble each other. There is then some variation in the so-called *adicity* of resemblance: it can hold of either one particular or two particulars.

Lewis (1997: 193) has proposed an even more variably polyadic resemblance, that is, one that holds between *any* number of particulars. This is to avoid a serious difficulty for Resemblance Nominalism which I shall deal with later on, namely the imperfect community difficulty. For the same reason Alan Hausman (1979: 201–2) has proposed resemblance, not indeed between *any* number of particulars, but between a fixed number of them, which normally exceeds two. (For more on Lewis's and Hausman's proposals see Section 9.1 below.)

For simplicity let us call any resemblance that can obtain between more than two particulars 'collective resemblance'. Thus if *a*, *b*, and *c* are all scarlet then they resemble each other, and if resemblance is collective, this resemblance between them all is something over and above the resemblance between any two of them. I shall now argue that the resemblance the Resemblance Nominalist needs is *not* collective, that is, that the resemblance needed by Resemblance Nominalism links *at most* two particulars. In other words, the only variation in the adicity of resemblance I shall allow is that which enables it to be reflexive: it can hold between no more than two particulars.

Consider the following basic fact about resemblance: if any number *n* of particulars resemble then any subgroup of those particulars also

resemble. That is, if *all* of $x_1, x_2, \ldots, x_n$ resemble then so do *any* of $x_1, x_2, \ldots, x_n$. We can also put the matter in terms of classes: if the members of a certain class resemble, then so do the members of any subclass of it. Thus, if $\alpha = \{a,b,c\}$ and $\beta = \{a,b\}$, then if α's members resemble, β's members must also resemble. This is in the nature of resemblance: if Socrates, Plato, and Aristotle resemble, then so do Socrates and Plato, Socrates and Aristotle, and Plato and Aristotle.

Why? Universalists have no problem in explaining this. For they can say that if the members of α resemble, this is in virtue of some universal being present in each of them, which therefore makes any members of α resemble. Similarly, if resemblance is *non-collective*, the Resemblance Nominalist also has an easy explanation. For then α's members resemble because *a* resembles *b*, *a* resembles *c*, and *b* resembles *c*. And this entails that the members of β also resemble. In short, the *pairwise* resemblance of *a*, *b*, and *c* is a conjunctive fact, the resemblance of *a* and *b* being simply one of its conjuncts.

But if resemblance is *collective* then the fact that *a*, *b*, and *c* resemble is entirely independent of any resemblance facts about any two of them. The *collective* resemblance of *a*, *b*, and *c* is an atomic fact which does not entail the resemblance of *a* and *b*. 'Collectivists' about resemblance cannot then explain why if more than two particulars resemble, then so do any two of them. True, they can stipulate that, if their collective resemblance relation obtains between the members of a certain class, then it obtains between the members of every subclass of it. But this does not *explain* why, if the members of a class resemble, then so do the members of its subclasses. The explanation of this is, I maintain, that resemblance links *pairs* of particulars; so that what makes the members of any class resemble is that they resemble *pairwise*, which entails that the members of all its subclasses also resemble. This is why resemblance need not, and I say does not, ever link more than two particulars.

4.7 The transtemporality of resemblance

Resemblance is transtemporal in the sense that it can obtain between particulars existing at different times. That is, some particulars existing at different times resemble each other. Thus an elephant resembles a mammoth, men living nowadays resemble Ancient Greeks, an apple in my kitchen resembles a seventeenth-century apple, and so on.

This sounds like a triviality but it has an important ontological consequence, namely that mammoths, Ancient Greeks, and seventeenth-century apples exist, for what does not exist cannot resemble anything. This consequence is also controversial, since it is denied by so-called *Presentists*, who believe that only what is present exists.

But perhaps Resemblance Nominalism can nevertheless be accepted by Presentists? Only if Resemblance Nominalists can deny that the seventeenth-century apple exists, which seems to be a consequence of the claim that my apple resembles it. But can Resemblance Nominalists deny that seventeenth-century apples exist? Some people may think so on grounds that what the claim that my apple resembles a seventeenth-century one means is that if the latter existed the former would resemble it. But this would be to explain the meaning of a controversial claim in terms of another claim whose meaning is not clear and, when clarified, is controversial.

Could Presentists accept Resemblance Nominalism by denying that my apple resembles the seventeenth-century one? Imagine that the two apples have the same absolute determinate shade of red. Such Resemblance Nominalists would have it that the seventeenth-century apple was that shade of red in virtue of resembling other contemporary particulars. Similarly they would have it that my apple is red in virtue of resembling other contemporary particulars. But then what makes these particulars the same shade of red would be something different, since their respective contemporary particulars are different. But, as I said in Section 4.5, what makes a particular **F** must be the same as what makes any other particular **F**. So what makes two apples the same shade of red is the same thing—whether that is resembling the same particulars, instantiating the same universal, or having resembling tropes. Thus Resemblance Nominalists must accept that the seventeenth-century and the twenty-first-century apple resemble each other and therefore that the seventeenth-century apple exists. So Resemblance Nominalism is committed to a Non-Presentist view,

one according to which past and future particulars exist alongside present ones.[7]

This is not Resemblance Nominalism's only ontological consequence having to do with time, as the following problem, closely related to the so-called Problem of Temporary Intrinsics, shows. For consider a particular *a* that is scarlet at a time *t* and crimson at a different time *t′*. What makes *a* scarlet at *t* is that it resembles all scarlet particulars at any time and what makes *a* crimson at *t′* is that it resembles all crimson particulars at any time. So at *t a* resembles all scarlet particulars at any time but not all crimson ones and at *t′ a* resembles all crimson particulars at any time but not all scarlet ones. But then there is some scarlet particular *b* at some time that *a* both resembles and does not resemble, which is impossible.

Some might try to meet this difficulty by relativizing resemblance to times. On this view *a* resembles-at-*t b* although *a* does not resemble-at-*t′ b*. And surely resembling *b* at *t* but failing to resemble it at *t′* is as possible as being scarlet at *t* but being crimson at *t′*. Thus what makes *a* scarlet at *t* is that it resembles-at-*t* scarlet particulars existing at any times and what makes it crimson at *t′* is that it resembles-at-*t′* crimson particulars existing at any times.

But relativizing resemblance to times is useless. For suppose *b* is scarlet at both *t* and *t′*. What makes it scarlet at *t*, on the present proposal, is that it resembles-at-*t a*, among other particulars. But how can resembling-at-*t a* make *b* scarlet at *t*? True, *a* is scarlet at *t*; but it is crimson at *t′*—so why shouldn't resembling-at-*t a* make *b* crimson? Furthermore, this relativization of resemblance to times entails the absurd consequence that what makes some particulars scarlet is different from what makes other particulars scarlet and what makes some particulars scarlet at a certain time is different from what makes *them* scarlet at different times—for while *resembling-at-t* scarlet particulars would make *b* scarlet at *t*, *resembling-at-t′* scarlet particulars would

[7] Thus Non-Presentism is *not* the view that what is present does not exist. What I am here calling 'Non-Presentism' is sometimes called 'Four-Dimensionalism', but I shall avoid using this terminology because 'Four-Dimensionalism' is also used sometimes to name the thesis that particulars have temporal parts, a thesis about which I shall speak below.

make it scarlet at t'. But what makes a particular scarlet at a certain time is what makes any particular scarlet at any time.

The way to meet this difficulty is by relativizing resembling particulars to times. So instead of having particulars like a and b resembling each other, we now have particulars like a-at-t, a-at-t', b-at-t, b-at-t', c-at-t, c-at-t' etc. resembling each other. Thus what makes a-at-t scarlet is that it resembles, among other particulars, b-at-t'. And resembling b-at-t', among other particulars, is what makes any other time-relativized scarlet particular scarlet. Similarly resembling a-at-t', among other particulars, is what makes any other time-relativized crimson particular crimson.

But is this a real solution to our difficulty? Even if what makes the particular a-at-t scarlet is, among other things, that it resembles b-at-t', what does that have to do with what makes the particular a scarlet at t? Or is it that there are no particulars like a and all particulars are time-relativized particulars like a-at-t? This would be too drastic a consequence of Resemblance Nominalism. But Resemblance Nominalism can admit time-relativized particulars without rejecting persistence. This is done by adopting a *Perdurantist* ontology—an ontology in which particulars persist through time by being composed of time-relativized particulars. In other words, particulars persist through time by having different parts or stages located at different times but no part is wholly present at more than one time.

Needless to say, these time-relativized particulars or temporal parts are as particular and concrete as the particulars of which they are parts. Resemblance Nominalism says that what makes these temporal parts have the properties they have is that they resemble other such parts.

But what makes a particular, say an apple, as opposed to its temporal parts, have the properties it has? The apple has different properties at different times and, for any time t and property **F**, the apple has **F** at t in virtue of its part at t having **F**. So if the apple is green at t and red at t' this is in virtue of the apple-at-t being green and the apple-at-t' being red. What makes the apple-at-t green is that it resembles the green time-relativized particulars. Similarly, what makes the apple-at-t' red is that it resembles the red time-relativized particulars.

Thus the ontology of Resemblance Nominalism is a Non-Presentist Perdurantist ontology. Is this a drawback for Resemblance Nominalism? I do not think so, since there are powerful arguments against Presentism and the opposite of Perdurantism, so-called *Endurantism* (for arguments against Presentism see Mellor 1998: 20, 56; for arguments against Endurantism see Lewis 1986: 203–4). It seems to me, on the basis of those and other arguments, that Non-Presentism and Perdurantism should be preferred over their respective alternatives. This is not the place, however, to rehearse or add to those arguments or to show that Non-Presentism and Perdurantism are superior to their alternatives, so I shall content myself with having shown why Resemblance Nominalism is committed to such ontological views.

For simplicity I shall continue to speak as if in Resemblance Nominalism what makes particulars like apples, atoms, houses, people, etc., have their properties is that they resemble other such particulars. But strictly speaking Resemblance Nominalism has it that what makes such particulars have their properties is that they have certain temporal parts that resemble other temporal parts.

4.8 Facts

Can the Resemblance Nominalist accept *facts*, or *states of affairs* as they are also called? Normally, facts are thought of as complex entities, having different constituents combined or structured in a certain way. It is part of this conception of facts that what makes different facts different is either that they have different constituents or that they have the same constituents combined in a different way. I think this structuralist conception of facts is the right one. Can the Resemblance Nominalist make sense of it? Yes, provided facts can be conceived to have no constituents over and above resembling particulars.

Consider the facts that Socrates is white and that Plato is white. These are different facts, consisting of different particulars, Socrates and Plato, having the same property, the property of *being white*. Those who believe in Universalism will say that these facts consist of different particulars instantiating the same universal, *whiteness*. Those who believe in Trope Theory will say that they consist of different particulars having different but resembling tropes. In both cases the two facts count as numerically different because they have different constituents.

What Resemblance Nominalists say about these facts is that they are composed of more basic facts, facts of resemblance. For according to Resemblance Nominalism what makes Socrates white is that he resembles all the white particulars. So the fact that Socrates is white is a complex, conjunctive fact, whose constituents are the resemblance facts between Socrates and each of the white particulars. Similarly for the fact that Plato is white. Thus, imagining that all and only white particulars are Socrates, Plato, and Aristotle, the fact that Socrates is white is the conjunctive fact that Socrates resembles himself, and Socrates and Plato resemble each other, and Socrates and Aristotle resemble each other. This fact has different constituents from the fact that Plato is white, which comes out as the fact that Plato resembles himself, and Plato and Socrates resemble each other, and Plato and Aristotle resemble each other. This is why and how, in Resemblance Nominalism, the facts that Socrates is white and Plato is white are made different by having different constituents: since, for example, the fact that Socrates and Aristotle resemble each other is a constituent of the fact that Socrates is white, but not of the fact that Plato is white.

Similarly, the fact that Socrates is white is different from the fact that Socrates is, say, snub-nosed. For imagining that all and only snub-nosed particulars are Socrates, Plato, and Parmenides, the fact that Socrates is snub-nosed is the conjunctive fact whose constituents are the facts that Socrates resembles himself, that Socrates resembles Plato, and that Socrates resembles Parmenides. Thus the facts that Socrates is white and that Socrates is snub-nosed have different constituents, since that Socrates resembles Parmenides is a constituent of the latter but not of the former.

How about facts that prima facie differ only in the way in which the constituents are combined, like the facts that *a* loves *b* and that *b* loves *a*? Here the Resemblance Nominalist says that the fact that *a* loves *b* is a conjunctive fact whose constituents are the resemblance facts

between the ordered pair $<a,b>$ and each of the ordered pairs whose first member loves their second, while the fact that *b* loves *a* is a conjunctive fact whose constituent facts are the resemblance facts between the ordered pair $<b,a>$ and each of the ordered pairs whose first member loves their second. So, in Resemblance Nominalism, the difference between the facts that *a* loves *b* and that *b* loves *a* comes out as a difference in the constituents of those facts.

In general facts of particulars having a property, or of groups of particulars being related in a certain way, are conceived in Resemblance Nominalism as conjunctive facts whose conjuncts are resemblance facts. But what then about these resemblance facts? As we shall see in Section 6.5, they also differ from each other if and only if they have different constituents.

Before starting to meet some major objections to Resemblance Nominalism in the following chapters, in the last four sections of this chapter I shall consider how it answers some objections whose consideration does not require a chapter of its own.

4.9 Natures and the internal character of resemblance

Armstrong derives an objection to Resemblance Nominalism from the claim that resemblance is an *internal* relation. A relation is internal, for Armstrong, when, given certain entities with certain natures, the relation must hold between them (Armstrong 1989*b*: 43). In other words, internal relations are those which are determined by the natures of their terms. Spatiotemporal and causal relations, says Armstrong (1989*b*: 43) following Hume, are external: the natures of *a* and *b* do not determine whether they are one or two miles from each other or whether—and if so which—one is a cause of the other. But resemblance is internal, Armstrong says. For given that two objects have a certain nature, their resemblance and its degree are fixed: there is no possible world, according to Armstrong (1989*b*: 44), in which the objects remain unaltered but in which their degree of resemblance changes.

Armstrong thinks this internal character of resemblance presents a problem for Resemblance Nominalism, for what is it about the nature that determines the resemblance? Resemblance Nominalists cannot say that it is the common properties of the related particulars, because for them it is resemblance which determines the common properties of the particulars, not the other way round. Nor, Armstrong says, can Resemblance Nominalists desert the nature of particulars and say that what determines the resemblance is just the particulars; this, he says, 'would be such a weak foundation for the relation that it would make it possible for anything to resemble anything. That is, resemblance would have to be what it is not: an external relation' (Armstrong 1989*b*: 44).

Armstrong thinks the Resemblance Nominalist can solve this problem by 'particularizing' natures. How does this go? First one takes properties to be particulars and then, Armstrong says, one has to 'congeal the particular properties into a single grand (but still particular) property within which no differentiation can be made. Then we have the particularized nature of a thing' (Armstrong 1989*b*: 45). It is these particularized natures which, according to Armstrong, the Resemblance Nominalist must invoke to account for the internal character of resemblance. Furthermore, Armstrong thinks, these particularized natures serve to meet other objections to Resemblance Nominalism. One of these is that there may be a property which is had by only one particular. For given that Resemblance Nominalism accounts for properties in terms of the resemblances between the particulars that have them, it seems that Resemblance Nominalism cannot account for such properties which are had by only one particular. But, Armstrong says, particularized natures meet this difficulty, for the particular has its nature, even if it resembles nothing else, and so this nature 'is the foundation for attributing [the property] to it' (Armstrong 1989*b*: 46).[8]

But invoking particularized natures betrays the spirit of Resemblance Nominalism. For if that *a* and *b* resemble each other is determined by their natures, then their natures are not determined by their resembling each other, and so what is doing all the work is their natures, not their resembling each other. Indeed, if in the case of one-instance properties what grounds the attribution of the property to the instance is its nature,

[8] '[the property]' replaces Armstrong's phrase 'a type', 'type' being one of the words he uses in his (1989*b*) for properties.

why appeal to resemblances in the cases of multiple-instances properties? Thus, following Armstrong in this respect and endowing particulars with particularized natures, means abandoning Resemblance Nominalism.

There is no sense in Resemblance Nominalism in which resemblance holds in virtue of properties. In Resemblance Nominalism, properties are had in virtue of resemblance. However, it is true that if x and y have certain properties, then x and y cannot fail to resemble to the degree they do. It is in this sense that we can say that natures fix the degree of resemblance.

Can the Resemblance Nominalist account for this? Can one account for this without making resemblance hold in virtue of properties? If natures are based on resemblances between particulars, how can it be that natures fix the degree of resemblance between particulars?

Fortunately, Resemblance Nominalists can explain how it can be true that natures fix degrees of resemblance. For saying that natures fix the degree of resemblance comes to just saying that if x resembles z to degree n then if y has the same nature as x then y resembles z to degree n. But x and y have the same natures if and only if they have the same properties, that is, if and only if they exactly resemble each other. Thus that natures fix degrees of resemblances comes down to the fact that if x resembles z to degree n then if y exactly resembles x then y resembles z to degree n. But this follows directly from (ER), the principle introduced in Section 4.5 to define exact resemblance. Thus Resemblance Nominalists can explain how it can be true that natures fix degrees of resemblance without betraying Resemblance Nominalism, that is, without making resemblance hold in virtue of natures.

It remains to answer the objection that Resemblance Nominalism cannot account for one-instance properties and Armstrong's claim that abandoning natures would make it possible for anything to resemble anything. The first objection I shall consider in the next section and the other objection is a simple *non sequitur*. For why can the Resemblance Nominalist not say that it is essential for *a* to resemble some particulars and not others? Why should saying, as many say, that having certain properties and relations is essential to particulars be any less obscure than saying that resembling certain particulars and not others is essential to them? While if no properties and relations are essential, then all theories of properties are on a par: since all of them must then admit that it is possible for anything to resemble anything. This, however, as we shall see in Section 5.4, is not so, and the Resemblance Nominalist can say why not.

4.10 One-instance properties

For Resemblance Nominalism, what makes a particular scarlet, say, is its resembling all the scarlet particulars. But it is surely possible that a scarlet particular, let it be *a*, exists alone in the world. Armstrong (1978*a*: 51–3, 1989*b*: 46) and van Cleve (1994: 579) think that this constitutes a problem for Resemblance Nominalism since, they believe, it cannot account for what makes that particular scarlet. I think the Resemblance Nominalist must acknowledge the possibility that there is only one particular in the world and that it might be scarlet (or crimson, or square, or . . .). But then how are we to account for this possibility?

Armstrong considers solutions to this difficulty in terms of resemblances between the particular and its parts, and in terms of resemblances between the parts of the particular, and concludes that the difficulty cannot be met. His argument against these solutions depends on his view that it is impossible for a particular to resemble itself (Armstrong 1978*a*: 53), that is, that resemblance is irreflexive. But we saw in Section 4.5 that resemblance *is* reflexive and so it is open for the Resemblance Nominalist to say that what makes *a* scarlet, if it is the only scarlet particular in the world, is that it resembles itself.

This answer, however, is not good enough, although it solves one problem, for it generates another. For if *a* is the only particular, then not only may it be the only scarlet particular but also, say, the only square particular. If so, the one and only one scarlet particular is also the one and only one square particular, and so the properties of *being scarlet* and *being square* are coextensive. That is, lack of coexistent particulars brings coextensive properties. And so in this case saying that resembling all the scarlet particulars, that is, resembling *a*, is what makes *a* scarlet will not do, for then resembling *a* would also be what

makes it square. This is the problem that coextensive properties pose for Resemblance Nominalism: if all **F**s are **G**s and vice versa, how can resembling all the **F**-particulars be what makes a particular **F** rather than **G**? Both this problem and that of accounting for the possibility of a unique particular having a certain property will receive a common solution in Section 5.3.

4.11 Resemblance Nominalism and paraphrase

In Chapter 6 of his *Nominalism and Realism* Armstrong claims that the Nominalist owes us an analysis of sentences like the following two in which no ostensible reference to universals is made (Armstrong 1978*a*: 58):

(1) Carmine resembles vermilion more than it resembles French blue.

(2) Scarlet is a colour.[9]

After showing that a couple of Nominalist paraphrases of sentences like (1) and (2) fail, Armstrong (1978*a*: 61) confidently claims that this shows that no such paraphrase is possible. This is not the conclusion to draw. The most he has shown is that the paraphrases he examined fail, not that no such paraphrases are available. This is symptomatic of what some have said about the dispute about the availability of paraphrases of sentences like the above, namely that '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 paraphrase and think that will do, no argument being given why there cannot be an adequate paraphrase lurking around the corner' (Oliver 1996: 65–6. See also Mellor and Oliver 1997: 13). Furthermore, the Resemblance Nominalist may take properties to be classes and one can, as Lewis (1997: 194–7) has urged, find paraphrases of sentences (1), (2), and the like in terms of classes.

[9] Armstrong's examples involve determinable properties rather than lowest determinate ones.

However, since the Resemblance Nominalist project is neither about the meaning nor the ontological commitment of sentences, but about their truthmakers, instead of giving a paraphrase of (1) and (2) what the Resemblance Nominalist really needs to do is to say what makes (1) and (2) true. And this is not a difficult task. For what makes (1) true is (1′):

(1′) A carmine particular can resemble a vermilion particular more closely than a carmine particular can resemble a French blue particular.[10]

(1′) of course employs that notion of resemblance mentioned in Section 4.4 which may be used to account for determinables and which is the basis of the resemblance between properties. But, as I said there, this is not the resemblance I am concerned with in this book. Thus detailed examination of this notion of resemblance goes beyond the limits of the present work.

What makes (2) true? Surely that all scarlet particulars are coloured has something to do with it, but it cannot be the whole story; for then one would wonder why that all scarlet particulars are shaped and extended does not make it true that scarlet is a shape or an extension (cf. Jackson 1997: 89). The question is then transformed into what makes it true that scarlet is a colour rather than a shape or an extension. In Section 3.3 I suggested that determinables are disjunctions of their determinates, in the sense that the property of *being coloured* is the property of *being white or being red or being green or being yellow or being blue* (say). And similarly the property of being red is the property of *being scarlet or being crimson or being purple or being vermilion* (say). And now the answer is clear, if not trivial: scarlet is a colour rather than a shape or an extension because a scarlet particular is coloured in virtue of being scarlet, but not shaped or extended in virtue of being scarlet.

[10] This is like one of the paraphrases offered by Lewis (1997: 195 n. 10) for a sentence like (1). In Section 5.3 we shall see that Resemblance Nominalists, like Lewis himself, must admit *possibilia*. If so what makes (1) true is better expressed by (1″): 'Some carmine particular resembles some vermilion particular more closely than any carmine particular resembles any French blue particular' (see Lewis 1997: 195 n. 10).

4.12 Resemblance Nominalism and perception

Mulligan, Simons, and Smith, who believe in tropes, have advanced the following epistemological objection against Concept Nominalism and Universalism. They think that these theories must account for cases where we seem to see and hear tropes, cases we report using descriptions like 'the scarletness of the table'.[11] According to Mulligan, Simons, and Smith, Concept Nominalists and Universalists must claim that in such circumstances we see not just independent things *per se*, but also those things *as falling under certain concepts*, or as *exemplifying certain universals*. And this, they rightly say, is counterintuitive (Mulligan *et al.* 1984: 306).

Clearly this objection against Concept Nominalism and Universalism can also be made against Resemblance Nominalism. The objection is thus that if Resemblance Nominalism is true then in those cases of perception we report by saying that we see the scarletness of the table what we are perceiving is that the table resembles all other scarlet particulars. And given the way I shall develop Resemblance Nominalism, in those cases we should perceive not only that the table resembles other actual scarlet particulars but also other merely possible scarlet particulars (see Sect. 5.3) as well as perceive that certain pairs resemble each other (see Sect. 9.6) and that the scarlet particulars form a particular kind of maximal class satisfying certain specific conditions (see Sect. 11.4). To claim that this is what involves perceiving the scarletness of the table is not merely counterintuitive, it is certainly false. And so, the objection goes, Resemblance Nominalism is false.

But this objection does not work. In those cases of perception we report by saying that we see the scarletness of the table what we see is

[11] Their example is not 'the scarletness of the table' but 'the smile that just appeared on Rupert's face', which is not a trope. This is because they are concerned with arguing for the existence of what they, following Husserl, call *moments*, a wider ontological category including *tropes*, or *particularized qualities* as they call them in their paper (Mulligan *et al.* 1984: 291–2). But since the scarletness of the table is a clearer case of a trope than the smile that just appeared on Rupert's face, and here tropes are more relevant than moments in general, I shall discuss Mulligan *et al.*'s arguments with my own example of a trope, namely 'the scarletness of the table'.

that the table is scarlet. And what makes a scarlet particular scarlet involves its resembling all other scarlet particulars and more than that (see Chs. 5 and 9–11). But the objection is a *non sequitur*. For, in general, to perceive that *a* is **F** we need not perceive what makes it so. So, for instance, to perceive that something is gold or water one need not, and typically does not, perceive that the thing has atomic number 79 or that its molecular composition is H_2O.

Similarly, to perceive that the table is scarlet (or has any other property) we need not perceive what makes it so. Thus what we perceive in the circumstances, the Resemblance Nominalists say, is that the table is scarlet, period. And since to perceive that the table is scarlet we need not perceive what makes it so, when we perceive that it is scarlet we need not perceive that it resembles all scarlet particulars or that they form any sort of maximal class.

Some may think that the analogy with the cases of gold and water is not good. For while it was an empirical discovery that what makes something gold is that it has atomic number 79 and that what makes something water is that its chemical composition is H_2O, it is not an empirical discovery that what makes the table scarlet is that it resembles the scarlet particulars. I am not sure why this difference would be relevant to the quality of the analogy. But, anyway, this is a poor line of reasoning. For the empirical discovery was that gold has atomic number 79 and that the chemical composition of water is H_2O. That what makes something gold is that it has the atomic number it has, and that what makes something water is that it has the chemical composition it has, were not empirical discoveries but philosophical insights, like the thesis that what makes something scarlet is that it resembles the other scarlet particulars.

But Mulligan, Simons, and Smith may object that it is wrong to think that cases we report by saying that we see the scarletness of the table are cases where we see that the table is scarlet. For, to adapt an example of theirs, Susan may see the scarletness, but fail to recognize that it is the table's (Mulligan *et al.* 1984: 307). True, but not all cases need be the same. In some cases when Susan seems to see the scarletness of the table what she actually sees is that the table is scarlet. In other cases she merely sees that something is scarlet, but what causes

her perception is that the table is scarlet. Thus Mulligan *et al.*'s case against explaining apparent cases of perception of the scarletness of the table in terms of the perception that the table is scarlet is far from conclusive.

No doubt what I have said here does not amount to an account of perception. But Resemblance Nominalism is not an epistemological theory about how we know or perceive that particulars have certain properties. Resemblance Nominalism is a metaphysical theory about what makes particulars have their properties. So no account of perception is required in this book. All I need to rebut the objection in question is what I have just done, namely to show why it does not work.

The Coextension Difficulty 5

5.1 The coextension difficulty

The coextension difficulty, raised against Resemblance Nominalism many times (e.g. Armstrong 1989*b*: 50–1, 1997*b*: 162), arises from cases of coextensive properties, that is, properties had by exactly the same particulars. If the Resemblance Nominalist identifies properties with classes the difficulty is evident: if Resemblance Nominalism is true then there cannot be coextensive properties.

But if the problem were merely a consequence of identifying properties with classes then, as we saw in Section 4.2, one could keep the fundamentals of Resemblance Nominalism and avoid the coextension difficulty simply by eschewing the identification of properties and classes. But the coextension difficulty goes deeper, since it does not depend on identifying properties with classes. The root of the problem is this: Resemblance Nominalism says that a particular that is **F** and **G**, is **F** in virtue of its resembling all the **F**-particulars and **G** in virtue of resembling all the **G**-particulars. But if all **F**-particulars are **G** and all **G**-particulars are **F**, then how can a particular have two different properties in virtue of resembling the very same particulars? If what makes a particular **F** must be something different from what makes it **G**, and there are coextensive properties, Resemblance Nominalism cannot be right.

5.2 Are there any coextensive properties?

Modern philosophers continually assert that properties can be coextensive, if only because all and only animals with a heart have kidneys, thus making the properties of *being cordate* and of *being renate* apparently coextensive. Furthermore all and only entities with three angles have three sides, thus making the properties of *being trilateral* and of *being triangular* apparently coextensive. And, surely, there are plenty of other such cases; perhaps even infinitely many in geometry.

I do not deny that all and only cordates are renates and all and only trilaterals are triangulars. But I *do* dispute that these are cases of coextensive properties. They are not cases of coextensive *properties* because the predicates 'is cordate' and 'is renate' are relational ones, applying in virtue of the whole–part relations holding between organisms and hearts, and organisms and kidneys, respectively.

And they are not cases of *coextensive* relations because hearts are not kidneys and kidneys are not hearts. Indeed if one identifies properties and relations with classes one of those relations would come out, say, as the class of ordered pairs $\langle x,y \rangle$ such that x is an organism and y its heart and the other, say, as the class of ordered pairs $\langle w, \{z,u\} \rangle$ such that w is an organism and z and u its kidneys. So even if the predicates 'is cordate' and 'is renate' apply to exactly the same particulars they do not apply in virtue of the same relation, not even in virtue of coextensive ones.

Similarly for *being trilateral* and *being triangular*. A particular is trilateral in virtue of standing in some relation to three other particulars that are sides, and triangular in virtue of standing in some relation to three other particulars that are angles. But since sides are not angles and vice versa, these relations are not even coextensive. So although the predicates 'is trilateral' and 'is triangular' apply to exactly the same particulars they do not apply in virtue of the same relation, not even in virtue of coextensive ones.

Note moreover that even if we call the relations between a cordate and its heart, and between a renate and its kidneys, a 'whole–part' relation, a cordate's relation to its heart and a renate's relation to its kidneys are both complex and different, given the different functions of hearts and kidneys. Thus not only does the class corresponding to the predicate 'is cordate' differ from that corresponding to the predicate 'is renate', those classes do not even resemble each other. In other words, cordates do not relate to their hearts as renates relate to their kidneys. Similarly with triangles: a triangle's relation to its sides differs from its relation to its angles.

Does this show that there are no coextensive properties? Certainly not: all it shows is that, on the view of relational properties endorsed in Section 4.1, the two most famous examples of coextensive properties are not really examples. This does not show that no one could find a real example of coextensive properties. And even if there are no such properties, their mere possibility creates a problem for Resemblance Nominalism. For since Resemblance Nominalism, as a theory about what makes particulars have the properties they have, is not based on any contingent feature of the world, it cannot rely on any such feature as the contingent absence from our world of coextensive properties.

The problem of coextensive properties is not merely that of handling or accommodating a mere intuition that properties could be coextensive. If this were the case then perhaps Resemblance Nominalists could reply that, given that their theory requires the impossibility of coextensive properties, we should reject our intuitions to the contrary. But that reply will not do. For Resemblance Nominalists need only admit that there might have been fewer particulars than there actually are to admit the possibility of coextensive properties. Indeed, as I said in Section 4.10, lack of coexistent particulars brings coextensive properties. For suppose that the properties **F** and **G** are not coextensive, though some particulars are both **F** and **G**. Then it must be a possibility that the only **F**-particulars that exist are those which are also **G**, and the only **G**-particulars that exist are those which are also **F**. And this is a possibility that **F** and **G** are coextensive. So as even Resemblance Nominalists must admit the possibility of coextensive properties, they do need to overcome the coextension difficulty.

5.3 *Possibilia*

Resemblance Nominalists can only accommodate the possibility of coextensive properties by adopting *Realism about Possible Worlds*. The Resemblance Nominalist must say that what makes a particular **F** is that it resembles all *possible* **F**-particulars. Thus the class of **F**-particulars includes not only actual **F**s but also merely possible ones. This is like Lewis, who takes properties to be classes of actual and possible particulars (1986: 50–2, 1997: 189–90), except that for Lewis it is a primitive fact which classes a particular belongs to, and which of them are natural properties (Lewis 1997: 193). In Resemblance Nominalism, on the other hand, what makes a particular belong to classes of particulars with a property in common is that it resembles all their members.

Thus resemblance is not only a transtemporal relation (see Sect. 4.7), it is also a trans-world relation in the sense that entities in different possible worlds can resemble each other. That this is so, once one has admitted possible worlds, should be obvious, for otherwise particulars in different possible worlds could not have the same properties. I conclude therefore that what makes a particular have any property F in any possible world is that it resembles all the **F**-particulars in all possible worlds, that is, all the *possible* **F**-particulars. This obviously allows the Resemblance Nominalist to accommodate all contingently coextensive properties **F** and **G**, for even if **F** and **G** are coextensive in some worlds—for example, ours—not all possible **F**s are **G**s or not all possible **G**s are **F**s.

Some people may object that Resemblance Nominalism, like every Nominalism, should eschew *possibilia*, but this depends on what one takes Nominalism to be. I, like others (e.g. Armstrong 1978*a*, 1989*b*, Lewis 1997), take a Nominalist to be one who rejects both universals and tropes, and on this understanding Nominalism and *possibilia* are perfectly compatible, since merely possible particulars are as particular as actual ones. Or one may object to Resemblance Nominalism's invoking merely possible particulars that no one could compare them to actual particulars to see whether they resemble or not. This objection might be derived from Armstrong (1978*a*: 51). But this misses the point entirely, since Resemblance Nominalism is not a theory about how we classify particulars, but about what it is for a particular to have a property. I therefore see no reason why Resemblance Nominalists should not admit *possibilia*, and a very good one why they must do so, namely that it is a way out of the coextension difficulty.

However, admitting merely possible particulars will not distinguish what makes particulars have *necessarily* coextensive properties. Admittedly the usual examples of such properties, like *being triangular* and *being trilateral*, as we saw in Section 5.2, are really only necessarily coextensive predicates applying in virtue of different and not coextensive relations. Similarly for all the other familiar examples, like *being quadrilateral* and *being quadrangular*: they too are not really coextensive properties, merely necessarily coextensive predicates applying in virtue of different, not coextensive, relations.

Someone might, however, insist that there could be necessarily coextensive properties or relations which Resemblance Nominalism would wrongly identify. But here, I think, the Resemblance Nominalist can plausibly deny that there are any such properties or relations, and claim that any apparent example is in fact just a case of semantically different predicates applying in virtue of one and the same property or relation. For while we saw in the last section that even Resemblance Nominalism must admit the possibility of *contingently* coextensive properties, there is no such need to admit necessarily coextensive properties. Only on a different theory of properties is it plausible to claim that they can be necessarily coextensive. And so it is perfectly legitimate for the Resemblance Nominalists to argue, as they do, that there are no such properties.

Possibilia pay an additional service to Resemblance Nominalism, as they allow Resemblance Nominalists to account for the possibility, discussed in Section 4.10, of there being a unique particular with a certain property, say the property of *being scarlet*. What makes that unique particular scarlet is that it resembles other scarlet particulars in other possible worlds.

5.4 Counterparts

Lewis is not only a Realist about Possible Worlds, he also accepts so-called *Counterpart Theory* (Lewis 1968, 1986: 192–220) which indeed he, and others, believe that Realism about Possible Worlds entails (Lewis 1986: 192–220; Loux 1979: 64; Schlesinger 1983: 157–9). Counterpart Theory says that no particular exists entirely in more than one possible world, and so a modal truth like 'Diego Maradona could have been a tennis player' is not made true by *Maradona* being a tennis player in some possible world but by some *counterpart* of him being so, where Maradona's counterpart in a given world is the person who resembles him closely in important respects and does so no less closely than any other particular in that world (Lewis 1973: 39).

I agree that Realism about Possible Worlds entails Counterpart Theory, to which therefore Resemblance Nominalism is committed. In fact, as we shall see in Section 6.5, Counterpart Theory allows Resemblance Nominalism to account for the truthmakers of resemblance sentences while not violating (T**) (see Sect. 2.2). But does this commitment not pose a problem for Resemblance Nominalism, given that while it uses overall resemblance to account for properties, counterparts are defined in terms of resemblance-in-a-respect?

To see why not, it is useful to distinguish two parts of Counterpart Theory: (*a*) no particular exists in more than one possible world and (*b*) what makes modal sentences about a particular *a* true are facts involving *a*'s counterparts. For a Realist about Possible Worlds who accepts (*a*), the most natural and plausible course is to adopt (*b*) as well. For if Maradona himself being a tennis player in some possible world is not what makes it true that he could have been a tennis player, what else can make that true if not that he has a counterpart in some possible world who is a tennis player? Even so, (*a*) and (*b*) are still different components of Counterpart Theory. And all Resemblance Nominalism needs to say what makes a particular in any possible world have the properties it has is part (*a*) of Counterpart Theory. It needs this because Resemblance Nominalism says that a particular *a* has a property **F** in a world *w* in virtue of resembling all **F**-particulars existing in any possible worlds. But then Resemblance Nominalism needs to say in virtue of what *a* resembles the particulars it resembles. And, as we shall see in Section 6.5, to say this Resemblance Nominalism needs part (*a*) of Counterpart Theory, which makes no mention of properties or resemblance. But if to say what makes particulars have their properties all Resemblance Nominalism needs is part (*a*) of Counterpart Theory, then the notion of a counterpart, which involves the notion of resemblance-in-a-respect, or resemblance-with-respect-to-a-property, can in turn be given a Resemblance Nominalist account, thus enabling the Resemblance Nominalist to adopt part (*b*) of Counterpart Theory, without begging the question. And once this is done part (*b*) of Counterpart Theory can also be used by Resemblance Nominalism to rebut certain objections having to do with modality, as we shall see below.

Why does Realism about Possible Worlds entail that no particular exists in more than one world? Lewis's argument is that otherwise the so-called problem of *accidental intrinsics* has no satisfactory solution (Lewis 1986: 201). This is the problem of explaining how the accidental, that is, non-necessary, and intrinsic, that is, non-relational, properties of a particular can vary from world to world. Thus if colour is an accidental intrinsic property, and particular *a* exists in more than one world, how can *a* be scarlet in one world and crimson in another? It seems there is no way except, of course, by making *a*'s being scarlet in world *w* a *relation* between *a* and *w*, and *a*'s being crimson in world *w'* a *relation* between *a* and *w'*, which betrays the intrinsic character of colour. From this Lewis concludes that no particular exists in more than one possible world.

Obviously this cannot be the end of the story, for if no particular can exist in more than one world how can any particular *a* have accidental, i.e. non-necessary, properties? There are two options here for the Realist about Possible Worlds: either make *a* a trans-world individual with different parts in different worlds, and say that *a*'s colour is an accidental property because different parts of it in different worlds have different colours or adopt part (*b*) of Counterpart Theory and say that what makes *a*'s colour an accidental property is that some of *a*'s counterparts differ in colour from *a*. For reasons given by Lewis (1986: 210–20) I think the option of trans-world individuals is not a good idea and therefore

Resemblance Nominalists, like all other Realists about Possible Worlds, should adopt full-blown Counterpart Theory, after accounting for properties and counterparts in their Resemblance Nominalist way.

But now it might seem that, since Resemblance Nominalism accounts for properties in terms of resemblances among particulars, and so in terms of their being *related* in some way (see Sect. 4.1), Resemblance Nominalists cannot use the problem of accidental *intrinsics* to argue that no particular exists entirely in more than one world. Yet even if this is so, it does not matter much, since another argument, similar to the one for temporal parts in Section 4.7, leads Resemblance Nominalists, given their Realism about Possible Worlds, to hold that no particular can exist in more than one world. For suppose we want to explain the accidental character of the colour of a particular *a*. One way would be to say that the accidentality of the colour of *a* consists in that *a* is scarlet in a world *w* and crimson in a world *w'*, say. Then in *w a* resembles all scarlet particulars—but not all crimson ones—existing in any possible world, and in *w' a* resembles all crimson particulars—but not all scarlet ones—existing in any possible world. So there is some scarlet particular *b* in some world that *a* both resembles and does not resemble. But there can be nothing that *a* resembles and does not resemble.

One might try a way out by relativizing resemblance to worlds. But this is as problematic as relativizing resemblances to times (see Sect. 4.7). Thus suppose that *b* is scarlet both in *w* and *w'*—why should resembling-in-*w a* make it scarlet rather than crimson? Furthermore, this relativization of resemblance to worlds entails the absurd consequence that what makes particulars scarlet in a world is different from what makes other particulars scarlet in other worlds, and what makes some particulars scarlet in a world is different from what makes *them* scarlet in different worlds—for while *resembling-at-w* scarlet particulars would make *b* scarlet in *w*, *resembling-at-w'* scarlet particulars would make it scarlet at *w'*. But what makes a particular scarlet in a possible world is what makes any particular scarlet in any possible world.

So the way out is to deny that *a* exists in more than one possible world. Then, after accounting for properties in terms of resemblances, one can say that what makes its colour an accidental property of *a* must rather be that some of its counterparts in some possible worlds—by resembling different particulars from those *a* resembles—have different colours. This is why and how Resemblance Nominalism is committed to Counterpart Theory. (An alternative to Counterpart Theory would be to make *a* a trans-world individual with different parts in different worlds, but I have already indicated that I do not think this is a good idea.)

Accounting for the accidentality of properties in terms of counterparts helps the Resemblance Nominalist to block a potential objection. For it could be objected to Resemblance Nominalism that all scarlet particulars could have been some shade of blue, for example, ultramarine, and all these blue particulars could have been scarlet. Prima facie it looks as if Resemblance Nominalism cannot account for such possibilities, for if all scarlet particulars had been ultramarine and all ultramarine ones had been scarlet then what would have made ultramarine particulars ultramarine is the same as what makes them scarlet, namely that they resemble each other, that is, that they resemble the particulars that are actually scarlet; and what would have made scarlet particulars scarlet is the same as what makes them ultramarine, namely that they resemble each other, that is, that they resemble the particulars that are actually ultramarine. But surely what makes scarlet (ultramarine) particulars scarlet (ultramarine) could not have made them ultramarine (scarlet).

But counterparts provide a nice way out of this problem. That all scarlet particulars could have been ultramarine and all ultramarine particulars could have been scarlet is accounted for in terms of the fact that all scarlet particulars have ultramarine counterparts and all ultramarine particulars have scarlet counterparts.

Counterparts also help Resemblance Nominalism to avoid the unhappy consequence which Armstrong thinks follows from taking the resembling particulars themselves to be the foundation of resemblance, namely that it would be possible for anything to resemble anything (Armstrong 1989*b*: 44). For it is possible for a particular *a* to resemble another particular *b* only if their counterparts resemble each other. And no doubt there are cases where none of the counterparts of a given pair of particulars resemble each other. In this case it is not possible for those particulars to resemble each other.

Russell's Regress 6

6.1 Russell's regress

In the following passage Russell put forward a famous objection against Resemblance Nominalism:

> If we wish to avoid the universals *whiteness* and *triangularity*, we shall choose some particular patch of white or some particular triangle, and say that anything is white or triangle if it has the right sort of resemblance to our chosen particular. But then the resemblance required will have to be a universal. Since there are many white things, the resemblance must hold between many pairs of particular white things; and this is the characteristic of a universal. It will be useless to say that there is a different resemblance for each pair, for then we shall have to say that these resemblances resemble each other, and thus at last we shall be forced to admit resemblance as a universal. The relation of resemblance, therefore, must be a true universal. And having being forced to admit this universal, we find that it is no longer worth while to invent difficult and implausible theories to avoid the admission of such universals as whiteness and triangularity. (Russell 1997: 48)

In this passage Russell is often presented as arguing that Resemblance Nominalism, or any attempt to get rid of universals in favour of a relation of resemblance, leads to a vicious infinite regress. In fact Russell makes just two points: (*a*) we cannot avoid universals since the relation of resemblance is itself a universal, and (*b*) a universal of resemblance makes it pointless to deny other universals, like whiteness and triangularity. If Russell is right on both points, or at least on the first of them, then Resemblance Nominalism must be given up. But, as we shall see in this chapter, Russell is wrong on the first point and, indeed, on both of them.

Suppose *a*, *b*, and *c* are white, and so resemble each other. May the resemblances between *a* and *b* and between *b* and *c* not be as particular as *a*, *b*, and *c*? Yes, but then we do get an infinite regress of resemblances, as Russell suggests in the passage above and explicitly recognizes elsewhere (Russell 1992: 346–7). For then the question arises: are the resemblances between our original resemblances instances of a universal of resemblance or are they just particulars? If the latter, the same question arises about them, and so on *ad infinitum*.

The regress mentioned above arises, of course, only if the different resemblances resemble each other. But they do. For since *a*, *b*, and *c* are white, so that every two of them resemble each other, the resemblances between *a* and *b* and between *a* and *c*, for example, resemble each other in being resemblances of white particulars. Similarly, the resemblances between these resemblances resemble each other, since they are resemblances between resemblances between white particulars, and so on *ad infinitum*. The regress is thus constituted by a hierarchical infinite series of orders of resembling entities, where the members of each order are the resemblances between the members of the previous order:

Order 0: Resembling entities.
Order 1: Resembling resemblances between entities of order 0.

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Order *n*: Resembling resemblances between entities of order *n*–1.

For this regress to start we do not need the concrete particulars usually used to illustrate it. Indeed, since the regress has an infinite number of orders, entities of any order *n* in some regress of resemblances might equally well be the entities of order 0 in another such regress.

The important point to notice, however, is that the entities of order 0 need be neither concrete particulars nor resemblances of them since, as has been widely noticed, the regress also arises for other theories like Universalism (Price 1953: 23–4; Armstrong 1978*a*: 56; Campbell 1990: 36; Daly 1997: 150) and Trope Theory (Küng 1967: 167–8;

Campbell 1990: 35–6; Daly 1997: 148–53). For, in the case of Universalism, if *a*, *b*, and *c* share the universal *whiteness*, then they resemble each other. But then their resemblances resemble each other, and similarly for the resemblances between their resemblances, and so on *ad infinitum*. Similarly, if *a*, *b*, and *c* have respectively the resembling tropes *t*, *t′*, and *t″*, then there are resemblance tropes r_1, r_1', and r_1'' holding between each two of them, resemblance tropes r_2, r_2', and r_2'' holding between each two of r_1, r_1', and r_1'', and so on *ad infinitum*.

However, since these theories are all different, the regress may be vicious in one but not in another. Here, of course, what matters is whether the regress is vicious for Resemblance Nominalism, or whether Resemblance Nominalism is really committed to anything like it.

6.2 Arguments for the viciousness of the regress

Some philosophers, like Armstrong (1974: 196, 1978*a*: 56), think that the regress, by positing an *infinite* number of resemblances, shows Resemblance Nominalism to be committed to a 'gross lack of economy'. But this depends of course on the sort of ontological economy in question. Is it *qualitative* economy, where a theory is more or less economical depending on the number of *kinds* of entities it postulates? Or is it *quantitative* economy, where a theory is more or less economical depending on the number of entities, of any kinds, it postulates? If the economy in question is *qualitative* then Armstrong's claim is false, for the regress only introduces particular resemblances and so only one *kind* of entities: particulars. And if the economy in question is *quantitative*, Armstrong's claim that Resemblance Nominalism is committed to a gross lack of economy is also false for, as we shall see in Section 6.5, Resemblance Nominalism is not committed to an infinite regress of resemblances.

But philosophers have more often argued that the regress is vicious in a different sense, namely that it stops Resemblance Nominalism accounting for all properties in terms of resembling particulars. Thus, Armstrong (1978*a*: 56) says, 'the $n + 1^{th}$ level of resemblances has to be postulated in order to explain what needs explaining: the unity of the set of resemblances at the n^{th} level'. And this regress, Armstrong believes, is vicious, because '[a]t each step in the analysis there is something left unanalysed which, since the something left is a type, requires a resemblance analysis. Successive applications of the analysis never get rid of this residue' (Armstrong 1974: 196).

In his (1989*b*) Armstrong says that the regress arises because the fundamental relation of resemblance used by Resemblance Nominalism must be used again: by being applied to tokens of itself. But then it must be analysed again, and so on *ad infinitum* (Armstrong 1989*b*: 54). Other authors have expressed a similar point of view. Chris Daly, in particular, has argued similarly that the regress arising in Trope Theory is vicious. Since he articulates the charge of viciousness in a very perspicuous way, let me adapt the following passage of his to apply to Resemblance Nominalism:

> I conclude that Russell's regress argument stands: a universal of resemblance has to be admitted and it cannot be accounted for in terms of [resembling particulars]. Since a category can be accounted for in terms of [resembling particulars] if and only if every entity which belongs to that category can be accounted for in terms of [resembling particulars], it follows that the category of universals cannot be accounted for in terms of [resembling particulars]. Therefore, the [Resemblance Nominalist] has to admit it as a fundamental category. (Daly 1997: 153)

Others, like Reinhardt Grossmann (1992: 40), make a similar point about Resemblance Nominalism. Thus, if the regress is vicious, it is vicious because it prevents Resemblance Nominalism from accomplishing its explanatory project of accounting for all properties in terms of resembling particulars: such a project remains for ever incomplete.

I shall argue that there is no such regress. But since others have argued—unsuccessfully I think—that there is a virtuous or non-vicious regress, let us first consider their arguments and see why they fail.

6.3 Supervenience and the regress

Price (1953: 23–6) and Küng (1967: 168) believe that the fact that the resemblances in the above regress are of different orders stops it being

vicious. But, as Daly (1997: 151) says, the mere fact that the resemblances form a hierarchy does nothing to show the regress to be virtuous. Campbell (1990: 35–6), defending Trope Theory from its own resemblance regress, argues that the regress is not vicious because it proceeds in a direction of 'greater and greater formality and less and less substance'. However, as Daly (1997: 151) argues, each stage of any vicious regress can also be characterized as being 'more formal' and 'less substantial' than its predecessors; so this in no way marks the virtuousness of a regress.

Finally, Campbell appeals to supervenience in order to show that the regress of tropes is not vicious by claiming that as each member of the regress supervenes upon—because it follows from—its predecessor, none constitutes an 'ontic addition'. This argument is endorsed by Simons (1994: 556). But again, as Daly (1997: 152) notes, this 'pattern of dependence' between successive members of a regress is also present in vicious regresses, so that this too does not show the resemblance regress to be virtuous. Campbell also claims that resemblance supervenes on its relata because it is an internal relation. Daly replies, correctly, that this does not show that resemblance is no ontic addition over its relata.

The supposed link between the supervenience of resemblance upon its *relata* and the non-viciousness of the regress is also invoked by Armstrong in his (1989*b*), where he changes his mind and argues that the regress of resemblances is *not* vicious, appealing precisely to the supervenient character of resemblance. The motivation for this change of mind is that all theories of properties, and in particular Armstrong's own Universalism, are subject to a similar regress. Since Armstrong also considers the resemblance regress that arises for Resemblance Nominalism, and I think I can add some points of my own, let me examine Armstrong's argument in detail, and show why it fails.

I have already criticized, in Section 4.9, Armstrong's idea that Resemblance Nominalism must take resemblance, since it is an internal relation, to flow from the *particularized natures* of the resembling particulars. Let us now see why he thinks these natures make the resemblances' regress virtuous. The reason is that the resemblance to degree n between a and b supervenes upon the natures of a and b.

According to Armstrong if resemblance supervenes upon natures it is therefore not distinct from what it supervenes upon. The ontological ground, that which makes resemblance obtain in the world, is just the natures of particulars. Resemblances are not something extra and, therefore, it does not matter whether they instantiate a universal of resemblance or are mere resembling particulars. Either way, he concludes (1989*b*: 56), the regress is harmless.

The problem with all this is that, even if resemblances supervene upon the natures of particulars, they may still be distinct from what they supervene upon. To infer that they are not, as Armstrong does, is a *non sequitur*, for although identity entails supervenience, in no normal account of supervenience does supervenience entail identity. More to the point, Armstrong's own version of supervenience does not entail identity, as is clear from this passage: 'I favor, and will use, a definition [of supervenience] in terms of possible worlds. Entity Q supervenes on entity P if and only if every possible world that contains P contains Q. This definition allows particular cases of supervenience to be symmetrical: P and Q can supervene on each other' (Armstrong 1989*b*: 56). Worse, not only is there a *non sequitur* in Armstrong's reasoning, his conclusion is false. For if *a*'s resembling *b* to degree *n* were *identical* to *a* and *b* having natures **F** and **G**, then resembling to degree *n* would entail having those natures. But it does not entail this, as Armstrong himself recognizes: '. . . it would be possible for them [*a* and *b*] to resemble to that exact degree yet have different natures' (Armstrong 1989*b*: 55–6). Thus Armstrong has failed to show that the regress is virtuous for Resemblance Nominalism.

6.4 Resemblances as particulars

As I argued in Section 2.3, Resemblance Nominalism seeks to give the truthmakers of sentences like '*a* is scarlet', '*a* is hot', '*a* is square', and so on. Thus before deciding whether it is vicious or not, the regress must be reformulated in terms of truthmakers: if *a*, *b*, and *c* are white then what makes each of them white is (partly, if there are other white particulars) that they resemble each other. But then, what makes the

resemblances between them resemblances? Either that they are instances of a universal of resemblance or that they resemble each other. But if the latter, what makes the resemblances between those resemblances resemblances? Either that they are instances of a universal of resemblance or that they resemble each other. But if the latter, what makes the resemblances between those resemblances resemblances? And so on *ad infinitum*.

But then it seems that this regress is non-existent, rather than vicious or virtuous. For, to adapt some comments of van Cleve (1994: 578) about Russell's original argument, this regress begs the question against Resemblance Nominalism, for it assumes that if *a* and *b* resemble each other then there is some entity like 'the resemblance between *a* and *b*'. But to accomplish its explanatory task, Resemblance Nominalism needs only suppose that particulars resemble each other, not that there are any resemblances. Thus the Resemblance Nominalist need not worry about any regress of resemblances: there are none.

But if the problem which concerns Resemblance Nominalism is the Many over One, must it not, for the sake of ontological completeness, account for what it invokes to solve the Many over One, namely resemblance facts? In other words, must not Resemblance Nominalism explain what it is for a group of particulars to resemble each other?

Yes, it must and it does, the answer being that a group of particulars resemble each other whenever every two of them resemble each other. But then surely Resemblance Nominalism must say what it is for a pair of particulars to resemble each other. That is, Resemblance Nominalism must say what makes sentences like '*a* and *b* resemble each other' true. These are made true of course by *a* and *b* resembling each other to some specific degree *n*. But then the question becomes: what makes *a* and *b* resemble each other to degree *n*? or what makes sentences like '*a* and *b* resemble each other to degree *n*' true? This question, I think, is the fundamental one, analogous to the question 'In virtue of what does *a* instantiate the universal **F**-ness?' for Universalism.

But since Resemblance Nominalism admits only particulars, what can make it true that *a* and *b* resemble each other to degree *n* if not a particular? And what particular could this be if not the resemblance-between-*a*-and-*b*? Understood in this way, resemblances would be relations linking different particulars, but they would be as particular as the particulars they link.[1]

One might think that taking resemblances as particulars in this way is a poor strategy, precisely because it regenerates the regress of resemblances. Thus if *a*, *b*, and *c* all resemble each other, then it is the particulars resemblance-between-*a*-and-*b*, resemblance-between-*a*-and-*c*, and resemblance-between-*b*-and-*c* which make this true. But these three resemblance-particulars also resemble each other and what makes that true are the resemblances between them, which in turn resemble each other, and so on *ad infinitum*. Thus at no point in the regress have the Resemblance Nominalists completed their explanation of what makes '*a* and *b* resemble each other' true. If this is true then Resemblance Nominalism is indeed a defective theory.

But this is not so. The requirement that the Resemblance Nominalist give the truthmakers of all sentences like '*a* and *b* resemble each other' can easily be met as follows. For any particulars *x* and *y*, let '*x*/*y*' stand for 'the resemblance-between-*x*-and-*y*'. Then Resemblance Nominalists must say more than

> the truthmakers of '*a* and *b* resemble each other', '*a* and *c* resemble each other', and '*b* and *c* resemble each other' are, respectively, *a*/*b*, *a*/*c*, and *b*/*c*; and the truthmakers of '*a*/*b* and *a*/*c* resemble each other', '*a*/*b* and *b*/*c* resemble each other', and '*a*/*c* and *b*/*c* resemble each other' are, respectively, *a*/*b*/*a*/*c*, *a*/*b*/*b*/*c*, and *a*/*c*/*b*/*c*; and the truthmakers of . . .

they must say rather something like:

> For every *x* and *y*, if '*x* and *y* resemble each other' is true then this is made true by *x*/*y*.

As this single general statement covers all the infinity of cases in the regress, Resemblance Nominalism need not go through the regress step by step. And since the Resemblance Nominalists can account for every member of the hierarchy of resemblances at once, they can give

[1] From now on I shall often, for ease of exposition, drop the reference to the degree to which particulars resemble and talk just of particulars resembling each other, on the understanding that whenever two particulars resemble each other at all they do so to some specific degree *n*. Indeed if they resemble each other at all, they do so in virtue of resembling each other to some degree *n*.

a complete explanation of what makes sentences like '*a* and *b* resemble each other' true.

But can Resemblance Nominalism really treat resemblances as particulars, as this answer to the regress objection requires? In particular, what kind of particulars can these resemblances be? Certainly, whatever it is, the resemblance-between-*a*-and-*b* is not a particular like *a* and *b*. If a particular at all, the resemblance-between-*a*-and-*b* would be a particular of the same kind as the squareness-of-*a* would be. It seems, then, that the only way to make sense of resemblances as particulars would be to treat them as *tropes*. Yet in Resemblance Nominalism there are no tropes, and so it cannot take resemblances as particulars.

6.5 Particulars as the truthmakers of resemblance sentences

The question which needs an answer is: what makes the resembling particulars *a* and *b* resemble each other? One would like to say that *a* and *b* resemble in virtue of their sharing some property, but this would turn Resemblance Nominalism on its head, for Resemblance Nominalism says that what makes *a* and *b* share a property is their resembling each other.

Could the Resemblance Nominalist say that what makes *a* and *b* resemble each other is that they both belong to some one class? Apparently not, for any two particulars both belong to *some* same class, even though not every two particulars resemble each other, since not every two particulars have some property in common. But is it true that some pairs of particulars share no properties? Goodman (1972: 443) and many others think not. And in a sense, the sense in which Goodman intended it (1972: 443 n.), they are right: if properties are just what predicates mean, then every two particulars must indeed share some property. For example, for any two particulars *a* and *b*, the predicate '__ is identical to *a* or identical to *b*' applies to both *a* and *b*, and so both of them share the property of *being identical to a or identical to b*. Indeed every two particulars share infinitely many *abundant* properties. But, as I said in Section 3.4, the properties to which solutions to the Problem of Universals must apply are *sparse* properties. And not every two particulars share some sparse properties. Therefore not every two particulars resemble each other, and so belonging to some same class is not what makes two resembling particulars resemble each other.

But even if we restrict the classes, membership of which makes particulars resemble each other, there is a further reason why such membership cannot really be what makes particulars resemble each other. For, given the necessary connection between resemblance and the sharing of properties, this would imply that what makes particulars have a certain property is that they belong to some class. And this is surely absurd, for of what class could Socrates' membership make him white? Clearly only the class of white particulars. But that will not do, for—as Armstrong (1978*a*: 36) and Mellor (1997: 262) have emphasized—it is Socrates' being white that makes him a member of that class, not the other way round.

But perhaps the Resemblance Nominalist can say that what makes any two resembling particulars resemble each other is that the pair of them belongs to the class R of all pairs of resembling entities (i.e. particulars or ordered *n*-tuples)? Thus every two resembling entities x and y (whether they are particulars or ordered *n*-tuples) resemble *because* the ordered pairs $\langle x,y \rangle$ and $\langle y,x \rangle$ belong to R. Belonging to R would, of course, be a brute fact in the sense that it cannot be explained further. For how could one explain that a certain pair belongs to R? The only thing one could say is that it is a member of that class if and only if it resembles all the other members. But resembling anything at all would just be being a member of some ordered pair in R.

This story will not do, I think. For according to it a and b resemble each other in virtue of something about the ordered pairs $\langle a,b \rangle$ and $\langle b,a \rangle$, namely the fact that those two ordered pairs belong to the class R. This again seems to be reversing the order of explanation, since what makes those pairs belong to the class R is surely that a and b resemble each other, not the other way round. And then one cannot patch things up by saying that a and b resemble each other because $\langle a,b \rangle$ and $\langle b,a \rangle$ resemble other ordered pairs in R, for that would be to explain resemblance by resemblance, that is, to explain the resemblance between a and b by the resemblances between $\langle a,b \rangle$ and $\langle b,a \rangle$ and $\langle c,d \rangle$ and $\langle d,c \rangle$, say.

What then makes it true that a and b resemble each other? The Resemblance Nominalist's answer is: just a and b together. In general any two resembling entities x and y (whether they are particulars or ordered *n*-tuples) resemble each other in virtue of being x and y. If a and b resemble each other then their resemblance is a fact because of their being the entities they are, and so a and b are the sole truthmakers of 'a and b resemble each other'. There is then no need to postulate extra entities to account for facts of resemblance: the resembling entities suffice to account for them.[2] And so no regress of resemblances arises, since there are only resembling particulars and no resemblances at all.

Rejecting resemblances and admitting only resembling entities makes these the only constituents of resemblance facts. Even so, resemblance facts, like any other facts, differ from each other if and only if they have different constituents. For given the symmetry of resemblance it is plausible to suppose that the fact that a resembles b and the fact that b resembles a are one and the same fact.

But is this account of the truthmakers of resemblance sentences acceptable? One may complain that saying that a and b resemble each other in virtue of being the entities they are is to give a poor answer to an interesting question. But, as Campbell aptly points out, 'it is important to remember that such answers arise at some point in *every* system' (Campbell 1990: 30). As he says, the Universalist must answer in a similarly poor way the question about in virtue of what the presence of the universal *electric charge* is necessary and sufficient for something's having charge. Indeed the answer given by the Universalist must be: in virtue of being what it is.

But another objection comes almost immediately to mind: the conjunction of 'a exists' and 'b exists' does not entail 'a and b resemble

[2] Note that this does not make Resemblance Nominalism collapse into Ostrich Nominalism. According to the latter a is sufficient to make it true that a is scarlet while according to the former other particulars are necessary. Also, according to Ostrich Nominalism a and b are sufficient to make it true that a is bigger than b, while according to Resemblance Nominalism other pairs of particulars are necessary.

each other' and therefore *a* and *b* are at most *parts* of the truthmaker of '*a* and *b* resemble each other'. But there is a way out of this, namely the claim of Counterpart Theory that no particular exists in more than one possible world—a claim to which, as we saw in Section 5.4, the Resemblance Nominalist is anyway committed. For if *a* and *b* exist only in one possible world and they resemble each other there, then '*a* exists and *b* exists' *does* entail '*a* and *b* resemble each other', for then the former cannot be true and the latter false. Thus the Resemblance Nominalist can perfectly well maintain that the truthmakers of a sentence like '*a* and *b* resemble each other' are just *a* and *b* without abandoning the entailment between '*a* exists and *b* exists' and '*a* and *b* resemble each other' required by (T**) (see Sect. 2.2).

Note that this means that although *a* and *b* are the truthmakers of '*a* and *b* resemble each other', *a* and *b* are not necessarily such that they resemble each other. For on Counterpart Theory this requires that all of *a*'s and *b*'s counterparts resemble each other, which is surely not the case. Some may think this is a problem, for they may think that if *a* and *b* are the truthmakers of '*a* and *b* resemble each other' then they must necessarily resemble each other. But this is confusion. All the idea of truthmakers requires of *a* and *b* for them to make it true that they resemble each other is that there is no possible world where they exist without resembling each other. And this is still the case even if some of their counterparts fail to resemble. Surely, if one assumes a non-Counterpart-theoretic point of view then that there is no possible world where *a* and *b* exist without resembling each other means that they necessarily resemble each other. But this consequence does not follow once, as in Resemblance Nominalism, Counterpart Theory has been taken on board.

One might think that by invoking different counterpart relations one has an alternative way of dealing with this problem. This alternative works by selecting a counterpart relation according to which all counterparts of *a* and *b* resemble each other so that *a* and *b* necessarily resemble each other relative to this counterpart relation. This is what Lewis would be inclined to do. Lewis is a sort of Truthmaker Ostrich Nominalist, who believes that the truthmaker of '*a* is **F**' is just *a qua* **F**, that is, just *a*; and the truthmaker of '*a* is **G**' is just *a qua* **G**, that is, just *a*

(Lewis 2002). For 'the' counterpart relation is flexible, as he says. Thus the name '*a qua* **F**' selects one counterpart relation under which *a* is essentially **F** and the name '*a qua* **G**' selects a different counterpart relation under which *a* is essentially **G**. Thus if one selects a counterpart relation according to which both *a* and *b* are, say, essentially scarlet, they necessarily or essentially resemble each other. This enables Lewis to say that *a* and *b* jointly make it true that *a* resembles *b* (personal correspondence).

But Resemblance Nominalists cannot and need not adopt Lewis's idea. They cannot use this idea because for them resemblance grounds properties—not the other way round. Thus what makes *a* scarlet is that it resembles other particulars that exist in any possible worlds. But counterparts are based on resemblance, and the counterparts of *a qua* scarlet are things in other possible worlds that resemble *a in respect of being scarlet*. So by accounting for the truthmakers of '*a* resembles *b*' in terms of the counterparts of *a qua* scarlet and *b qua* scarlet the Resemblance Nominalist will be accounting for the truthmakers of '*a* resembles *b*' in terms of *a*'s and *b*'s being scarlet. This is Resemblance Nominalism upside down, if Resemblance Nominalism at all.

As I said in Section 5.4, when accounting for what makes particulars have their properties in terms of resemblances, all Resemblance Nominalists can make use of in Counterpart Theory is its part (*a*), namely that no particular exists in more than one possible world. It is in terms of particulars resembling each other that Resemblance Nominalism accounts for their properties, and it is part (*a*) of Counterpart Theory that is used by Resemblance Nominalism to account for the truthmakers of resemblance sentences. Only when Resemblance Nominalists have explained, in terms of resemblance, what makes particulars have their properties, can the notion of counterparts, explained in Resemblance Nominalist terms, be adopted.

But that Resemblance Nominalists cannot adopt Lewis's idea is no problem for them because they do not need that idea. For, as we saw, even if *a* and *b* do not necessarily resemble each other, they are still such that there is no possible world where they exist without resembling each other. So '*a* exists and *b* exists' does entail '*a* and *b* resemble each other', which is all (T**) commits the Resemblance Nominalist to.

It might be thought that *a* and *b* cannot make true that they resemble each other because they may not exist in the same possible world, in which case they would not meet a requirement of (T**), namely that the truthmakers exist in at least one same possible world. But this objection is wrong in assuming that (T**) requires resembling particulars to exist in the same possible world. (T**) does not require that. Given the way I have interpreted (T**) all it requires is that *if* certain truthmakers exist in the same possible world then the truth they ground cannot fail to be true in that world. But this is of course compatible with joint truthmakers not existing in the same possible worlds. Actually (T**), as I have interpreted it, is true of any truthmakers not existing in the same worlds. For if such truthmakers exist in different possible worlds then the sentence affirming that they coexist is false in every possible world and so entails any other sentence. That is, joint truthmakers existing in different possible worlds vacuously satisfy the consequent of (T**).

Now (T**) is a way of interpreting and giving content to the idea that truthmakers suffice for the truths they make true. So since Resemblance Nominalism has it that entities existing in different possible worlds can be joint truthmakers of certain truths, can the Resemblance Nominalist give content to the idea that truthmakers suffice for their truths in the form of a requirement that does not vacuously apply to truthmakers existing in different possible worlds? Yes, what the Resemblance Nominalist does is to invoke a more general principle, of which (T**) is a particular case, which cashes out the idea that truthmakers suffice for their truths. What this principle requires of joint truthmakers is satisfied non-vacuously by those existing in different possible worlds. This more general principle is (T***):

(T***) If $E_1, \ldots, E_n$ are joint truthmakers of 'S' then there is no part of modal reality of which the truthmakers of 'S' are parts but in which 'S' is false.

Let a part of modal reality be any mereological sum of possible existents; thus there are parts of modal reality that are not possible worlds. Thus if *a* and *b* exist in different possible worlds, given Counterpart Theory, it follows that their sum is a part of modal reality that is not a possible world. Let a simple or atomic sentence 'S' be true/false in a

part of modal reality if and only if it is true/false of some of its parts, jointly or separately. Then if *a* in world *w* resembles *b* in world *w′* '*a* and *b* resemble each other' is true in *a*+*b*. And since, given Counterpart Theory, each of *a* and *b* exist in only one *possible world*, they resemble in every part of modal reality and so there is no part of modal reality of which *a* and *b* are parts but in which '*a* and *b* resemble each other' is false.

Let me make some comments on (T***). First, as intended, (T**) is a particular case of (T***). For possible worlds are parts of modal reality, and the things that exist in a possible world are parts of it.

Secondly, the truth/falsity of a non-atomic sentence in a part of modal reality is made dependent in the usual way on the truth/falsity of atomic sentences in that part.

Thirdly, if 'S' is true in a part of modal reality, (T***) does not require the truthmakers of 'S' to exist in that part. This should not be surprising since, after all, if 'S' is true in a possible world *w* its truthmakers need not exist in *w* (not all the truthmakers of '*a* is necessarily red' at world *w* exist in *w*—some of them are counterparts existing in other possible worlds). All (T***) requires is that if the truthmakers of 'S' exist in a part of modal reality, then 'S' be true in that part of modal reality.

Fourthly, the modal status of a sentence at a part of modal reality, whether a possible world or not, depends on the truth of the sentence at other *possible worlds*—not at other parts of modal reality that are not worlds. Thus my letting sentences have truth values in parts of modal reality other than possible worlds does not affect the modal status of any sentences at any worlds. Thus parts of modal reality that are not possible worlds are modally inconsequential—as it should be, for what matters for modality are *possible worlds*. Thus the purpose of (T***) is neither to change nor to add to the way we understand necessity, entailment, and possible worlds.

Fifthly, (T***) is not an ad hoc principle. It has the same rationale as (T*) and (T**) have, namely that truthmakers suffice for the truths they make true. Indeed, the purpose of (T***) is just to give content to the idea of the sufficiency of truthmakers when applied to truthmakers that exist in different possible worlds. The sufficiency of truthmakers has a modal import that is naturally expressed in terms of what happens and does not happen in possible worlds. But that idea, if expressed in terms of possible worlds, can only be vacuously satisfied by joint truthmakers existing in different possible worlds. This is why a broader principle is needed to express the modal import of the sufficiency of truthmakers in a more general way. This is what I think (T***) does. Truthmakers are sufficient for their truths because there is no part of modal reality where they exist but the truths they make true are false.

Thus that *a* and *b* jointly make true '*a* and *b* resemble each other' does not violate any of the constraints imposed on truthmaking. But does not Resemblance Nominalism's solution to the Many over One show that just *a* and *b* cannot be what makes '*a* and *b* resemble each other' true? For not only do *a* and *b* resemble each other but they also, let us suppose, are contiguous to each other and repel each other. The Many over One demands an explanation of the variety of relations between these pairs of particulars, given that something different must make each of '*a* and *b* resemble each other', '*a* and *b* are contiguous to each other', and '*a* and *b* repel each other' true. And the explanation offered by Resemblance Nominalism is that what makes *a* and *b* so variously related, in general, is that the pair of *a* and *b* resembles many other groups of pairs of entities. But this of course will not work for resemblance itself. Saying that what makes it true that *a* and *b* resemble each other is that this pair resembles other pairs explains nothing, as we have already seen.

What can then one say? I say that the answer given by Resemblance Nominalism about the truthmakers of other relational sentences need not apply to resemblance. What makes it true that *a* and *b* resemble each other can just be *a* and *b* provided this does not make true any other relational sentence about *a* and *b*. With that proviso, the insight that what makes *a* and *b* **R**-related must be different from what makes them **S**-related is not violated by having just *a* and *b* as what makes them resemble each other.

But can this proviso be met? For is not '*a* exists and *b* exists' a counterexample given that *a* and *b* respectively make true '*a* exists' and '*b* exists' and hence the truthmakers of the conjunctive sentence '*a* exists and *b* exists' are *a* and *b*? But here *a* and *b* *together* make the conjunctive

sentence true by *separately* making its conjuncts true. In other words, '*a* exists and *b* exists' is true in virtue of *a* and *b* because '*a* exists' is true in virtue of *a* and '*b* exists' is true in virtue of *b*. The roles of *a* and *b* as truthmakers of '*a* exists and *b* exists' are therefore different. But this is not so in the case of '*a* and *b* resemble each other' or '*a* and *b* resemble each other to degree *n*'. Here *a* and *b* play exactly the same role in making these sentences true: *a* and *b* together do not make '*a* and *b* resemble each other' true by separately making anything else true.

What about '*a* and *b* are numerically different'? Are not just *a* and *b* the truthmakers of this sentence too? I think they are. I think moreover that *a* and *b* make '*a* and *b* resemble each other' true in the same way in which they make '*a* and *b* are numerically different' true. But this, I think, is no objection to my Resemblance Nominalism. For the Many over One is a problem about *sparse* properties and relations, and so it requires that the truthmakers of sentences like '**R***ab*' and '**S***ab*' be different provided **R** and **S** are sparse relations. But numerical identity and difference are not sparse relations. And resemblance, although not an abundant relation, is not, in Resemblance Nominalism, a sparse relation either: for it is in terms of resemblance that the theory accounts for what makes a particular have any sparse property **F** or bear any sparse relation **R** to any particulars. This is an additional reason why '*a* exists and *b* exists' is also not a counterexample to Resemblance Nominalism's thesis that what makes '*a* and *b* resemble each other' true is just *a* and *b*. Thus the fundamental insight of the Many over One is not violated if what makes '*a* and *b* resemble each other' true is the same as what makes '*a* and *b* are numerically different' true. The fact that *a* and *b* also make '*a* and *b* are numerically different' true is no more problematic than the fact that *a* makes '*a* exists', '*a* is identical to *a*', and '*a* resembles *a*' true.

So Resemblance Nominalism can and must maintain that particulars resemble each other just in virtue of being the particulars they are, so that what makes '*a* and *b* resemble each other' true is just *a* and *b*. That is, there are no resemblances—only resembling particulars. This is why Resemblance Nominalism is not trapped by Russell's regress.

6.6 How wrong was Russell?

So far I have argued that Resemblance Nominalism needs admit no resemblances at all, and so that Russell was wrong in thinking that Resemblance Nominalism needed to postulate at least one universal, namely a universal of resemblance. But, as we saw in Section 6.1, Russell also thought that admitting resemblance as a universal would make it no longer worthwhile to avoid the admission of other universals such as whiteness and triangularity (Russell 1997: 48).

One might think that Russell's second thought is wrong because of considerations of economy. In Section 6.2 I distinguished two kinds of economy: *qualitative*, measured by the number of *kinds* of entity postulated by a theory, and *quantitative*, measured by the number of *entities*, of any kinds, postulated by a theory. Some philosophers, as we shall see in Section 12.4, think only qualitative economy matters. But Daniel Nolan (1997) has argued persuasively that quantitative economy matters too, and that we should try to minimize the number of entities of each kind postulated. Although in Section 12.7 I shall conclude that qualitative economy takes precedence over quantitative economy, both sorts of economy matter. But then a theory that postulates just one universal is preferable to one that postulates many of them. So even if Resemblance Nominalism had to admit a universal of resemblance, it would still be an advantage that it needs postulate no others.

But actually Resemblance Nominalism could not admit only one universal. For if n is the number of degrees to which any two particulars can resemble then it must admit n different universals of resemblance, one for each degree.[3] For resemblance, to some degree or other, is a determinable universal, the resemblances to specific degrees being the determinates. But even then, a theory admitting n universals of resemblance would be quantitatively more economical than a full-blooded Universalism postulating a universal for each determinate property.

Indeed the only universals admitted by such Resemblance Nominalism would be universals of resemblance, and such Resemblance

[3] Since the properties resemblance accounts for are sparse, of which particulars have only a finite number, the universals of resemblance could be no more than a finite number.

Nominalism would say that what makes a have any property **F** (or a and b be **R**-related) is a's instantiating with every other **F**-particular the resemblance universal (or the ordered pair $\langle a,b \rangle$'s instantiating with every other **R**-related pair the resemblance universal). Such a version of Resemblance Nominalism, call it *Resemblance Nominalism$_2$, is* a substantive theory to which it cannot be objected that having admitted some specific universals, it lacks reasons for denying others.

But is Resemblance Nominalism$_2$ a version of Resemblance Nominalism? Should Resemblance Nominalism$_2$ not be called 'Resemblance Universalism' instead? Putting the trivial terminological question aside, Resemblance Nominalism$_2$ is clearly more like Resemblance Nominalism than Universalism. For a start resemblance is still a primitive. For even if on Resemblance Nominalism$_2$ when two particulars resemble each other this is in virtue of the fact that they instantiate a universal, this is a universal of resemblance and so resemblance is still a primitive. Things are different in Universalism, where resemblance is not a primitive, but is reduced to the instantiation of one or more *other* universals. But in Resemblance Nominalism$_2$ there are no other universals apart from resemblance universals, and facts about particulars having properties and (other) relations are reduced to facts of resemblance. Resemblance Nominalism$_2$ thus faces most of the problems of Resemblance Nominalism: it must account for the formal properties of resemblance and for its internal character, and solve the *coextension*, *imperfect community*, and *companionship* difficulties. These are the typical problems of a Resemblance Nominalist theory, none of which arises for any sort of Universalism. And so I conclude Resemblance Nominalism$_2$ is a version of Resemblance Nominalism.

But whether or not Resemblance Nominalism$_2$ is a version of Resemblance Nominalism the important point about it is that, since it postulates fewer universals than Universalism, Resemblance Nominalism$_2$ might be preferable to Universalism. Thus the mere admission of one or more universals might still make it worthwhile to avoid the admission of other universals. And so Russell was wrong on both points he made in his famous criticism of Resemblance Nominalism.

The Resemblance Structure of Property Classes 7

7.1 Egalitarian and Aristocratic Resemblance Nominalism

According to Resemblance Nominalism what makes something **F** is that it resembles all **F**s, including possible ones. But is it not enough for something to be **F** that it resembles some specific **F**s, or at least some specific groups of **F**s? This is what some Resemblance Nominalists might think, whose views I shall discuss in this chapter.

I distinguish two versions of Resemblance Nominalism: the *egalitarian* and the *aristocratic*. They differ in their conceptions of the resemblance structure of property classes. Property classes, as we saw in Section 4.2, are classes whose members are all and only particulars sharing a property. On the egalitarian version the members of those classes all have the same status. On the aristocratic version property classes contain one or more relatively small groups of privileged particulars. The main example of Aristocratic Resemblance Nominalism is the one presented by H. H. Price in his (1953). It is from him that I borrow the egalitarian/aristocratic terminology, though he used the word 'equalitarian' and, more important, what he characterized as egalitarian was *Universalism*, or the *Philosophy of Universals* as he called it, rather than any kind of Resemblance Nominalism. Let us see what Price says about what he called the

Philosophy of Resemblances, which corresponds to what I here call *Aristocratic Resemblance Nominalism*:

> It is agreed by both parties that there is a *class* of red objects. The question is, what sort of structure does a class have? . . . According to the Philosophy of Universals, a class is so to speak a promiscuous or equalitarian assemblage. All its members have, as it were, the same status in it. All of them are instances of the same universal, and no more can be said. But in the Philosophy of Resemblances a class has a more complex structure than this; not equalitarian, but aristocratic. Every class has, as it were, a nucleus, an inner ring of key members, consisting of a small group of standard objects or exemplars. The exemplars for the class of red particulars might be a certain tomato, a certain brick, and a certain British post-box. (Price 1953: 20)[1]

The privileged members which Price called *exemplars* or *standard objects*, I, following Armstrong (1978*a*: 45–6), shall call *paradigms*. These paradigms play an important role in the aristocratic theory, since they are supposed to account for the unity of property classes. That is, the paradigms determine those classes by making any particulars resembling *them* in a certain way belong to those classes. Since their paradigms are responsible for the unity of the classes, they are essential to them: all such classes must have paradigms. As Price says:

> According to the Philosophy of Resemblances, there cannot be a class unless there are exemplar objects to hold the class together . . . In the Philosophy of Universals, what holds a class together is a universal . . . In the Philosophy of Resemblances . . . [w]hat holds the class together is a set of nuclear or standard members. Anything which has a sufficient degree of resemblance to these is thereby a member of the class; and 'resembling them sufficiently' means 'resembling them as closely as they resemble each other'. (Price 1953: 21–2)

As others have pointed out (Armstrong 1978*a*: 47; Raphael 1955: 114), by 'resembling as closely as' Price must here mean 'resembling *at least* as closely as', that is, '*at least* to the same degree as'. Otherwise, to take

[1] Price presented and articulated Aristocratic Resemblance Nominalism, but it is not clear to what extent he endorsed it. He thinks that what he calls the *Philosophy of Resemblances* and the *Philosophy of Universals* are just alternative terminologies, two systematically different ways of acknowledging the same facts (Price 1953: 30). (It might be interesting to recall that some years earlier, in his (1946), Price had argued *for* Universalism and *against* Resemblance Nominalism.)

Price's example of the red paradigms, no other red tomato would belong to the class of red particulars, for it would resemble the tomato paradigm more closely than the brick and the post-box. Thus, let us take Price as saying that the classes in question are constituted by the particulars resembling their paradigms *at least* as closely as these paradigms resemble each other. We shall see, however, that there are other ways of specifying property classes in terms of paradigms, corresponding to different ideas of what a paradigm is. Let us say, then, that in general Aristocratic Resemblance Nominalism is the view that for every property **F**, the class of **F**-particulars has some paradigms; otherwise, since there are no universals, there would be nothing to 'hold the class together'.

On the other hand, according to Egalitarian Resemblance Nominalism, the resemblance structure of property classes is less complex: they contain no privileged paradigms. All members of the class, by resembling each other, contribute equally to holding the class together. Carnap's treatment of *similarity circles* and *quality classes* in the *Aufbau* may be considered an example of Egalitarian Resemblance Nominalism, since they contain no paradigms or privileged members (Carnap 1967: 129–33).

Now Price did not think of property classes as I do, that is, as containing particulars existing in different possible worlds, nor did he think that Resemblance Nominalism should be concerned primarily with *lowest determinate* properties. However, given what I have said in Sections 3.3 and 5.3, I shall here be concerned with a version of Aristocratic Resemblance Nominalism where the paradigms are meant to collect particulars sharing a lowest determinate property across different possible worlds, and where the paradigms themselves may exist in different possible worlds. Similarly, of course, the members of Egalitarian property classes may exist in different possible worlds. For simplicity and ease of exposition, however, all examples in this chapter will use determinable properties like *being red*, *being blue*, or *being hot*, but it should be always kept in mind that the properties with which I am concerned, and which my examples are meant to be examples of, are lowest determinate properties.

Notice that the issue between Egalitarian Resemblance Nominalism and Aristocratic Resemblance Nominalism is independent of whether

one takes properties to be classes or not. For even if Resemblance Nominalists refuse to identify properties with classes, and say only that what makes a particular *a* have a property **F** is that it resembles certain particulars, they still face the question: resembling *which* particulars makes *a* have the property **F**? Is it *a*'s resembling all **F**-particulars that makes it **F**—as I have assumed so far? Or is it *a*'s resembling certain specific groups of **F**-particulars—groups of **F**-paradigms, as the Aristocratic Resemblance Nominalists would say? In the second case, but not the first, the class of **F**-particulars has some privileged members—or at least some privileged groups of members, for it might be that every member of the class belongs to at least one such group. Thus, although the issue between Egalitarian and Aristocratic Resemblance Nominalism can be discussed as a problem about the structure of property classes, as I shall do, it is independent of whether the Resemblance Nominalist identifies properties with any classes.

In this chapter I shall first examine three prima-facie versions of Aristocratic Resemblance Nominalism, the kind of Resemblance Nominalism current writers on the topic like Armstrong normally have in mind. I shall show those three versions to be seriously defective. But since even some critics of Resemblance Nominalism, like Russell (1997: 48) and Armstrong (1978*a*: 45–6), have thought that it must appeal to paradigms, in the last section of the chapter I shall argue that Aristocratic Resemblance Nominalism lacks a sound motivation.[2]

7.2 Pricean paradigms

According to Price, as we saw, what makes a particular **F** is that it resembles the **F**-paradigms at least as closely as they resemble each other. This seems to presuppose that there is a single degree to which every two paradigms resemble each other. And if so, it is clear that

[2] In the passage quoted in Section 6.1, Russell (1997: 48) says: 'If we wish to avoid the universals *whiteness* and *triangularity*, we shall choose some particular patch of white or some particular triangle and say that anything is white or a triangle if it has the right sort of resemblance to our chosen particular'. Here the chosen patch of white and the chosen triangle are acting as paradigms of the respective classes.

they should resemble to degree 1 or, in other words, that every two paradigms should resemble in only one respect. So, for example, the red paradigms must resemble only in being red; for if they also resembled in being square, they would not collect some red particular that is not square, and so they would not have determined the class of red particulars. But then it seems there is an easy argument against Pricean paradigms, since it appears that they never succeed in collecting the right classes, for there will always be non-**F**-particulars resembling each **F**-paradigm in some respect. Indeed, a non-**F**-particular might resemble one **F**-paradigm in having property **G**, another one in having property **H**, another one in having property **J**, and so on. But, assuming particulars have a finite number of properties, there is an easy solution to this problem, namely to let the number of paradigms be n if the number of properties a particular can have is n.[3] Thus, assuming for simplicity that particulars resemble (and differ) only with respect to colour, shape, and temperature, Table 7.1 shows three particulars, a, b, and c, that resemble each other only in being red.

The class determined by a, b, and c as paradigms is the class of red particulars. They resemble each other in only one respect and every red particular will resemble each of them at least in one respect, while no non-red particular will resemble all three of them.

But the availability of this example presupposes that there are at least three shape determinates and three temperature determinates. So the question might arise as to whether Pricean paradigms can be guaranteed even if there are determinables consisting of two determinates.[4]

TABLE 7.1

	Colour	Shape	Temperature
a	Red	Square	Hot
b	Red	Round	Cold
c	Red	Triangular	Tepid

[3] The assumption that particulars have a finite number of properties is justified since the properties in question are sparse properties. I argue for this assumption in Section 9.7.

[4] Determinables consisting of only one determinate, if any, can be ignored, since all particulars of the relevant sort will have the determinate in question.

And the answer to this seems to be positive. For all we need to collect the class of **F**-particulars is, it seems, a collection of paradigms such that they are all **F** and such that together they exhaust the possible combinations of **F** and other properties. Imagine then that there are only two determinate shapes, square and round, and two determinate temperatures, hot and cold. Thus Table 7.2 represents a set of red paradigms.

In Table 7.2 there is no single degree to which every two paradigms resemble each other and so it is not clear what to make of Price's requirement that red particulars should resemble each paradigm at least as closely as the paradigms resemble each other. The sensible thing to do would be to require that red particulars resemble each paradigm at least as closely as the least resembling of the paradigms resemble each other. With this modification to the notion of a Pricean paradigm these paradigms do succeed in collecting the class of red particulars, for there are pairs of paradigms, like a and d for instance, that resemble only in being red. Therefore no non-red particulars will resemble all of these paradigms—and every red particular will resemble them at least as closely as the least resembling paradigms resemble each other.

That there is a class of red paradigms in these circumstances does not ensure that there is a class of **F**-paradigms for every property **F**. But this example might lead one to think that, provided there exist the right particulars, every property **F** has its class of **F**-paradigms, for what is required is that each paradigm has one of the possible combinations of **F** and the other properties. So an objection against this version of Aristocratic Resemblance Nominalism is that there may not actually be such paradigms.

TABLE 7.2

	Colour	Shape	Temperature
a	Red	Square	Hot
b	Red	Square	Cold
c	Red	Round	Hot
d	Red	Round	Cold

If the objection is simply that there may not *actually* be such paradigms simply because some *possible* paradigms do not happen to actually exist, then this is easily met by Aristocratic Resemblance Nominalists' admission of *possibilia*. The coextension difficulty is no less a difficulty for Aristocratic Resemblance Nominalism than it is for any other form of Resemblance Nominalism. For if **F** and **G** are coextensive properties then the **F**-particulars will resemble the **G**-paradigms and the **G**-particulars will resemble the **F**-paradigms. But admitting *possibilia* is the solution to the coextension difficulty. And once *possibilia* are admitted the paradigms need not belong to the actual or even to the same possible world.

But the admission of *possibilia* does not actually help Aristocratic Resemblance Nominalism with the objection that the required paradigms may not exist. For it might be that some of those paradigms are not even possible. This would be the case if some properties were necessarily accompanied by others, that is, if some properties necessarily occur only in particulars having certain other properties. Imagine then that, necessarily, round particulars are cold particulars; if that were the case then Table 7.2 would not represent a possible combination of paradigms. Instead we could only have the paradigms represented in Table 7.3.

But the paradigms in Table 7.3 fail to collect the class of red particulars, for a blue, square, and cold particular, for instance, will resemble each paradigm at least as closely as the least resembling paradigms resemble each other.

The assumption that some determinables consist of only two determinates plays merely a simplifying function in our example. All that is required is that certain determinates be necessarily accompanied by others. But there is no a priori guarantee that there are no cases of

TABLE 7.3

	Colour	Shape	Temperature
a	Red	Square	Hot
b	Red	Square	Cold
d	Red	Round	Cold

necessary companionship among properties. For all we know there may well be some basic properties of particles that are necessary companions of others. If so some property classes may lack Pricean paradigms. Indeed an example like the one we imagined in Table 7.3 might well be the case. If so, as we have seen, some property classes *do* lack paradigms. This shows that, contrary to what Price and others say, the class of **F**-particulars need not be held together by paradigms that are themselves **F**. Thus what makes a particular **F** is not that it resembles certain paradigm **F**-particulars.

7.3 An alternative to Pricean paradigms

But is it not possible that non-**F**-particulars help to determine the class of **F**-particulars? An **F**-particular may of course resemble some non-**F**-particulars more closely than any **F**-particular (other than itself). But if an **F**-particular and a non-**F**-particular differ only with respect to being **F**, then no **F**-particular can fail to resemble the former more closely than the latter. This may suggest the following way, brought to my attention by Timothy Williamson, of making non-**F**-particulars help to determine the class of **F**-particulars. Select one paradigm for each property class, make the paradigms of different classes differ from each other in only one respect, and then say that the **F**-paradigm collects all those particulars resembling it more closely than they resemble other paradigms.[5] Table 7.4, in which *a*, *b*, and *c* are the red, blue, and yellow paradigms respectively, exemplifies this alternative conception of paradigms: for each one of them there is only one property that it has and the other two lack.

TABLE 7.4

	Colour	Shape	Temperature
a	Red	Square	Hot
b	Blue	Square	Hot
c	Yellow	Square	Hot

[5] That Williamson suggested this view should not be taken to imply that he endorses it.

It is clear that the paradigms in Table 7.4 determine the right classes. Only red particulars can resemble *a* more than *b* and *c*, whatever their other properties, and no red particulars can fail to resemble *a* more than *b* and *c*, whatever their other properties. Similarly with the blue and yellow paradigms. So, here, the red, blue, and yellow paradigms have successfully neutralized the other respects in which particulars may resemble them.

But the problem with this view of paradigms is that it cannot work for all property classes—even if we let the members of those classes belong to different possible worlds. In particular, if our paradigms are as in Table 7.4, there can be no such paradigms for the classes of square particulars and hot particulars, among others. For how could the square paradigm differ from every other paradigm in only one respect? There is no way, if the square paradigm must have some colour. For suppose it is red, and so differs in colour from the blue and yellow paradigms. Then, in order to differ from them in only one respect, it must be both square and hot. But if the *square* paradigm is red, square, and hot, it is exactly similar to the *red* paradigm, from which it does not differ in *any* respect. But then, it must do the same job as the red paradigm, that is, collect *all* red particulars—including non-square ones—and *only* red particulars—excluding non-red square particulars. Similarly if the square paradigm is not red, but blue, yellow, or any other colour. And making the square paradigm lack any colour, if that is possible at all, would be equally disastrous. For then the coloured square particulars would resemble some of the coloured paradigms more closely than the square one, and so would not be collected by the square paradigm. Identical considerations apply to the hot paradigm.

In general, the problem for this view of paradigms is that it needs a constant stock of respects in which *all* the paradigms resemble and, as our example shows, this makes it impossible to have paradigms of these common respects. Yet that these common respects exist is a consequence of the requirement that every two paradigms differ in only one respect. For suppose the paradigms *a* and *b* differ only in colour. Then of course they resemble in shape and temperature. Now if *a* and *b* differ only in colour, the paradigm *c* can only differ from *b* in colour

and must therefore resemble it in shape and temperature. For suppose otherwise: *b* and *c* differ only in shape and, consequently, resemble in colour and temperature. Then *a* and *c* differ in two respects, colour and shape, for *a* differs from *b* in colour and so therefore differs from *c*, and *a* resembles *b* in shape, and so therefore differs from *c*. Thus, on this conception of paradigms, if two paradigms differ only in colour, all paradigms differ only in colour and, therefore, resemble in shape and temperature. (Note that this result is, as it should be, independent of the simplifying assumption that particulars resemble—and differ—only with respect to colour, shape, and temperature: adding any other properties will not affect the result.)

This difficulty cannot be avoided by letting the paradigms differ from each other in more than one respect. For what particulars then does the **F**-paradigm collect? Clearly, not those particulars resembling it more closely than other paradigms. For if the red and yellow paradigms differ also in shape, for example, the red one is square and the yellow one round, the red paradigm will wrongly collect non-red particulars, for blue and square particulars would resemble it more closely than they resemble the yellow paradigm. Nor can we say that the **F**-paradigm collects those particulars resembling it as closely as they resemble other paradigms. For, if the red and yellow paradigms differ in that the former is red and square while the latter is yellow and round, a yellow and square particular, whatever its other properties, would be wrongly collected by the red paradigm, which it would resemble as closely as the yellow one. Nor can the **F**-paradigm collect those particulars resembling it less closely than they resemble other paradigms: for then it would almost invariably collect some non-**F**-particulars, and fail to collect some **F**-particulars, as the reader can easily verify.

This shows that this view of paradigms is also vulnerable to the existence of companionship relations between properties. For suppose that all red particulars were, necessarily, square, all yellow particulars were, necessarily, round, and all blue particulars were, necessarily, either round or square. Then the blue paradigm, if square, would fail to collect blue and round particulars—for a blue and round particular would not resemble the blue paradigm more closely than it resembles the yellow paradigm. A similar result obtains if the blue paradigm is round.

We now see the importance of requiring paradigms to differ from each other in only one respect. That requirement entails that, if there is an **F**-paradigm, then all and only **F**-particulars resemble it more closely than other paradigms. But since, as we have seen, this makes it impossible to give *every* property a paradigm, the whole project fails. Yet this is what makes the red, blue, and yellow paradigms in Table 7.4 do their job properly.

7.4 Paradigms and counterparadigms

I see another way of developing Williamson's idea. For instead of selecting paradigms for different classes which differ in only one respect, one could select different maximal groups of particulars such that each of them differs in only one respect from each of the others. Each of these particulars determines the class of particulars that resemble it more closely than they resemble the other particulars in the group. I call each of these particulars the *paradigm* of the class it determines in this way, and the other members of the group *counterparadigms*. Thus all particulars in such groups are both paradigms and counterparadigms, relative to different classes. What allows us now to have these paradigms and counterparadigms for every property is that there is no single group of paradigms and counterparadigms containing paradigms for every property. For example, the red paradigm might be *a*, as represented in Table 7.4, while *b* and *c*, as represented in the same table, might be the *counter*paradigms to the red paradigm. We know already that the joint action of *a*, *b*, and *c* suffices to determine the class of all and only red particulars. But now there would be no problem in finding a square paradigm (and its counterparadigms). Table 7.5 shows what *d*, the square paradigm, and *e* and *f*, its counterparadigms, might look like.

There is no question that *d*, as represented in Table 7.5, and its counterparadigms collect the class of all and only square particulars. And, of course, for any **F**, this does not prevent there being an **F**-paradigm

Table 7.5

	Colour	Shape	Temperature
d	Blue	Square	Hot
e	Blue	Round	Hot
f	Blue	Triangular	Hot

with its counterparadigms. Thus, on this view, the unity of property classes is given by their paradigms and counterparadigms. It is the paradigm and its counterparadigms which hold a class together. A cluster consisting of a paradigm and its counterparadigms is thus an essential feature of the structure of property classes.

Notice, incidentally, that any **F**-particular can act as an **F**-paradigm, since, as Resemblance Nominalism admits *possibilia* along actual particulars, for every **F**-particular there is available such a group of counterparadigms. Furthermore, there is no need for the cluster of paradigms and counterparadigms to be *maximal*, since the same work can be done by the paradigm and *one* of its counterparadigms. To see this in an example, imagine that only *e*, say, is the counterparadigm to the square paradigm *d* in Table 7.5. Square particulars will still resemble *d* more closely than they resemble *e*, and non-square particulars will *not* resemble *d* more closely than they resemble *e*. Even non-square non-round particulars, for example, triangular particulars, will *not* resemble *d* more closely than they resemble *e*, for they would not share more properties with *d* than with *e*.

It might be thought that a problem for this view is that paradigms may not differ in only one respect from their counterparadigms. For, surely, it might be that, for some property **F**, necessarily no **F**-particular differs in only one respect from any non-**F**-particular. This will be the case whenever there are multiple cases of companionship between properties, that is, when a property necessarily occurs only in particulars having another property. But one cannot rule out cases of companionship a priori. Thus imagine that, necessarily, particulars are either red, yellow, blue, or green, and either hot or cold and either square or round (but they may have other properties as well), and that (*a*) necessarily, every red particular is hot and square, (*b*) necessarily, every yellow particular is hot and round, (*c*) necessarily, every blue particular is cold and round, and (*d*) necessarily, every green particular is cold and square. This is depicted in Figure 7.1, and it is easy to see that every two possible particulars that differ either in colour, temperature, or shape differ in at least two respects, namely colour and temperature or colour and shape.

But this problem is solved by letting paradigms differ in more than one respect from counterparadigms. For instance, in the example of Figure 7.1, the cold (or hot, or square, or round) paradigm must differ *exactly* in two respects from its counterparadigm. Thus if the cold paradigm is green its counterparadigm cannot be yellow (thereby differing *at least* in colour, temperature, and shape from the cold paradigm). For in that case some cold and blue particulars would not resemble the cold paradigm more closely than they resemble the counterparadigm. And of course the counterparadigm cannot be blue either, for this would make some cold and blue particulars resemble the counterparadigm more closely than they resemble the cold paradigm. So if the cold paradigm is green, its counterparadigm must be red and, moreover, it must differ from it only in two respects, that is, colour and temperature. For if the counterparadigm differed in an additional respect some cold particulars could resemble the counterparadigm more closely than they resemble the cold paradigm. Thus suppose the counterparadigm was a hot, red, square, and small particular and the paradigm was a cold, green, square, and big particular. Then a cold, blue, round, and small particular would not resemble the paradigm more closely than it resembles the counterparadigm and so it would be excluded from the class determined by the cold paradigm.

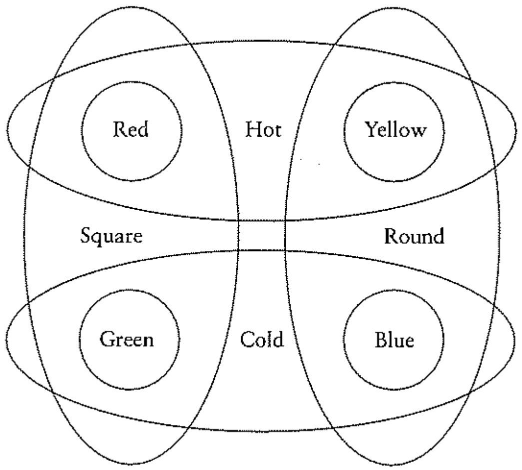

Figure 7.1

Note that the number of respects in which the paradigms and counterparadigms must differ will vary from property to property according to the different companionship relations between properties. Thus paradigms determining a property class corresponding to some colour need not differ from their counterparadigms in exactly two respects. For instance, the counterparadigm to *a*, the yellow paradigm, *could* be a green particular *b* differing from *a* only in three respects, colour, shape, and temperature. For clearly no yellow particular would fail to resemble *a* more closely than it resembles *b*, and no non-yellow particular would resemble *a* more closely than it resembles *b*.

Thus although there may not be any single number of respects in which counterparadigms must differ from paradigms, it looks as if on this version of Aristocratic Resemblance Nominalism every property class is determined by some cluster of paradigms and counterparadigms. Thus let us assume that apart from colour, shape, and temperature particulars have two other properties, size and mass, say, and that both size and mass are independent of all other properties, that is, no particular size or mass is involved in any companionship relations with other properties. So Table 7.6. exemplifies what a cold paradigm and its counterparadigm might look like.

But the present version of Aristocratic Resemblance Nominalism is not free of problems. For what makes a group of particulars a cluster of

TABLE 7.6

	Temperature	Colour	Shape	Size	Mass
a	Cold	Green	Square	Big	Heavy
b	Hot	Red	Square	Big	Heavy

paradigms and counterparadigms? What makes, for instance, the cluster of a and b in Table 7.6. a cluster of paradigms and counterparadigms? In other words, what makes them determine a property class? The answer cannot be that while both are square, big, and heavy, one of them is cold and green and the other is hot and red. For Aristocratic Resemblance Nominalism constructs respects or properties from resemblance relations to paradigms. Indeed, saying that would be like saying that what makes something **F** is that it resembles other particulars in *being F*—a way that is not open to the Resemblance Nominalist.

Thus Aristocratic Resemblance Nominalists must say what makes a and b paradigm and counterparadigm in terms of how much they resemble or fail to resemble each other. Can the Aristocratic Resemblance Nominalist say that what makes them paradigm and counterparadigm for cold particulars is that they fail to resemble to degree 2, where degrees of dissimilarity are taken as primitive? This answer is wrong, because there are pairs of particulars that are dissimilar to degree 2 but are not paradigms and counterparadigms for any class. An example of this is the cluster made up of a and c, as depicted in Table 7.7. Thus a resembles both b and c to the same degree, namely degree 3, and similarly it fails to resemble both of them to the same degree, namely degree 2. But while a and b determine a property class, the class of cold particulars, a and c do not determine any property class (a and c may be thought to determine the class of big and heavy particulars, for all and only such particulars resemble a more closely than they resemble c—but as I have already said, I am interested here only in property classes corresponding to *sparse* properties and, as we saw in Section 3.4, conjunctive properties are not sparse).

I see no way in which the Aristocratic Resemblance Nominalist can distinguish a proper cluster of paradigms and counterparadigms, like

TABLE 7.7

	Temperature	Colour	Shape	Size	Mass
a	Cold	Green	Square	Big	Heavy
c	Cold	Green	Square	Small	Light

that formed by a and b, from a spurious one, like that formed by a and c, in terms of degrees of resemblance and dissimilarity. This is a serious defect of this version of Aristocratic Resemblance Nominalism.

7.5 Why paradigms?

The three versions of Aristocratic Resemblance Nominalism examined above do not seem to work. This does not show that Aristocratic Resemblance Nominalism cannot be developed in a proper and satisfactory way. Perhaps there is a good version of Aristocratic Resemblance Nominalism waiting to be developed. But, for two different reasons, I doubt that the project of Aristocratic Resemblance Nominalism has a sound philosophical motivation.

The first reason for doubts about the motivation of Aristocratic Resemblance Nominalism has to do with the idea of paradigms. The idea that there are **F**-paradigms is the idea that some **F**s are special, in the sense that they are more **F** than other **F**s, or more typically, paradigmatically, or importantly **F** than other **F**s. This idea may make some kind of sense when **F** is understood to be a determinable property. Thus there are shades of red that are more paradigmatically red than others, and consequently particulars of that shade of red are more paradigmatically red than particulars of other shades of red. One may even say that the former are more red than the latter.

But Aristocratic Resemblance Nominalism, as I said in Section 7.1, is supposed to account, in terms of paradigms, for property classes of lowest determinate properties. Thus the **F**-paradigms are paradigms of a lowest determinate property **F**. But there is not much sense in supposing that some **F**s, when **F** is a lowest determinate property, are more **F** than other **F**s, or more typically, paradigmatically, or importantly **F** than other **F**s. For when **F** is a lowest determinate property there is no way in which an **F** can resemble something in respect of **F** more closely than it resembles any other particular in respect of **F**. For instance, among particulars of exactly the same shade of red, no one resembles any other in colour more closely than any one of those particulars resembles any other in colour.

Thus the idea of **F**-paradigms, when **F** is a lowest determinate property, does not seem to make much sense. It should not be surprising then that in the versions of Aristocratic Resemblance Nominalism examined above any **F**-particular is an **F**-paradigm when accompanied by the right particulars.

The second reason for doubts about the philosophical motivation of paradigms has to do with the reasons for postulating them. I know of only one argument for thinking that property classes must contain paradigms and, as I shall show, this argument does not work. This argument was first given by Price (1953: 19–20) and then reproduced by Armstrong (1978*a*: 46). According to this argument, to say that what makes a class the class of red particulars is that its members resemble each other, and that what makes a class the class of blue particulars is that its members resemble each other, is not enough to distinguish those classes, and so not enough to distinguish red from blue particulars, since we are using the same formula in each case. What then differentiates *being red* from *being blue* (or, for that matter, from *being round* or *being hot*)? Is it the difference between the *respect* in which red particulars resemble one another and that in which blue particulars resemble one another? But what are those respects? No Nominalist can say, of course, that red particulars resemble in respect of *redness*, while blue particulars resemble in respect of *blueness*: that would be to revert to Universalism. It is to avoid this that paradigms are introduced: red particulars resemble *these* particulars, blue particulars resemble *those* particulars. According to this argument, one posits paradigms to differentiate red from blue particulars without invoking universals.

But this argument is a *non sequitur*. For Egalitarian Resemblance Nominalists say that what makes red particulars red is that they resemble each other. Of course, they say the same thing about blue particulars. Does this stop them differentiating red from blue particulars? Not at all: red particulars are *these* particulars, blue particulars are *those* particulars; in other words, red particulars are the ones forming class **R**, while blue particulars are the ones forming class **B**. Since they need no paradigms to say this, Egalitarian Resemblance Nominalists need not invoke them to explain how red and blue particulars differ.

But now suppose the Egalitarian Resemblance Nominalist is asked what the class **R** is. Saying that it is the class of red particulars is not an informative answer. One can of course say that it is the class whose members are $x_1, \ldots, x_n$, but only if one knows *all* the red particulars, which we do not. So perhaps we should select certain particulars, say *a*, *b*, and *c* as depicted in Table 7.1, and say that **R** is the maximal class of resembling particulars of which *a*, *b*, and *c* are members. What then are *a*, *b*, and *c*, if not paradigms of the class of red particulars?

We can call *a*, *b*, and *c* paradigms if we like, but they are not paradigms in the relevant sense, since their only role here is to fix the reference of the singular term '**R**'. Because we cannot fix the reference of '**R**' by enumerating all the members of **R**, we fix it by means of the definite description 'The maximal class of resembling particulars containing *a*, *b*, and *c*'. This is all that calling *a*, *b*, and *c paradigms* of **R** here means. But this does not require these particulars to determine the class **R** by *how other particulars resemble them*. For being *the maximal class of resembling particulars containing a, b, and c as members* is not the same as being *the maximal class whose members resemble a, b, and c at least as closely as these particulars resemble one another*. Thus using 'The maximal class of resembling particulars containing *a*, *b*, and *c*' to fix the reference of '**R**' does not make *a*, *b*, and *c* paradigms in Price's sense. Price's argument does not therefore provide adequate support for the aristocratic thesis that property classes must contain paradigms.

Thus since (*a*) the versions of Aristocratic Resemblance Nominalism examined in the previous sections do not seem to work and I cannot think of any other plausible ones, (*b*) the idea of paradigms does not make sense for lowest determinate properties, and (*c*) no good reason for postulating paradigms has been advanced, I think Aristocratic Resemblance Nominalism is not worthy of philosophical development. From now on, therefore, I shall take it that being **F** is a matter of resembling *all* **F**-particulars, *not a specific group of them*. But this, as we shall see in the next chapter, is not the end of the story about what makes **F**-particulars **F**.

Goodman's Difficulties 8

8.1 Goodman's difficulties

In Resemblance Nominalism resemblance is anterior to properties, since particulars have properties in virtue of their resemblances to other particulars. That is, a particular *a* has property **F** in virtue of resembling certain particulars, that is, all the **F**-particulars, and has property **G** in virtue of resembling other particulars, that is, all the **G**-particulars. In general, what makes **F**-particulars have the property **F** is that they resemble each other, what makes **G**-particulars have the property **G** is that they resemble each other, and so on.

This theory faces two serious difficulties. If resembling each other is what makes **F**-particulars have the property **F**, this cannot be because they have that property. But if so, why does not every group of particulars that resemble each other have a common property? Imagine, for example, that particulars have only colour, shape, and temperature, and that *a* is red, round, and hot, *b* is red, square, and cold, and *c* is blue, square, and hot, as shown in Table 8.1.

Table 8.1

	Red	Blue	Round	Square	Hot	Cold
a	1	0	1	0	1	0
b	1	0	0	1	0	1
c	0	1	0	1	1	0

In Table 8.1 *a*, *b*, and *c* resemble each other, but resembling each other does not make them have any property. For what property can *a*, *b*, and *c* have in virtue of resembling each other? Not the property of *being red*, since *c* is not red. Nor the property of *being blue*, since *a* and *b* are not blue. Similarly resembling each other cannot make them have the property of *being round* (*b* and *c* lack it), or *being square* (*a* lacks it), or *being hot* (*b* lacks it), or *being cold* (*a* and *c* lack it).

But if resembling each other does not make *a*, *b*, and *c* have any property, why does resembling each other make the red particulars have the property of *being red*? How do the resemblances between red particulars differ from the resemblances between *a*, *b*, and *c* depicted in Table 8.1? This, basically, is the so-called *imperfect community difficulty*, discovered by Goodman in his examination of Carnap's *Aufbau* (Goodman 1966: 162–4). Resemblance Nominalism needs to answer the imperfect community difficulty, and the answer cannot be that in one case, but not in the other, the particulars share a property, since Resemblance Nominalism explains common properties in terms of resemblances.

The second difficulty shows it to be false that what makes a particular have the property **F** is merely that it resembles all the **F**-particulars. For consider the case in which all the **F**-particulars are also **G**-particulars, but not vice versa. Here we have every **G**-particular resembling all **F**-particulars, yet not all of them are **F**-particulars, so that merely resembling all the **F**-particulars cannot be what makes a particular have the property **F**. But if resembling all the **F**-particulars is not what makes a particular **F**, how can **F**-particulars be **F** in virtue of their resemblances to other **F**-particulars? This is the so-called *companionship difficulty*, highlighted by Goodman (1966: 160–2) but anticipated by Carnap in the *Aufbau* (1967: 112). I call the imperfect community and companionship difficulties *Goodman's difficulties*.

Resemblance Nominalists thus face a double challenge. They say that what makes **F**-particulars have the property **F** is that they resemble each other, and so what makes a particular have the property **F** is that it resembles all the **F**-particulars. But, the objection goes, this cannot be so, for two reasons: (1) some groups of particulars, like those shown in Table 8.1, resemble each other and yet share no one property, and (2) some particulars resemble all particulars having a certain property without having that property, as when all **F**-particulars are **G**-particulars but not vice versa.

Goodman's difficulties present formidable problems, as yet unsolved and even rarely addressed. To solve these difficulties the Resemblance Nominalist, as we shall see, has to add to the explanation I have so far given of what makes particulars have a property. But the nature of these difficulties can be better appreciated if we ask what the resemblance conditions are for what I, in Section 4.2, called a *property class*. A property class is the class of all and only particulars having one specific property. Thus α is a property class if and only if:

(*a*) there is a property shared by the members of α; and
(*b*) there is a property such that all particulars having it are members of α.

Thus, the property class of **F** is the class of *all* and *only* **F**-particulars, and the property class of **G** is the class of all and only the **G**-particulars—including, of course, particulars in other possible worlds. Notice that since property classes contain particulars of any possible worlds, and I rejected necessarily coextensive properties in Section 5.3, when (*a*) and (*b*) are satisfied, there is only one property which satisfies them both.

Thus property classes are the classes with which Resemblance Nominalists identify properties, *if* they do identify them with any classes. But, of course, for Resemblance Nominalists property classes are classes of resembling particulars. So whether or not Resemblance Nominalists identify properties with classes, they must be able to say what the resemblance conditions are for property classes. For since they say that particulars have their properties in virtue of their resemblances, and anything belongs to a property class if and only if it has the property in question, the Resemblance Nominalists must say, in terms of resemblances, what are the necessary and sufficient conditions for being a member of a property class.

What then are the necessary and sufficient resemblance conditions of property classes? Saying that what makes particulars have a property **F** is that they resemble all the **F**-particulars suggests that property classes are *maximal* classes of resembling particulars. These are, basically, the resemblance conditions proposed by Carnap for his *similarity circles* (Carnap 1967: 113). If so, then, a property class α must satisfy the following two resemblance conditions:

(*A*) every two of α's members resemble each other; and
(*B*) nothing outside α resembles every one of its members.

In general, then, α is a property class if and only if the following obtains, where 'Rxy' stands for '*x* resembles *y*':

$$(x)(y)(x \in \alpha \;\&\; y \in \alpha \supset Rxy) \;\&\; (z)(z \notin \alpha \supset (\exists w)(w \in \alpha \;\&\; {\sim}Rzw))$$

The first conjunct formulates (*A*) and the second formulates (*B*). But every theory committed to the thesis that (*A*) and (*B*) give the resemblance conditions for (*a*) and (*b*) is wrong, as the imperfect community and companionship difficulties show.

Note that neither (*a*) and (*b*) nor (*A*) and (*B*) entail each other respectively. That (*a*) and (*A*) do not entail (*b*) and (*B*) is clear, since (*b*) and (*B*) are the respective maximality conditions on (*a*) and (*A*). Otherwise no proper subclasses of classes satisfying (*b*) or (*B*) would satisfy (*a*) or (*A*), which is plainly false. Nor do (*b*) and (*B*) entail (*a*) and (*A*). For a class containing *all* the **F**-particulars need not be a class *all* of whose members are **F**-particulars. A simple example: the class of all red and all green particulars is a class having as members all the red particulars, but not a class all of whose members are red. Similarly (*B*) does not entail (*A*): because some red particulars and some green particulars do not resemble at all, the fact that nothing resembles every red particular *and* every green particular does not make the class of red and green particulars a class satisfying (*A*).

But what about the entailments between the conjunctions (*a*)&(*b*) and (*A*)&(*B*), which is what matters when one is interested in knowing whether (*A*) and (*B*) give the necessary and sufficient resemblance conditions for (*a*) and (*b*)? It is here that Goodman's difficulties enter into the scene. Let us first concentrate on the imperfect community difficulty.

8.2 The imperfect community difficulty

What the imperfect community difficulty shows is that (*A*)&(*B*) is not a sufficient condition for (*a*)&(*b*). Figure 8.1 divides (non-empty) classes into communities and non-communities, and divides the former into perfect and imperfect communities. Tables 8.2, 8.3, and 8.4 represent a perfect, an imperfect, and a non-community respectively.[1]

Clearly property classes must be perfect communities. Neither imperfect communities nor non-communities can be property classes,

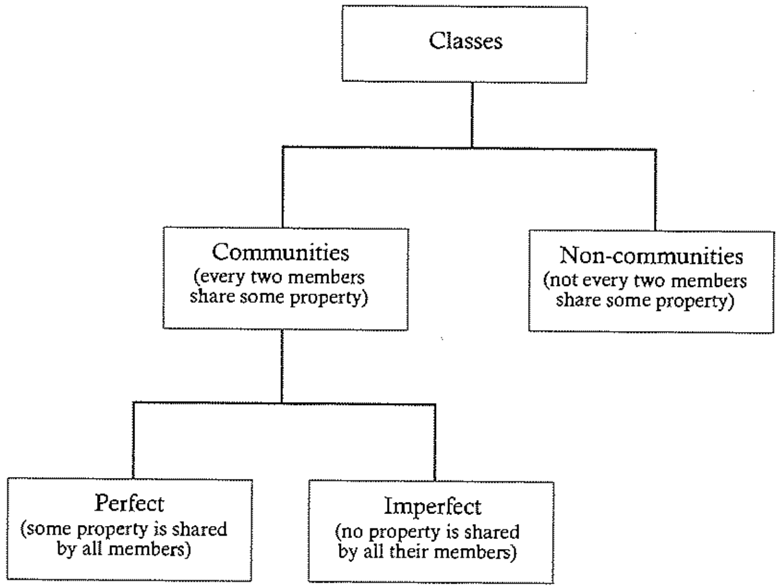

Figure 8.1

Table 8.2. Perfect community

	F	G	H
a	1	1	1
b	1	0	1
c	1	1	0

[1] I borrow the expression 'perfect community' from the title of Alan Hausman's (1979) paper, but the expression appears *only* in the title and so it is not clear what he meant by it. The labels 'community' and 'non-community' have not, I believe, been used in this way before.

Table 8.3. Imperfect community

	F	G	H
d	0	1	1
e	1	0	1
f	1	1	0

Table 8.4. Non-community

	F	G	H
g	0	1	0
h	1	0	1
i	1	1	0

since there is no property shared by all their members. Now the imperfect community $\{d,e,f\}$ in Table 8.3 does satisfy (*A*). Thus assuming that $\{d,e,f\}$ also satisfies (*B*), it refutes the thesis that (*A*)&(*B*) is sufficient for (*a*)&(*b*). For $\{d,e,f\}$ is not a property class, for even if it satisfies (*b*), it does not satisfy (*a*), since there is no property shared by all its members.

Now, obviously, since $\{d,e,f\}$ is an imperfect community, it satisfies (*A*) but not (*a*). But for imperfect communities to show the insufficiency of (*A*)&(*B*) for (*a*)&(*b*) they must satisfy (*B*) as well as (*A*), which is why I assumed that $\{d,e,f\}$ does so. But was that assumption legitimate? Can I guarantee that there are imperfect communities which satisfy (*B*) as well as (*A*)? I think that whenever there is an imperfect community, which *ipso facto* satisfies (*A*), there is one satisfying (*B*) as well. For suppose $\{d,e,f\}$ does not satisfy (*B*). Then there are particulars, apart from *d*, *e*, and *f*, which resemble each of *d*, *e*, and *f*. These particulars have at least two of the properties **F**, **G**, and **H**. Now form the class α of *all* the particulars having at least two of **F**, **G**, and **H**. α satisfies (*A*), for every two members of it resemble each other and, *ex hypothesi*, since it is the class of *all* the particulars having at least two of **F**, **G**, and **H**, it also satisfies (*B*). But, since $\{d,e,f\}$ is a proper subclass of α, and there is no property shared by the members of $\{d,e,f\}$, there is no property shared by the members of α, which must therefore be an imperfect community. The crucial fact is that no class with *no* property shared by its members can be a proper subclass of a class with *some* property shared by its members. This is what ensures that whenever there is an imperfect community there is such a community which satisfies (*B*) as well as (*A*). Thus the assumption that (*B*) obtains for the class of *d*, *e*, and *f* in Table 8.3 should be considered unproblematic.

Is there any way, apart from being an imperfect community, for a class α to satisfy (*A*)&(*B*) without satisfying (*a*)&(*b*)? The only way seems to be for α not to satisfy (*b*); for if it does not satisfy (*a*), given that *ex hypothesi* it *does* satisfy (*A*), then α is an imperfect community. But if α does not satisfy (*b*) there must be something outside it that shares a property with all its members but does not resemble all its members. But this, of course, is impossible. Thus, if α satisfies (*A*)&(*B*) but not (*a*)&(*b*) then α is an imperfect community.

What the existence of imperfect communities makes clear is that the resemblance of its members is not sufficient to make a class one whose members all share some property. The difficulty shows that we cannot capture condition (*a*) by (*A*), because all (*A*) ensures is that the classes thus specified are communities, not necessarily the *perfect* communities we need. In other words, resemblance seems to single out communities, which are classes every two of whose members resemble each other, but not *perfect* communities, which require all their members to share a property. The problem posed by the imperfect community difficulty is then how to provide resemblance conditions for perfect communities, that is, how to use resemblance to distinguish perfect from imperfect communities. (And it should not be doubted that *there are* imperfect communities, as the example of Table 8.1 should make clear—even if, of course, particulars have also properties other than colour, shape, and temperature.)

Three final points about the imperfect community difficulty. First, the imperfect community difficulty is only a problem for sparse properties, for any particulars share always some abundant property. In particular, that disjunctive properties are not sparse, as we saw in Section 3.4., is a precondition of the difficulty. For if given any two properties then we also have to consider a third had by anything having either of

the two, every community turns into a *perfect* community. Secondly, admitting *possibilia* does not solve the difficulty, since a group of particulars need not belong to the same possible world to form an imperfect community. Thirdly, the imperfect community difficulty has to do with giving resemblance conditions for classes satisfying condition (*a*), not with giving resemblance conditions for the maximality condition (*b*). Indeed, the imperfect community difficulty can be treated and solved, as it will be in the next chapter, independently of any considerations about maximality. And once perfect communities are thus singled out, I need only add some maximality condition to get a *sufficient* condition for property classes. For, surely, a maximal perfect community, that is, a perfect community that is a proper subclass of no other perfect community, is a property class. Adding this maximality condition will not, however, be the end of the task, for, as the companionship difficulty will then teach us, it will not constitute a *necessary* condition for property classes.

8.3 The companionship difficulty

As I have said, the companionship difficulty shows that the conjunction (*A*)&(*B*) is not a necessary condition for the conjunction (*a*)&(*b*). It does this by exhibiting property classes that do not satisfy (*A*)&(*B*). Now, given that particulars resemble each other if and only if they share some property, every class satisfying (*a*) and therefore every class satisfying (*a*)&(*b*), that is, every property class, must satisfy (*A*). For although (*A*) does not entail (*a*), (*a*) does entail (*A*): there cannot be a property common to certain particulars if not every two of them resemble each other. Thus (*A*) is a necessary condition of (*a*)&(*b*). So if (*A*)&(*B*) is not a necessary condition of (*a*)&(*b*) this must be because (*B*) is not such a necessary condition.

And this is precisely what the companionship difficulty shows: that certain property classes, namely those of *accompanied* properties, do *not* satisfy (*B*). What are these accompanied properties? I shall say that a property **F** is a *companion of a property* ***G***, or *accompanies a property* ***G***, if and only if every **G**-particular is also an **F**-particular. Thus if **F** is a companion of **G**, the extension of **G** is included in the extension of **F**.[2] Accompanied properties are, of course, those that have companions or, what is the same, those whose extension is included in the extensions of other properties. Moreover, since the classes I am considering have *possibilia* among their members, the extension of a property **F** consists of all actual and possible **F**-particulars. Thus companion properties are companions *necessarily*: if **F** is a companion of **G** then *necessarily* every **G**-particular is also an **F**-particular. That is, **F** is a *companion of a property* **G** if and only if the extension of **G** across all possible worlds is included in the extension of **F** across all possible worlds. This should make clear immediately that letting our resembling particulars belong to different possible worlds, something for which I argued in Section 5.3, does nothing to solve or attenuate the companionship difficulty.

Consider Table 8.5 and classes α, β, and γ, shown below it. There are three different properties in Table 8.5: **F**, **G**, and **H**, and **F** is a companion of **G**. There are, accordingly, three different property classes:

α, the property class of **F**-particulars;
β, the property class of **G**-particulars; and
γ, the property class of **H**-particulars.

TABLE 8.5

	F	**G**	**H**
a	1	1	1
b	1	1	0
c	1	0	1
d	0	0	1

α = {*a*,*b*,*c*}   β = {*a*,*b*}   γ = {*a*,*c*,*d*}

[2] Notice that this definition of companion properties does not coincide with Carnap's use (1967: 112), who would make, in exactly an opposite way to mine, **F** a companion of **G** if and only if every **F**-particular is also a **G**-particular. On the other hand, Goodman does not refer in any specific way to the properties that are instances of cases of companionship. This may have to do with the fact that, as I shall make clear in Section 8.4, Carnap and Goodman were not completely clear about the nature of the companionship difficulty, since, as we shall see, there are hints that they did not clearly distinguish the *companionship* and the *coextension* difficulties. Finally, John Bacon (1995: 15, 135 n. 20) uses 'companion' in my way, but erroneously says it is the way Carnap used the word.

However, only two of these, α and γ, satisfy (*A*) and (*B*). β satisfies (*A*), but it does *not* satisfy (*B*), since there are particulars outside β, namely *c*, that resemble every particular inside it. Thus classes like β constitute a counterexample to the claim that (*A*)&(*B*) gives a necessary resemblance condition for property classes. So if Resemblance Nominalism cannot find a way to rule out accompanied properties, or cannot give resemblance conditions for their property classes, then it is false, since then resembling the **G**-particulars will not be what makes a particular have the property **G**.

The companionship difficulty is a problem because there may be property classes that are subclasses of other property classes. And since particulars sharing properties resemble each other, property classes that are subclasses of other property classes cannot satisfy the maximality condition (*B*). But one cannot do without *any* maximality clause in our resemblance conditions, since *every* (non-empty) subclass of a property class is a perfect community, that is, satisfies (*A*), while not every subclass of a property class is a property class. The problem posed by the companionship difficulty is then that of providing a maximality condition in terms of resemblances that will be satisfied even by property classes that are subclasses of other property classes. If Resemblance Nominalism cannot do this then it is wrong, for accompanied properties are at least a conceptual possibility.

In the previous section we saw that if a class α satisfies (*A*)&(*B*) but not (*a*)&(*b*) α is an imperfect community. We may ask now whether there is another way, apart from being a class of an accompanied property, for a property class not to satisfy (*A*)&(*B*). I shall now show that the only other way for a property class not to satisfy (*A*)&(*B*) is for it to be a subclass of an imperfect community.

Let us now see why if a property class does not satisfy (*A*)&(*B*) and is not a class of an accompanied property, then it is a subclass of an imperfect community. We have already seen that if α is a property class then α satisfies (*A*). The question is, then, whether without being a class of an accompanied property, a property class α can fail to satisfy (*B*). Suppose α is the property class of **G**s. If α does not satisfy (*B*) then there is some particular *a* outside α that resembles all of α's members. Since *a* resembles every member of α, *a* must share a property with every member of α. The property that *a* shares with the members of α cannot be **G**, since *a* does not belong to α, which is the property class of **G**s. There are two possibilities: either (i) *a* shares a certain property **F** with every member of α or (ii) it shares different properties with different members. If (i) **F** is a companion of **G** and, consequently, α is a class of an accompanied property. If (ii) then $\alpha \cup \{a\}$, that is, the class that results from adding *a* to α, is an imperfect community, since there is no property shared by its members: **G** is not had by *a* and each property shared by *a* and some other member of the class is not had by some other member of the class and so those properties are not shared by the members of the class. Thus the only way for a property class not to satisfy *(A)*&*(B)*, apart from being a class of an accompanied property, is for it to be a subclass of an imperfect community.

So solving the companionship difficulty does not amount, strictly speaking, to giving the necessary resemblance conditions for being a property class. But since, apart from exemplifying a case of companionship, the only other way for a property class not to satisfy *(A)*&*(B)* is for it to be a subclass of an imperfect community, the imperfect community difficulty and the companionship difficulty are the only two problems that affect *(A)*&*(B)* as a resemblance condition for property classes. This does not mean, however, that these are the only problems that I shall face and have to solve, for my solution to the companionship difficulty will present an additional problem, which I call the *mere intersections difficulty*, to be taken up in Chapter 11. But, although I shall still be looking for necessary resemblance conditions for property classes, at that stage I shall be far from something like *(A)*&*(B)*.

Because of the imperfect community and companionship difficulties Goodman (1972: 441–3) thought that resemblance does not suffice to define properties.[3] It is not my intention to quibble over the import of the word 'define' here, but by solving Goodman's difficulties in the following chapters I shall show that resemblance does suffice to define or specify property classes and thereby to account for what makes a particular have a property. But before doing so I shall in the next section consider the differences between the companionship and coextension difficulties.

[3] Strictly speaking Goodman's claim was about qualities, not properties, but the difference does not matter here.

8.4 The companionship and coextension difficulties

I said that **F** is a *companion of* **G** if and only if the extension of **G** across all possible worlds is included in the extension of **F** across all possible worlds. This definition of course leaves open the possibility of mutual companions, that is, properties whose extensions across all possible worlds coincide. Mutual companion properties are necessarily coextensive properties of which, as we saw in Section 5.3, the Resemblance Nominalist says there are none. But other authors, who do not allow *possibilia* and restrict the companionship relation to cases in which the *actual* extension of one property is included in the other, seem to have difficulties in distinguishing the problem posed by companion properties so defined and that posed by coextensive properties. The failure to distinguish between these problems is no doubt connected with the fact that coextensive properties (if any) exemplify cases of companionship. But the problems posed by the companionship and coextension difficulties are different.

The problem posed by coextensive properties is that if **F** and **G** are coextensive then resembling the **G**-particulars cannot be what makes a particular have the property **G**, for it should then also be what makes it have the property **F**, which thus prevents a satisfactory answer to the Many over One. For, surely, what makes something have the property **G** cannot be what makes it have the property **F**. Thus the philosophical challenge posed by coextensive properties is to account for what makes a particular have a property preserving the idea that what makes particulars have different properties cannot be the same.

But if **F** is a companion of, but *not* coextensive with, **G**, the problem is not that resembling the **G**-particulars cannot be what makes something have the property **G** because it would also make something have the property **F**. The problem is rather that resembling the **G**-particulars cannot be what makes something have the property **G** because there are particulars that resemble all the **G**-particulars without having the property **G**. The companionship difficulty is how to account for what makes a particular have a property while preserving somehow the idea that what makes a particular have a property **G** is that it resembles all the **G**-particulars.

The difference between the two problems is also clearly seen in relation to property classes. The companionship difficulty is the problem of giving a maximality condition in terms of resemblances that is satisfied by property classes which are subclasses of other property classes; while if **F** and **G** are coextensive (and have no other companions), there is no such maximality problem, since everything resembling every **G**-particular is also a **G**-particular.

That the problems are different may also be seen in the fact that there are theories, like Class Nominalism, for which only coextensive properties pose a difficulty. For, of course, if **F** is a companion of, but not coextensive with, **G**, the classes of **F**-particulars and **G**-particulars are different classes, membership of which the Class Nominalist takes to be a primitive, unexplainable fact. The reason that companion but not coextensive properties *do* pose a problem for Resemblance Nominalists is that they do *not* take membership of the class of **G**-particulars as a primitive fact, but try to explain it in terms of resemblances.

The fact that the companionship and coextension difficulties pose quite different problems for Resemblance Nominalism has not, however, always been realized. Nicholas Wolterstorff (1976: 101), for instance, invites us to consider the *companionship* difficulty by supposing that 'everything green is sticky and everything sticky is green', but, clearly, what this supposition introduces is the *coextension* difficulty. Donald Brownstein (1973: 8) sticks to Wolterstorff's erroneous characterization of the companionship difficulty and Keith Campbell (1981: 484, 1990: 33) commits the same mistake.

Carnap (1967: 112) also seems unaware of the difference, for he illustrates the difficulty with a case in which a certain colour, *r*, happens to occur only in things in which a different colour *b* occurs, and he adds that then 'the class for *r* would have to be included in (be part *or equal to*) the class of *b*' (emphasis added), which shows that Carnap had in mind all cases of companionship, including coextension. And

although admittedly Carnap then exemplifies companionship with properties that happen not to be coextensive, he gives no sign that he distinguishes the problems which companion and coextensive properties pose.

Finally, Goodman does not distinguish the companionship and coextension difficulties. Thus he refers to the connection between properties exemplifying cases of companionship as one of *co*-occurrence (1966: 162; emphasis added). And in some passages—like the one where he compares the companionship difficulty with the problem posed by the Principle of Identity of Indiscernibles (Goodman 1966: 213)—he clearly assimilates them, thereby failing to appreciate why these two sorts of properties present different problems to the Resemblance Nominalist.

As far as I know the only philosopher who has explicitly distinguished the companionship and coextension difficulties is Rolf Eberle (1975: 60–1), but he is very concise and his text contains nothing like our explanation of the different problems they pose. But we have now seen that, despite this marked tendency in the literature to confound them, the companionship and coextension difficulties pose quite different problems, which call for distinct solutions.

The Imperfect Community Difficulty 9

9.1 Goodman's and others' solutions

Lewis (1969) proposes a solution to the imperfect community difficulty within the system of Carnap's *Aufbau*, and uses the Carnapian similarity relation holding *between* Carnap's *quality classes* (Carnap 1967: 182), which correspond, roughly, to what I here call 'property classes'. But the problem with this solution is that it only ensures that *almost* all and only perfect communities will be counted as such. Thus, if we follow his method, Lewis (1969: 16) says, 'we will get rid of *few* genuine quality classes and *most* spurious ones' (emphasis added). This, given the standards Lewis, upon reflection of the nature of Carnap's *Aufbau* (Lewis 1969: 13–14), sets himself, may be enough, but it certainly does not suffice for my Resemblance Nominalist. For what makes the **F**-particulars have the property **F** must be a condition satisfied by *no* group of particulars with no property in common.

But in his 'New Work for a Theory of Universals' Lewis suggests a different solution to the imperfect community difficulty. This solution proceeds by making resemblance a variably polyadic relation: it applies between any number of particulars sharing some property (Lewis 1997: 193).[1] A perfect community would here be defined as a

[1] Lewis does not mention the imperfect community difficulty in that passage, but it is obvious that it is one of the things he has in mind and so he said to me. He also makes

class all of whose members bear to each other a variably polyadic resemblance relation; a definition which, I think, no imperfect community can satisfy.

But making resemblance *variably polyadic* to obtain the desired result is not really necessary, as Alan Hausman's (1979: 199–206) considerations show. For the resemblance relation can be given a fixed number n of places, provided n satisfies certain conditions. In particular, one could follow Hausman and make n one less than the number of particulars in the domain. This however depends on an argument which I do not find convincing, and making n the number of particulars in the domain would in fact do equally well. The resemblance predicate would then be explained as applying to $x_1, \ldots, x_n$ if and only if $x_1, \ldots, x_n$ share some property.[2] Again, on Hausman's approach, a perfect community is defined as a class all of whose members bear to each other the resemblance relation in question, a definition which no imperfect community can satisfy. But while Hausman's and Lewis's approaches both succeed in distinguishing perfect from imperfect communities, we saw in Section 4.6 that resemblance does not link more than two particulars. This is what makes Lewis's and Hausman's solutions to the imperfect community difficulty imperfect.

Eberle, on the other hand, tries to construct property classes and thereby solve the imperfect community difficulty by means of the triadic relation 'x exactly resembles y but not z' which is true of particulars x, y, and z just in case there is some property **F** such that both x and y have **F** but z does not (Eberle 1975: 69).[3] But note that, so interpreted, a particular x can resemble y but not z and resemble z but not y. Perhaps this is why Eberle says that his relation can be put more explicitly as follows: 'in a certain respect, x exactly resembles y but not

resemblance a contrastive relation. But I think he added this feature to avoid the companionship difficulty, which I shall discuss in the next chapter.

[2] Note that one can indeed use such a predicate to express the resemblance, if any, among less than n particulars. Thus suppose that $n = 5$ and of these five, three particulars, a, b, and c, share some property. Then since the resemblance predicate—call it 'H', for Hausman—must be reflexive, this fact is expressed, for instance, by '$Habccc$'. This example is adapted from Hausman (1979: 200).

[3] I have changed the terminology of Eberle, who speaks of quality classes, qualities, and individuals, rather than property classes, properties, and particulars. But this change does not affect the essentials of what he says.

z' (Eberle 1975: 69). But what are these respects if not the properties the Resemblance Nominalist proposes to account for in terms of resemblances? Thus Eberle's solution cannot be adopted by the Resemblance Nominalist.

Wolterstorff (1976: 98–9) proposes to solve the imperfect community difficulty by admitting qualitative aspects of particulars as well as particulars as terms of resemblance relations. But for Resemblance Nominalists Wolterstorff's solution amounts to abandoning their game. Indeed Wolterstorff's solution looks like an odd and unnecessary mixture of Resemblance Nominalism and Trope Theory.

Note that the imperfect community difficulty arises not only for Resemblance Nominalism, but also for the opposite project of accounting for particulars in terms of properties. Indeed Goodman faced the difficulty when he was trying to account for concrete particulars in terms of relations between property-like abstract entities he called *qualia*. He provided a *mereological* solution to the difficulty, that is, a solution using the calculus of individuals instead of the calculus of classes. His solution used a dyadic relation of resemblance and he pointed out that a similar solution could be given to the imperfect community difficulty as it arises for Resemblance Nominalism:[4]

> Now application of the general method of the preceding section will involve broadening our primitive relation so that not only [particulars] but also certain sums of [particulars] are included among our basic units. Let us, therefore, drop the calculus of classes in favor of the calculus of individuals. A [property] for this system, then, will not be a class, but a whole—the sum of all the individuals that, in ordinary language, have the [property] in common. The term '[property] stretch' may be used for any sum of one or more [particulars] all of which have a [property] in common . . . Let us now take as our new primitive the similarity relation L that obtains between every two discrete parts of a [property] whole. A [property] stretch may now be defined as any individual of which every two discrete parts form an L-pair. A [property] whole is then any [property] stretch that is a proper part of no other. This method of definition meets the difficulty of imperfect community here as well . . . (Goodman 1966: 211–12)[5]

If Goodman's definition of property wholes meets the imperfect community difficulty, it is because of its definition of property stretches, which, following our terminology, might be called *mereological* perfect communities. Goodman would say, then, that the sum $a+b+c$, in Table 9.1, is not a *property stretch* because, although $L(a,b)$, $L(a,c)$, and $L(b,c)$, it is not the case that $L(a,b+c)$.

Goodman (1966: 214) realized that his mereological solution to the imperfect community difficulty as it arises when one tries to account for particulars in terms of properties or property-like entities could be paralleled in the calculus of classes. But then his mereological solution to the imperfect community difficulty as it arises for Resemblance Nominalism can also be paralleled in the calculus of classes. This *classial* analogue of Goodman's solution would introduce a relation L* obtaining between every two disjoint subclasses of a property class (compare Goodman 1966: 214). Thus a perfect community is now a class, every two disjoint subclasses of which form an L*-pair. On this solution we should say that $\{a,b,c\}$, in Table 9.1, is not a perfect community because although $L^*(\{a\},\{b\})$, $L^*(\{a\},\{c\})$, and $L^*(\{b\},\{c\})$, it is not the case that $L^*(\{a\},\{b,c\})$.

TABLE 9.1

	F	G	H
a	0	1	1
b	1	0	1
c	1	1	0

[4] Goodman did not use the phrase 'Resemblance Nominalism'. He referred variously to theories like Resemblance Nominalism, where one accounts for (or 'constructs') properties in terms of concrete particulars, as 'particularistic systems', and called those theories (like his own) where one accounts for (or 'constructs') particulars in terms of properties or abstract entities in general, 'realistic systems' (Goodman 1966: 142). The general problems faced by particularistic and realistic systems are, respectively, the so-called 'problem of abstraction' and 'problem of concretion'. As part of these problems those systems must solve versions of the imperfect community difficulty.

[5] Since Goodman was thinking of phenomenalist systems like Carnap's, that is, those with *erlebs* as basic elements, he speaks of qualities rather than properties. I have adapted Goodman's passage to my terminology by replacing occurrences of 'quality' by bracketed occurrences of 'property' and occurrences of 'erlebs' by bracketed occurrences of 'particulars'.

Is any of these solutions satisfactory? Goodman's mereological solution is correct in the sense that it singles out all and only property stretches (mereological perfect communities). For take any property stretch PS. PS is then part of some property whole PW (which may be identical to PS), every two discrete parts of which form an L-pair. But every two discrete parts of PS are discrete parts of PW and so every two discrete parts of PS form an L-pair. So if an individual is a property stretch, every two of its discrete parts form an L-pair. Suppose, now, that every two discrete parts of some individual *z* form an L-pair. Then there is some property whole PW (which may be identical to *z*) such that every two discrete parts of *z* are discrete parts of PW. But if so, *z* is a part of PW, and therefore *z* is a property stretch, since every part of a property whole is a property stretch. Thus an individual is a property stretch (mereological perfect community) if and only if every two of its discrete parts form an L-pair.

But Goodman's solution will not satisfy the Resemblance Nominalist. Goodman calls L a *similarity* relation: but what does it mean to say that *a* is similar to *b*+*c*? Goodman never says. But he needs to. For if L is a relation of similarity or resemblance then presumably any two entities bearing L to each other must share some property. But since Goodman requires that some particulars stand in L to some *sums* of such particulars, sums must be given some properties to share with such particulars, and Goodman gives no indication of what those properties might be.

Yet it is clear what those properties of sums must be: the properties shared by the particulars which are their parts. Thus if *a*, *b*, and *c* have **F** and so are parts of the **F**-whole, *a*+*b* must have **F** too in order for it to resemble *c*, that is, to bear L to *c*. But this assumes that every relevant predicate of the form '*x* is **F**' is, to follow Goodman's terminology, *collective*, which is not true. A predicate is collective, according to Goodman, if it is satisfied by any sum of entities that satisfy it severally, that is, if '*a* is **F**', '*b* is **F**', and '*c* is **F**' are true then '*a*+*b*+*c* is **F**' is true (Goodman 1966: 54). But suppose **F** is a certain *size*, *mass*, or *shape*. Whatever it might mean to assign a *shape* to a sum, it is surely false that if *a* and *b* are triangular then so is *a*+*b*. And similarly for *size*, *mass*, and many other so-called 'extensive' properties. Goodman's solution is

therefore not a satisfactory solution to the imperfect community difficulty. (Compare the discussion of Mereological Nominalism in Armstrong 1978*a*: 35.)

9.2 The classial analogue of Goodman's solution

The classial analogue of Goodman's solution also gives an extensionally correct definition of perfect communities. L* is here explained as obtaining between every two disjoint subclasses of a property class, and a perfect community is defined as a class, every two disjoint subclasses of which form an L*-pair. This too singles out all and only perfect communities. For suppose α is a perfect community. Then α is a subclass of some property class β (which may be identical to α). Then every two disjoint subclasses of β form an L*-pair. But every two disjoint subclasses of α are disjoint subclasses of β and so every two disjoint subclasses of α form an L*-pair. So if α is a perfect community, every two of its disjoint subclasses form an L*-pair. Suppose, now, that every two disjoint subclasses of some class α form an L*-pair. Then there is some property class β (which may be identical to α) such that every two disjoint subclasses of α are disjoint subclasses of β. α is then a subclass of β, and so α is a perfect community, since every subclass of a property class is a perfect community. Thus a class is a perfect community if and only if every two of its disjoint subclasses form an L*-pair.[6]

This solution, unlike Goodman's mereological one, does not require classes to have the properties shared by their members, which is just as well: for while sums and their parts belong to the same logical type, that is, are *individuals*, this is not true of classes and particulars. The classial solution does not require classes to have their members'

[6] Since this solution is the classial analogue to Goodman's *mereological* solution and there is no null element in the calculus of individuals, I must decide whether by 'disjoint subclasses' I understand 'disjoint *non-empty* subclasses'. This gives us two possible ways of defining perfect communities: as (non-empty) classes every two disjoint *non-empty* subclasses of which form an L*-pair, or simply as (non-empty) classes every two disjoint subclasses of which form an L*-pair. But, as neither solution is better than the other, I shall ignore the ambiguity for present purposes.

properties because it says that a perfect community is a class, every two disjoint subclasses of which form an L*-pair, so that L* relates no class to any particular.

But this solution, as it stands, is still unsatisfactory, since it does not make clear in what sense L* is a similarity or resemblance relation. I shall now proceed to develop my own solution to the imperfect community difficulty, and in Section 9.8 I shall consider again the classial analogue of Goodman's solution and see whether it can make sense of L* as a resemblance relation.

9.3 Resembling pairs

In this section I want to draw attention to the simple idea that motivates what follows. Consider two groups of three particulars each: a, b, and c, which are all red, and d, e, and f, which are all green, as shown in Table 9.2; and consider also some pairs of them, and pairs of pairs of them, as shown below Table 9.2.

There is a sense in which the pairs 1 and 2 resemble each other but do not resemble pair 3. For both 1 and 2 are pairs of red particulars, while this is not true of 3. Similarly, pairs 4 and 5 resemble each other but they do not resemble pair 6, since 4 and 5 are pairs of pairs of red particulars, which is not true of 6. It is clear that similar resemblance relations can hold, or fail to hold, between pairs of pairs, pairs of pairs of pairs, and so on.

Specifically these resemblance relations hold between some but not all pairs in the hierarchy of *hereditary* pairs consisting of pairs of particulars (*first-order* pairs), pairs of pairs of particulars (*second-order* pairs), pairs of pairs of pairs of particulars (*third-order* pairs), and so on.

TABLE 9.2

	a	b	c	d	e	f
Red	1	1	1	0	0	0
Green	0	0	0	1	1	1

$1 = \{a,b\}$ $2 = \{a,c\}$ $3 = \{d,e\}$
$4 = \{\{a,b\}, \{b,c\}\}$ $5 = \{\{a,b\}, \{a,c\}\}$ $6 = \{\{a,b,\}, \{d,e\}\}$

As we shall see in Section 9.6, the Resemblance Nominalist takes these resemblances between nth-order pairs, for any and every n, as primitive and ultimate. And it is on the basis of these resemblances between nth-order pairs that the Resemblance Nominalist explains what makes particulars have the properties they do have, and thereby solves the imperfect community difficulty. Indeed, to solve the imperfect community difficulty I shall show that a class α is a perfect community if and only if all its members resemble each other, all pairs of members of α resemble each other, all pairs of pairs of members of α resemble each other, and so on; while if α is an imperfect community then, although all its members resemble each other, some pairs of members of α (or some pairs of pairs of members of α, or some pairs of pairs of pairs of members of α, etc.) do not resemble each other. Thus α is a perfect community if and only if, for every n, every two nth-order pairs formed from the members of α resemble each other. But before showing why this solution is correct I shall introduce, in the next section, some new concepts.

9.4 Pairs and their properties

Even if the resemblance between nth-order pairs is a primitive relation, I should say between which pairs it holds, so as to fix the extension of the relation. Similarly in Section 4.3 I said, without circularity, that the resemblance relation holds between any particulars sharing some sparse property. Can I then say that the relevant resemblance relation between pairs holds between any two of them sharing some property? But which properties? For example, do not pairs 1 and 3 share the property of *being a first-order pair*?

In Section 4.3 I did not face this problem, for there I knew which properties of particulars were involved, namely sparse or natural properties. But I can characterize, by means of a function $f(x)$, whose value is a class of properties of x when x is either a particular or a hereditary pair, the properties of hereditary pairs whose sharing is required by the resemblance relation the Resemblance Nominalist needs (whether or not the properties of pairs are sparse or abundant does not matter).

Thus if x is a particular then the value of $f(x)$ is the class of (sparse) properties of x. If x is a first-order hereditary pair, that is, a pair of particulars, the value of $f(x)$ depends on the values of $f(y)$ and $f(z)$ if y and z are the members of x. Similarly for higher-order pairs. In general the properties $f(x)$ assigns to pairs are a function of the properties it assigns to their members. As introduced in Figure 9.1 the capital $\boldsymbol{X}$'s (where $n \geq 0$ and $i \geq 1$) range over properties, and the lower case 'x', 'y', and 'z' over particulars and their hereditary pairs.

Since '$\boldsymbol{X}_1^{\mathbf{0}}$', . . . , '$\boldsymbol{X}_i^{\mathbf{0}}$' range over sparse properties of particulars, lowest determinate colours, shapes, temperatures, and so on are among their values. So when representing an arbitrary property of particulars, I shall now replace '**F**', '**G**', '**H**' etc. by '$\mathbf{F^0}$', '$\mathbf{G^0}$', '$\mathbf{H^0}$' etc. From now on when I speak about properties of a hereditary pair x I shall always be referring to the members of $f(x)$. In general, when I speak of a property of an entity x I shall be referring to a member of $f(x)$. Thus, as the only properties of particulars I am interested in are their sparse properties, the only properties of hereditary pairs I am interested in are those specified by $f(x)$. Just for the sake of illustration consider some of the values of $f(x)$ for Table 9.3, which are shown below it.

Now x and y share some property if and only if $f(x) \cap f(y) \neq \varnothing$, and the properties shared by x and y are those in $f(x) \cap f(y)$. x and y thus resemble each other if and only if $f(x) \cap f(y) \neq \varnothing$. Thus $f(x)$ captures the sense in which pairs 1 and 2 above resemble each other but they do not resemble pair 3 (see Sect. 9.3). For both 1 and 2 have the property of *being a pair of particulars with the property of being red*, which property is lacked by pair 3. Similarly, pairs 4 and 5 resemble each other but they do not resemble pair 6, since 4 and 5 have the property of *being a pair of pairs of particulars with the property of being red*, which property is lacked

$$f(x) = \begin{cases} \{\boldsymbol{X}_1^{\mathbf{0}}, \ldots, \boldsymbol{X}_i^{\mathbf{0}}\}, \text{ if and only if } x \text{ is a } \textit{particular} \text{ and the members of} \\ \{\boldsymbol{X}_1^{\mathbf{0}}, \ldots, \boldsymbol{X}_i^{\mathbf{0}}\} \text{ are all and only the sparse properties of } x. \\ \{\boldsymbol{X}_1^{n+1}, \ldots, \boldsymbol{X}_i^{n+1}\}, \text{ if and only if } x = \{y,z\} \text{ and } f(y) \cap f(z) = \{\boldsymbol{X}_1^{n}, \\ \ldots, \boldsymbol{X}_i^{n}\}. \\ \varnothing \text{ otherwise.} \end{cases}$$

Figure 9.1 Function $f(x)$

TABLE 9.3

	$\mathbf{F^0}$	$\mathbf{G^0}$	$\mathbf{H^0}$	$\mathbf{I^0}$
a	0	0	1	1
b	1	1	0	0
c	1	0	0	1
d	1	0	1	0

$f(a) = \{\mathbf{H^0},\mathbf{I^0}\}$ $f(b) = \{\mathbf{F^0},\mathbf{G^0}\}$ $f(c) = \{\mathbf{F^0},\mathbf{I^0}\}$ $f(d) = \{\mathbf{F^0},\mathbf{H^0}\}$
$f(\{a,b\}) = \varnothing$ $f(\{b,c\}) = \{\mathbf{F^1}\}$ $f(\{b,d\}) = \{\mathbf{F^1}\}$ $f(\{c,d\}) = \{\mathbf{F^1}\}$
$f(\{\{b,c\},\{c,d\}\}) = \{\mathbf{F^2}\}$ $f(\{\{c,d\},\{d,a\}\}) = \varnothing$ $f(\{\{\{b,c\},\{c,d\}\},\{\{b,c\},\{b,d\}\}\}) = \{\mathbf{F^3}\}$

by pair 6. $f(x)$ makes the properties of pairs depend on the properties of their members: a pair x has a property if and only if its members share the corresponding lower-order property. Let us single out this result in the following way, which will be useful in Section 9.5:

(1) If certain properties are shared by certain entities then the properties shared by their pairs are the corresponding higher-order properties. Thus if $\mathbf{F}^n$ is shared by x, y, and z, $\mathbf{F}^{n+1}$ is shared by $\{x,y\}$, $\{x,z\}$, and $\{y,z\}$.

$f(x)$ not only makes the properties of a pair depend on those of its members; it also makes them depend on those of what I call its *bases*, that is, the particulars bearing the ancestral of membership to them, also known as *ur-elements*. For example, the bases of $\{a,b\}$ are the particulars a and b, and the bases of $\{\{a,b\},\{a,c\}\}$ are the particulars a, b, and c. (Notice that if x and y are pairs then the class of bases of $\{x,y\}$ is identical to the union of the class of bases of x and the class of bases of y.)

It is clear how the function makes the properties of a pair depend on those of its bases. For if an nth-order pair has a property $\mathbf{F}^n$ then its members, entities of order n–1, share the property $\mathbf{F}^{n-1}$, and if its members are pairs then *their* members, entities of order n–2, share the property $\mathbf{F}^{n-2}$, and so on, until one arrives at entities of order n–n sharing the property $\mathbf{F}^{n-n}$, that is, particulars sharing the property $\mathbf{F^0}$. This result will be important in the next section. So let us call it (2) and formulate it as follows:

(2) If an nth-order pair has a property $\mathbf{F}^n$ then its bases share the property $\mathbf{F^0}$.

9.5 Perfect communities entail communities, imperfect communities entail non-communities

From now on, 'α^0' represents an arbitrary finite class of *particulars*, 'α^1' the class of first-order pairs whose bases are members of α^0, 'α^2' the class of second-order pairs whose bases are members of α^0, and so on. In general, then, 'α^n', when $n > 0$, represents the class of nth-order pairs whose bases are members of a given α^0 (similarly for 'β^0', 'γ^0', etc.). The requirement that these classes be finite will be discussed in Section 9.7.

Now, since pairs have properties which they either share or not, they form classes having the same structure as classes of particulars. Consider, for example, Tables 9.4, 9.5, 9.6, and 9.7. Tables 9.6 and 9.7 show the properties of the first-order pairs corresponding to Tables 9.4 and 9.5 respectively. Table 9.4 represents a perfect community, and Table 9.5 an imperfect community. But there is a further difference between them, made apparent by Tables 9.6 and 9.7: the first-order pairs corresponding to the perfect community form a *community*, while the first-order pairs corresponding to the imperfect community form a *non*-community.

Table 9.4

	$\mathbf{F}^0$	$\mathbf{G}^0$	$\mathbf{H}^0$
a	1	1	1
b	1	0	1
c	1	1	0

Table 9.5

	$\mathbf{F}^0$	$\mathbf{G}^0$	$\mathbf{H}^0$
d	0	1	1
e	1	0	1
f	1	1	0

Table 9.6

	$\mathbf{F}^1$	$\mathbf{G}^1$	$\mathbf{H}^1$
$\{a,b\}$	1	0	1
$\{a,c\}$	1	1	0
$\{b,c\}$	1	0	0

Table 9.7

	$\mathbf{F}^1$	$\mathbf{G}^1$	$\mathbf{H}^1$
$\{d,e\}$	0	0	1
$\{d,f\}$	0	1	0
$\{e,f\}$	1	0	0

This, however, is not always the case. For there are some imperfect communities such that their first-order pairs do form a community. Consider the imperfect community represented in Table 9.8. The first-order pairs of the class represented in Table 9.8 share at least one of the properties $\mathbf{F}^1$, $\mathbf{G}^1$, $\mathbf{H}^1$, $\mathbf{I}^1$, and $\mathbf{J}^1$ and so they form a community. But some of the second-order pairs of the class of Table 9.8, like the pairs $\{\{a,b\},\{c,d\}\}$ and $\{\{b,c\},\{d,e\}\}$ do not share any property at all and so the second-order pairs of the class of Table 9.8 form a non-community.

Again, there are imperfect communities such that their second-order pairs do form a community, like the class represented in Table 9.9. But even if the second-order pairs of this class do form a community, its third-order pairs form a non-community, as some of those third-order

Table 9.8

	$\mathbf{F}^0$	$\mathbf{G}^0$	$\mathbf{H}^0$	$\mathbf{I}^0$	$\mathbf{J}^0$
a	0	1	1	1	1
b	1	0	1	1	1
c	1	1	0	1	1
d	1	1	1	0	1
e	1	1	1	1	0

TABLE 9.9

	F^0	G^0	H^0	I^0	J^0	K^0	L^0	M^0	N^0
a	0	1	1	1	1	1	1	1	1
b	1	0	1	1	1	1	1	1	1
c	1	1	0	1	1	1	1	1	1
d	1	1	1	0	1	1	1	1	1
e	1	1	1	1	0	1	1	1	1
f	1	1	1	1	1	0	1	1	1
g	1	1	1	1	1	1	0	1	1
h	1	1	1	1	1	1	1	0	1
i	1	1	1	1	1	1	1	1	0

pairs share no property at all, like the pairs $\{\{\{a,b\},\{c,d\}\},\{\{e,f\},\{g,h\}\}\}$ and $\{\{\{b,c\},\{d,e\}\},\{\{f,g\},\{h,i\}\}\}$.

But what is important is that the first-order pairs of the perfect community of Table 9.4 *must* form a community, and that some class of *n*th-order pairs corresponding to the imperfect communities of Tables 9.5, 9.8, and 9.9 *must* form a non-community. This is because if α^0 is a perfect community then, for every n, α^n is a community, while if α^0 is an imperfect community then there is some n such that α^n is a non-community. This general fact is very important, since it allows us to solve the imperfect community difficulty. So let us be clear about it.

First, if α^0 is a perfect community then, for every n, α^n is a community. This can be easily proved since (1), of Section 9.4, conjoined with the assumption that the members of a class α^0 form a perfect community allows us to reach by a sort of induction that, for every n, α^n is a community. For if α^0 is a perfect community then there is some property $\mathbf{F}^0$ shared by its members. But if so, it follows from (1) that every pair of them will have $\mathbf{F}^1$. Thus α^1 is a perfect community. And since $\mathbf{F}^1$ is shared by the members of α^1, it follows again from (1), that every pair of them will have $\mathbf{F}^2$, that is, α^2 is a perfect community, and so on. Thus if α^0 is a perfect community then, for every n, α^n is a perfect community, and therefore a community.

Now let us see that if α^0 is an imperfect community then there is some n such that α^n is a non-community. For given a class α^0 there are some pairs x and y of some order n such that their bases jointly exhaust the members of α^0. Suppose α^0 is an imperfect community. If so, x and y share no property at all. For suppose they shared some property $\mathbf{F}^n$: it follows from (1) that $\{x,y\}$ has $\mathbf{F}^{n+1}$. But then it follows from (2), of Section 9.4, that $\mathbf{F}^0$ is common to the bases of $\{x,y\}$. But the bases of $\{x,y\}$ are the members of the union of the class of bases of x and the class of bases of y, that is, the bases of $\{x,y\}$ are the members of α^0. But then $\mathbf{F}^0$ is common to the members of α^0, which contradicts our initial supposition that α^0 is an imperfect community. Thus, x and y share no property at all. But since x and y are nth-order pairs whose bases belong to α^0, they belong to α^n, and since they share no property at all, α^n is a non-community.

This explains why, for the imperfect communities of Tables 9.5, 9.8, and 9.9, there is some class α^n that is a non-community. That the class in question is the class of *first*-order pairs for the imperfect community of Table 9.5, the class of *second*-order pairs for the imperfect community of Table 9.8, and the class of *third*-order pairs for the imperfect community of Table 9.9 has to do, of course, with the different cardinality of those imperfect communities. It is an interesting question what the numerical relation is between the number of members of an imperfect community α^0 and the value of n such that α^n is a non-community. The answer is that for every imperfect community α^0 the *least n* such that α^n is a non-community is the n such that $2^n < m \leq 2^{n+1}$, where m is the number of members of the smallest imperfect community which is a (proper or improper) subclass of α^0. This I shall discuss and prove in the Appendix for, although interesting, answering that question is not fundamental given our purposes, since what matters to solve the imperfect community difficulty is the basic fact that if α^0 is an imperfect community then there is some n such that α^n is a non-community.

9.6 Perfect communities

We know that the following, 'Carnapian', definition of perfect communities, where 'Rxy' stands for 'x resembles y', does not work, as it does not exclude imperfect communities:

α^0 is a perfect community $=_{\text{def.}} (x)(y)(x \in \alpha \ \& \ y \in \alpha \supset Rxy)$

But I have shown that perfect communities are those communities such that, for every n, the class of their nth-order pairs is a community. I did this by assigning properties to pairs by means of the function $f(x)$. I now introduce a resemblance relation R^* in the following way:

R^*xy if and only if $f(x) \cap f(y) \neq \varnothing$.

Thus R^* obtains between any two particulars or hereditary pairs if and only if they share some property. And R^* of course has the formal features of a resemblance relation, that is, it is reflexive (i.e. every particular or hereditary pair x resembles itself provided x resembles some entity), symmetrical, and non-transitive.

I can now give a definition of perfect communities, which is not subject to the imperfect community difficulty, in terms of the resemblance relation R^* (where $n \geq 0$):

(D_{PC}) α^0 is a perfect community $=_{\text{def.}} (n)(x)(y)(x \in \alpha^n \ \& \ y \in \alpha^n \supset R^*xy)$

In words, what (D_{PC}) says is that a class α^0 is a perfect community if and only if, for every $n \geq 0$, R^* obtains between every two members of α^n, that is, if and only if every two members of α^n share some property. (D_{PC}) is extensionally correct: all and only perfect communities satisfy its definiens. For, as we saw before, if α^0 is a perfect community then for all n, α^n is a community, that is, there is some property shared by all its members and therefore every two members of it resemble each other. And if α^0 is not a perfect community then there is some n such that α^n is a non-community, that is, there are at least two members of it sharing no property at all and thereby not resembling each other.

(D_{PC}) defines perfect communities *of particulars* and so it might be asked how shall I avoid imperfect communities of ordered n-tuples. If I cannot avoid them, I shall have solved the imperfect community difficulty in the case of properties but not in the case of relations. But it should be clear that by letting 'α^0', 'β^0', etc. stand for any class of particulars or of *ordered* n-tuples and making $f(x) = \{X_1^0, \ldots, X_i^0\}$ if and

only if x is a particular *or an ordered n-tuple* and the members of $\{X_1^0, \ldots, X_i^0\}$ are all and only the properties of x, (D_{PC}) would then also rule out imperfect communities of ordered n-tuples and so we have a solution to the imperfect community difficulty both for properties and relations. Having said this, and since whatever I say in the following sections and chapters about properties can be adapted to apply to relations as well, I shall from now on, for simplicity and ease of exposition, ignore relations and classes of ordered n-tuples.

Thus we now know what distinguishes perfect from imperfect communities. And so the Resemblance Nominalist says that what makes α^0 a class all of whose members share some property is that those members resemble each other, and the pairs of the members resemble each other, and the pairs of the pairs of the members resemble each other, and so on. Thus what makes **F**-particulars have the property **F** is not merely that they resemble each other, but also that their pairs resemble each other, and the pairs of their pairs resemble each other, and so on.

It is important to emphasize that the Resemblance Nominalist takes the resemblance relation R^* as primitive. In particular, the Resemblance Nominalist cannot say, for instance, that pairs of red particulars resemble each other in virtue of having the property of *being pairs of particulars with the property of being red*. For obviously a pair has such a property in virtue of its members being red or having the property of *being red*. But in virtue of what does a particular have such a property? Precisely because of the imperfect community difficulty the Resemblance Nominalist cannot say that particulars have the property of *being red* merely in virtue of resembling each other. For if resembling certain particulars makes some particulars have some properties, why does resembling the members of an imperfect community make particulars have no property at all?

But Resemblance Nominalists do not deny that a pair of red particulars has the property of *being a pair of particulars with the property of being red* in virtue of its members having the property of *being red*. What they deny is that pairs of red particulars resemble each other in virtue of sharing the property of *being a pair of particulars with the property of being red*. Instead the Resemblance Nominalists say that resemblance between pairs, as well as between particulars, is primitive and anterior to properties, and that in general what makes $\mathbf{F^0}$-particulars have the property $\mathbf{F^0}$ is that they resemble each other, that their pairs resemble each other, that the pairs of their pairs resemble each other, and so on.

I have then provided a satisfactory solution to the imperfect community difficulty, and I have thereby removed one of the great obstacles faced by Resemblance Nominalism.

9.7 Infinite imperfect communities

Since I stipulated that α^0 represents a finite class of particulars, (D_{PC}) defines only *finite* perfect communities. Should I not also define *infinite* perfect communities? Yes, I should. But then why did I stipulate in Section 9.5 that α^0 represents a finite class of particulars? The reason is that in Section 9.5 I showed that if α^0 is an imperfect community then there is some n such that α^n is a non-community, by showing that the hereditary pairs whose bases jointly exhaust the members of α^0 share no property. But if x and y are same-order hereditary pairs whose bases jointly exhaust the members of an infinite α^0, x and y must have infinitely many bases and so there are infinite descending $\in$-chains running from x and y to their respective bases. But infinite descending $\in$-chains are ruled out by the axiom of foundation, namely the axiom that all sets are well-founded, where well-founded sets are those which have *finite* descending $\in$-chains (Aczel 1988, p. xvii).[7]

But notice that if every infinite imperfect community has some finite imperfect community as a subclass then one can waive the requirement that α^0 be finite in (D_{PC}). For then one can show that if α^0 is an imperfect community then there is some n such that α^n is a non-community without violating the axiom of foundation. For take any *finite* imperfect community β^0 which is a subclass of an infinite imperfect community α^0. For the reasons given in Section 9.5, the class β^n having as members some nth-order pairs whose bases jointly

[7] On the points of this first paragraph I owe much to correspondence with Penelope Maddy and David McCarty. It is a most interesting question, though one I cannot discuss here, how and to what extent one could frame my solution to the imperfect community difficulty in a 'non-well-founded' set theory.

exhaust the members of β^0 is a non-community. But since β^0 is *finite* there are only *finite* descending $\in$-chains running from the members of β^n to the members of β^0. But since every nth-order pair whose bases are members of β^0 is also an nth-order pair whose bases are members of α^0, β^n is a subclass of α^n, and so α^n is a non-community, and from α^n to α^0 run only finite descending $\in$-chains. Thus one can show that if α^0 is an imperfect community then there is some n such that α^n is a non-community without violating the axiom of foundation.

And of course *all* perfect communities, finite and infinite, satisfy (D_{PC}) if α^0 can be infinite. So *if* every infinite imperfect community has some finite imperfect community as a subclass, one can drop the requirement that α^0 be finite and let (D_{PC}) be satisfied by all and only perfect communities, both finite and infinite. Is it true then that every infinite imperfect community has some finite imperfect community as a subclass?

Let us call those imperfect communities (finite or infinite), all of whose finite subclasses are perfect communities, *minimal* imperfect communities (the imperfect communities represented in Tables 9.5, 9.8, and 9.9 above, for example, are minimal). Then the question is: are there infinite *minimal* imperfect communities? If not, then I can allow α^0 to be infinite in (D_{PC}) and thereby provide a comprehensive definition of perfect communities.

I have an argument that there are no infinite minimal imperfect communities, which depends on the assumption that particulars have only finitely many *sparse* properties. This is a very plausible assumption, for more than one reason. First, because of the connection between sparse properties and science, namely that sparse properties are those that basic science tries to make an inventory of. Science also tries to discover the basic laws of nature, which are general facts about particulars having different sparse properties. But if particulars could have infinitely many sparse properties then science would be a project in principle impossible to complete.

Secondly, sparse properties are those the sharing of which 'makes for qualitative similarity' (Lewis 1986: 60) and so, if particulars could have infinitely many sparse properties, two particulars, x and y, without sharing all their properties, could resemble each other as much as x and z, sharing all their properties, would resemble each other. Thus suppose x, y, and z have each infinitely many sparse properties, x and z share all their sparse properties, and all sparse properties of y are properties of x but not vice versa. It is clear that x and y resemble each other to a lesser degree than x and z resemble each other but since x and y share the same number of properties, infinitely many, which x and z share, x and y resemble each other to the same degree that x and z do! The way to escape this paradoxical result is, I think, to reject the idea that particulars can have infinitely many sparse properties.

Once it has been admitted that particulars can have only finitely many sparse properties it is easy to show that there are no infinite minimal imperfect communities. For the members of an infinite minimal imperfect community would be particulars having infinitely many sparse properties, which are those for which I am interested in solving the imperfect community difficulty (indeed, as I said in Section 8.2, the imperfect community difficulty is only a problem for sparse properties). Proof: Suppose α^0 is an infinite *minimal* imperfect community and one of its members, a, has *finitely* many sparse properties. Suppose a has n such properties. Each of these n properties is such that at least one member of α^0 must lack it, otherwise α^0 would be a perfect community. Now consider the class β^0 satisfying the following conditions: (1) a is a member of β^0, and (2) for each sparse property $\mathbf{F}^0$ of a, one and only one member of α^0 lacking $\mathbf{F}^0$ belongs to β^0. β^0 is finite (it has $n+1$ members) and it is an imperfect community, but it is also a subclass of α^0, against our hypothesis that α^0 is an infinite *minimal* imperfect community. Thus, if α^0 is an infinite *minimal* imperfect community, each of its members must have infinitely many sparse properties.

But I have already argued that particulars have only a finite number of sparse properties. So there are no infinite minimal imperfect communities. I can then allow α^0 to be infinite in (D_{PC}), thereby providing a comprehensive definition of perfect communities.

9.8 The classial analogue of Goodman's solution reconsidered

Notice that one cannot object to (D_{PC}) as I objected to Goodman's mereological solution to the imperfect community difficulty in Section 9.1, namely that it gives pairs the properties of particulars. For if $n \neq m$, then $X_i^n \neq X_i^m$ and R* never obtains between a particular and a pair or between two pairs of different orders.

In Section 9.2 I said that the classial analogue of Goodman's solution does not make clear in what sense its relation L* is a similarity or resemblance relation. But might not that solution adopt our procedure of giving classes properties as functions of the properties of their members and then introduce L* on that basis, thereby making clear why it is a resemblance relation? The assignment of properties to classes would be made by function $g(x)$, represented in Figure 9.2.

The idea here is that a class of particulars α^0 has a property if and only if those particulars share a certain property. The resemblance relation L* would then be explained as obtaining between every two particulars or classes (of particulars) x and y if and only if they share some property, that is, if and only if $g(x) \cap g(y) \neq \varnothing$.[8] Then perfect communities could be defined as follows:

(D_{PC1}) α^0 is a perfect community $=_{\text{def.}} (x)(y)(x \in \alpha^0 \;\&\; y \in \alpha^0 \supset L^*xy \;\&\; (\beta^0)(\gamma^0)(\beta^0 \subseteq \alpha^0 \;\&\; \gamma^0 \subseteq \alpha^0 \;\&\; \beta^0 \cap \gamma^0 = \varnothing \supset L^*\beta^0\gamma^0)\,)$

$$g(x) = \begin{cases} \{\boldsymbol{X}_1^{\mathbf{0}}, \ldots, \boldsymbol{X}_i^{\mathbf{0}}\}, \text{ if and only if } x \text{ is a } \textit{particular} \text{ and the members of} \\ \{\boldsymbol{X}_1^{\mathbf{0}}, \ldots, \boldsymbol{X}_i^{\mathbf{0}}\} \text{ are all and only the sparse properties of } x. \\ \{\boldsymbol{X}_1^{\mathbf{1}}, \ldots, \boldsymbol{X}_i^{\mathbf{1}}\}, \text{ if and only if } x = \{y_1, \ldots, y_m\}, \text{ where } y_1, \ldots, y_m \text{ are} \\ \text{particulars and } m \geq 1, \text{ and } g(y_1) \cap \ldots \cap g(y_m) = \{\boldsymbol{X}_1^{\mathbf{0}}, \ldots, \boldsymbol{X}_i^{\mathbf{0}}\}. \\ \varnothing \text{ otherwise.} \end{cases}$$

Figure 9.2 Function $g(x)$

[8] Goodman would have required the relation to obtain only between classes, not also between particulars. But my definition of L* here simplifies the whole section, makes it akin to my definition of R* in Section 9.6, and does not affect my main point.

That is, α^0 is a perfect community if and only if all its members and all its non-empty disjoint subclasses stand in the resemblance relation L*, that is, if and only if every two of its members and every two of its non-empty disjoint subclasses share some property. (Note that in the definiens of (D_{PC1}) β^0 and γ^0 are bound to be non-empty, since I stipulated that 'β^0' and 'γ^0' stand for classes of particulars.) It should be obvious that (D_{PC1}) singles out all and only perfect communities.

But the problem with (D_{PC1}) is that it is based, via L*, on $g(x)$, of which the Resemblance Nominalist cannot make sense. For $g(x)$ assigns a property $\mathbf{F}^1$ to a class of particulars if and only if those particulars share $\mathbf{F}^0$. Similarly, $f(x)$ assigns $\mathbf{F}^n$ to an nth-order pair if and only if its members share $\mathbf{F}^{n-1}$. Thus, although Resemblance Nominalists, as we saw in Section 9.6, take resemblances between pairs (of any and every order n) as primitive, they can make sense of this assignment by saying that a nth-order pair has a property $\mathbf{F}^n$ if and only if its members resemble each other. But Resemblance Nominalists cannot make sense of $g(x)$'s assignment of properties to classes of particulars in this way, since a class α^0 of particulars cannot be said to have a property $\mathbf{F}^1$ if and only if those particulars resemble each other. For if α^0 is an imperfect community, its members resemble each other but share no property. The only way for the Resemblance Nominalists to make sense in terms of resemblances of $g(x)$'s assignment of properties to classes of particulars would be to appeal to a collective notion of resemblance which, as we saw in Section 4.6, will not do. Thus the Resemblance Nominalists should adopt (D_{PC}) which, based on $f(x)$, assigns a property $\mathbf{F}^n$ to an nth-order pair in a way acceptable to them.

The Companionship Difficulty 10

10.1 Perfect communities and the companionship difficulty

In Section 9.6 I provided a Resemblance Nominalist definition of perfect communities, which is not sufficient, however, for a definition of property classes, since every subclass of a perfect community is a perfect community while not every subclass of a property class is a property class. This is why a maximality condition is introduced: to distinguish those perfect communities that are property classes from their subclasses. But the problem posed by the companionship difficulty is that there are some property classes that *are* subclasses of other property classes and so a definition of property classes as maximal perfect communities does not work. To see this in an example consider Table 10.1, where $\mathbf{F}^0$ is a companion of $\mathbf{G}^0$, and the classes α^0 and β^0, represented below Table 10.1. In this table β^0 is the property class of $\mathbf{G}^0$ and also a perfect community, since for every n β^n is a community. But β^0 is not a *maximal* perfect community, since it is a proper subclass of α^0, which is a perfect community too.

In this chapter I shall solve the companionship difficulty by providing resemblance conditions which all property classes, even those of accompanied properties, do satisfy. Carnap was aware of the companionship difficulty, but he attempted no solution to it. Carnap says that

TABLE 10.1

	F^0	G^0
a	1	1
b	1	1
c	1	1
d	1	0

$\alpha^0 = \{a,b,c,d\}$ $\beta^0 = \{a,b,c\}$

a case of companionship is an unfavourable circumstance under which his method of construction does not work, and so he must assume that such cases do not obtain (Carnap 1967: 113). Goodman, who criticizes Carnap's assumption that cases of companionship do not occur (1966: 162), also proposes no solution and suggests that the companionship difficulty cannot be solved in particularistic systems (1966: 213), that is, in theories like Resemblance Nominalism which try to account for properties in terms of relations between concrete particulars. But, as we shall now see, I need not assume that there are no cases of companionship, for the companionship difficulty can be solved.[1]

Wolterstorff (1976: 98–9) claims to solve the companionship difficulty. But, besides confusing it with the coextension difficulty, as I noted in Section 8.4, his solution only works by admitting not only particulars, but qualitative aspects of particulars as terms of his resemblance relations; and this, as I said in Section 9.1, amounts to abandoning Resemblance Nominalism.

[1] Gilles Gaston Granger (1983: 22–3, 29–30), Joëlle Proust (1989: 192–3), Thomas Mormann (1994: 102), and Alan Richardson (1998: 61–4) endorse an interpretation of Carnap's project according to which he need not solve Goodman's difficulties. They base their interpretation on the fact that Goodman's difficulties presuppose an external point of view from which to check whether the construction of Carnapian similarity circles correctly represents an objective distribution of properties over particulars, a point of view of a sort which Carnap's *quasi*-analytic constructional method does not allow. Quasi-analysis, Richardson (1998: 64) says, 'is not constrained by antecedent or independent matters of fact about the qualities of the objects related by the similarity relations'. It seems to me that this sort of project does need the external point of view from which to check the extensional correctness of the theory. But anyway, whether or not Carnap's quasi-analysis allows that external point of view on which Goodman's difficulties arise, we have already seen that the imperfect community difficulty can be solved, as we shall now see that the companionship difficulty can be.

Eberle (1975: 69–70) proposes a solution to the companionship difficulty which uses a three-place contrastive resemblance relation, '*x* exactly resembles *y* but not *z*' or 'in a certain respect, *x* exactly resembles *y* but not *z*'. Similarly I take Lewis's (1997: 193) proposal to use a variably polyadic contrastive resemblance relation as intended to solve the companionship difficulty. But I have already argued, in Section 4.6, that the resemblance relation used by the Resemblance Nominalist links at most two entities, and I have also criticized, in Section 9.1, Eberle's resemblance relation on other grounds.

None of these debatable devices is necessary; for, as we shall see, the resemblance relation R*, used to define perfect communities, suffices to solve the companionship difficulty. This is where our notion of a *degree of resemblance*, on which two particulars resemble to degree *n* if and only if they share *n* properties, plays an important role. The key to solving the companionship difficulty involves extending that notion to apply both to particulars and *n*th-order pairs, for every *n*. Thus, where '*x*' and '*y*' range over particulars *and* their *n*th-order hereditary pairs, *x* and *y* stand in R* to degree *n* if and only if *x* and *y* share *n* properties. I shall also say, when this condition is satisfied, that *x* and *y* resemble to degree *n*. Then to solve the companionship difficulty I shall propose the following *necessary* condition for any property class α^0, namely that there is a lowest degree of resemblance *d* to which any two members of any α^n resemble each other, and α^0 is a proper subclass of no class β^0 such that *d* is the lowest degree to which any members of any β^n resemble each other.

10.2 Degrees of resemblance and (Max)-classes

To use degrees of resemblance in solving the companionship difficulty I must first clarify certain features of perfect communities. We already know that if α^0 is a perfect community then, for every *n*, α^n is a perfect community. That is, if some property is shared by the members of a class α^0 then some property is shared by the members of α^n, for every *n*. I reached this conclusion by way of induction upon the previous result (1), introduced in Section 9.4:

(1) If certain properties are shared by certain entities then the properties shared by their pairs are the corresponding higher-order properties.

It follows from (1) that if d properties (where 'd' ranges over positive integers) are shared by certain entities then their pairs have the corresponding d higher-order properties. Thus, by induction, we get:

(3) If d properties are shared by the members of α^0 then, for every n, d properties are shared by the members of α^n.

I conclude from this that if d properties are shared by the members of a class α^0 then every two members of α^n, for every n, resemble to a degree *not lower* than d.

That members of any α^n may resemble to a degree higher than d should be obvious. For even if only d properties are shared by all the members of α^0 some (perhaps every) pair of its members may share more than d properties, so that for some n some (perhaps every) pair of members of α^n may also share more than d properties and therefore resemble to a degree higher than d. Consider, for example, class α^0 in Table 10.2. Only *one* property is shared by the members of α^0, namely $\mathbf{F}^0$. But no members of α^1 resemble to a degree lower than 2. And clearly, for *every* n, there are members of α^n that resemble to degrees higher than 1 (since for every n there are, for instance, nth-order pairs whose bases are a, b, and c, which share three properties).

Now consider our previous result (2), introduced in Section 9.4:

(2) If an nth-order pair has a property $\mathbf{F}^n$ then its bases share the property $\mathbf{F}^0$.

TABLE 10.2

	$\mathbf{F}^0$	$\mathbf{G}^0$	$\mathbf{H}^0$	$\mathbf{I}^0$	$\mathbf{J}^0$	$\mathbf{K}^0$
a	1	0	1	1	1	1
b	1	1	0	1	1	1
c	1	1	1	0	1	1
d	1	1	1	1	0	1
e	1	1	1	1	1	0

$\alpha^0 = \{a,b,c,d,e\}$

(2) also shows that if an nth-order pair has d properties then its bases share the corresponding zero-order d properties. But then, given (3), if the members of α^0 share d properties then, for some n, some two nth-order pairs share d properties, namely pairs whose bases exhaust the members of α^0. And so since for every n no two members of any α^n resemble each other to a degree lower than d, d is such that some members of some α^n resemble each other to degree d and no members of any α^n resemble each other to a degree lower than d. That is, d is the lowest degree to which any two members of any α^n resemble each other. So we have:

(4) If d properties are shared by the members of α^0, then d is the lowest degree to which any members of any α^n resemble each other.

What is the significance of all this? If $\mathbf{F}^0$ is a companion of $\mathbf{G}^0$ then there must be fewer properties shared by the $\mathbf{F}^0$s than by the $\mathbf{G}^0$s.[2] This entails that if $\mathbf{F}^0$ is a companion of $\mathbf{G}^0$, α^0 is the property class of $\mathbf{F}^0$, and β^0 is the property class of $\mathbf{G}^0$, then the lowest degree to which any two members of any β^n resemble each other is higher than the lowest degree to which any two members of any α^n resemble each other. And this yields a solution to the companionship difficulty. For I can now relativize the notion of a perfect community to degrees of resemblance, and say that

α^0 is a perfect community *of degree* $d =_{\text{def.}} \alpha^0$ is a perfect community and d is the lowest degree to which any two members of any α^n stand in R^* to each other.

The lowest degree to which any two members of any α^n stand in R^* to each other coincides with the lowest degree to which any two members of a certain α^n, that is, where n has a specific value, stand in R^* to each other (to see what this specific value of n is, see the last paragraph of the Appendix). Now I define a maximality condition for the notion of a perfect community of degree d:

[2] An $\mathbf{F}^0$ which is not $\mathbf{G}^0$ may still resemble any $\mathbf{G}^0$ at least as closely as any *other* $\mathbf{G}^0$ does. For instance, imagine a and b are both $\mathbf{F}^0$ and $\mathbf{G}^0$ and they are the only $\mathbf{G}^0$-particulars. Imagine also that a and b share no other properties apart from $\mathbf{F}^0$ and $\mathbf{G}^0$, so that they resemble to degree 2. A particular c, that is $\mathbf{F}^0$ but not $\mathbf{G}^0$, may resemble both a and b to degree 2 if c shares with a a property $\mathbf{H}^0$ and it shares with b a property $\mathbf{I}^0$.

(Max) α^0 is a *maximal* perfect community *of degree d* $=_{\text{def.}}$ (i) α^0 is a perfect community of degree *d*; and (ii) α^0 is a proper subclass of no perfect community of degree *d*.

The concept of a maximal perfect community of degree *d* is fundamental in solving the companionship difficulty. For a property class α^0 always satisfies (Max), that is, if α^0 is a property class then it is a maximal perfect community of some degree *d*. Hereafter I shall call classes satisfying (Max) *(Max)-classes*. Thus every property class is a (Max)-class. For α^0 is the property class of a property $\mathbf{F}^0$ if and only if all and only $\mathbf{F}^0$-particulars are its members. That is, α^0 is the property class of $\mathbf{F}^0$ if and only if:

(I) $(x)(x \in \alpha^0 \equiv \mathbf{F}^0 x)$

And (I) is, of course, definitionally equivalent to the conjunction of (II) and (III):

(II) $(x)(x \in \alpha^0 \supset \mathbf{F}^0 x)$
(III) $(x)(\mathbf{F}^0 x \supset x \in \alpha^0)$

(II) says that only $\mathbf{F}^0$s are members of α^0, and (III) says that all $\mathbf{F}^0$s are members of α^0. If α^0 is a perfect community, that is, if it satisfies (II), then α^0 satisfies (i) in (Max). Therefore if α^0 satisfies (II) and (III), and hence satisfies (I), it satisfies (i) in (Max). But if α^0 satisfies (I) then it also satisfies (ii) in (Max) and thus satisfies (Max) itself.

For suppose α^0 satisfies (I) above but not (ii) in (Max). Then there is a class β^0 such that $\alpha^0 \subset \beta^0$, and β^0 is a perfect community of the same degree *d* as α^0 is. Then there is at least one property shared by β^0's members and, since $\alpha^0 \subset \beta^0$, all properties shared by the members of β^0 are also shared by the members of α^0. But if α^0 and β^0 are perfect communities of the same degree *d*, then the members of α^0 share the same number of properties as the members of β^0. And then, since all properties shared by the members of β^0 are also shared by the members of α^0, all properties shared by the members of α^0 must also be shared by the members of β^0. Then, given (II), it follows

(IV) $(x)(x \in \beta^0 \supset \mathbf{F}^0 x)$

But if $\alpha^0 \subset \beta^0$ then (V) holds:

(V) $(\exists x)(x \notin \alpha^0 \,\&\, x \in \beta^0)$

(IV) and (V) entail (VI):

(VI) $(\exists x)(x \notin \alpha^0 \,\&\, \mathbf{F}^0 x)$

But (VI) contradicts (III) and thereby contradicts (I). Therefore if α^0 is the property class of $\mathbf{F}^0$, that is, if α^0 satisfies (I), then α^0 is a (Max)-class. But then, in general, whether or not a certain property has a companion, its property class is a (Max)-class. And this is why any definition of property classes which makes them (Max)-classes avoids the companionship difficulty.

In the last chapter I gave a Resemblance Nominalist definition of perfect communities; in this one I have shown that all property classes, even those whose properties have companions, are perfect communities satisfying a maximality condition, (Max), that is acceptable to Resemblance Nominalists. So what makes the $\mathbf{F}^0$-particulars have the property $\mathbf{F}^0$ is that their class is a (Max)-class, that is, the $\mathbf{F}^0$-particulars are such that

(*a*) every two of them resemble each other and, for every *n*, every two *n*th-order pairs whose bases are $\mathbf{F}^0$-particulars resemble each other (i.e. the $\mathbf{F}^0$-particulars form a perfect community);
(*b*) there is a lowest degree of resemblance *d* to which any members of any α^n resemble each other (i.e. the $\mathbf{F}^0$-particulars form a perfect community of degree *d*); and
(*c*) the class of $\mathbf{F}^0$-particulars is a proper subclass of no other perfect community of degree *d* (i.e. the $\mathbf{F}^0$-particulars form a *maximal* perfect community of degree *d*).

Have I finished my task? Is this the whole explanation of what makes $\mathbf{F}^0$-particulars have the property $\mathbf{F}^0$? Have I found necessary and sufficient resemblance conditions for property classes? Not quite, as we shall see in the next chapter. But before seeing that, let us see how (Max) singles out even the property classes of accompanied properties.

10.3 Example

There are four properties in Table 10.3, $\mathbf{F^0}$, $\mathbf{G^0}$, $\mathbf{H^0}$, and $\mathbf{I^0}$, and four cases of companionship:

$\mathbf{F^0}$ is a companion of $\mathbf{I^0}$;
$\mathbf{G^0}$ is a companion of $\mathbf{H^0}$;
$\mathbf{G^0}$ is a companion of $\mathbf{I^0}$;
$\mathbf{H^0}$ is a companion of $\mathbf{I^0}$.

Let us see if the corresponding property classes satisfy (Max).

$\mathbf{F^0}$'s property class is $\{a,b,c,e,f\}$. As there is only one property shared by all its members, it is a perfect community of degree 1. Furthermore it is a subclass of no other perfect community of degree 1. For the only class of which $\{a,b,c,e,f\}$ is a proper subclass, $\{a,b,c,d,e,f\}$, is not a perfect community at all, since no property is shared by all its members. Thus $\{a,b,c,e,f\}$ is a (Max)-class. For similar reasons, $\mathbf{G^0}$'s property class, $\{a,b,c,d,e\}$, is also a (Max)-class, as readers can easily verify.

$\mathbf{H^0}$'s property class, $\{a,b,c,d\}$, is a perfect community of degree 2, since its members share two properties ($\mathbf{G^0}$ and $\mathbf{H^0}$). And it is *maximally* so; for, as we have just seen, of the three classes of which it is a proper subclass, namely $\{a,b,c,d,e\}$, $\{a,b,c,d,f\}$, and $\{a,b,c,d,e,f\}$, $\{a,b,c,d,e\}$ is a perfect community of degree 1 and the other two are not perfect communities at all. So, as $\{a,b,c,d\}$ is a subclass of no other perfect community of degree 2, it is a (Max)-class.

$\mathbf{I^0}$'s property class, $\{a,b,c\}$, is a maximal perfect community of degree 4. For as a, b, and c have all the properties $\mathbf{F^0}$, $\mathbf{G^0}$, $\mathbf{H^0}$, and $\mathbf{I^0}$, no

TABLE 10.3

	$\mathbf{F^0}$	$\mathbf{G^0}$	$\mathbf{H^0}$	$\mathbf{I^0}$
a	1	1	1	1
b	1	1	1	1
c	1	1	1	1
d	0	1	1	0
e	1	1	0	0
f	1	0	0	0

class failing to contain all of a, b, and c will be a *maximal* perfect community of any degree d. So all (Max)-classes in Table 10.3 contain a, b, and c, and of these $\{a,b,c,d\}$, $\{a,b,c,d,e\}$, and $\{a,b,c,e,f\}$ are maximal perfect communities of a degree *other than 4*. That leaves only $\{a,b,c,e\}$, $\{a,b,c,f\}$, $\{a,b,c,d,f\}$, and $\{a,b,c,d,e,f\}$, none of which is a perfect community of degree 4. For $\{a,b,c,d,f\}$ and $\{a,b,c,d,e,f\}$ are not perfect communities at all; and since the members of $\{a,b,c,e\}$ share only two properties and the members of $\{a,b,c,f\}$ only one, these classes are not perfect communities *of degree 4*. Thus $\{a,b,c\}$, as the only perfect community of degree 4, is a proper subclass of no perfect community of degree 4. Thus $\{a,b,c\}$ is a (Max)-class.

The Mere Intersections Difficulty 11

11.1 Mere intersections

(Max), as we saw, is satisfied by *all* property classes, and thus a definition that requires property classes to be (Max)-classes avoids the companionship difficulty. Furthermore, no imperfect community can satisfy (Max), for this requires classes to be perfect communities. So a definition of property classes as (Max)-classes avoids *both* the imperfect community and companionship difficulties. Can we therefore define property classes as (Max)-classes? The answer is No. For although all property classes are (Max)-classes, they are not the *only* (Max)-classes. Consider the class $\{a,b,c,d\}$ in Table 11.1. $\{a,b,c,d\}$ is a perfect community of degree 2 and, furthermore, it is maximally so. For neither $\{a,b,c,d,e\}$, nor $\{a,b,c,d,f\}$, nor $\{a,b,c,d,e,f\}$ are perfect communities *of degree 2*. Yet, as the table shows, it is not the property class of any of our properties, $\mathbf{F^0}$, $\mathbf{G^0}$, or $\mathbf{H^0}$.

Why not? The reason is that while $\{a,b,c,d\}$'s members are all the particulars with all of certain properties, they are not the *only* particulars with any *one* of those properties. Classes like $\{a,b,c,d\}$, though not property classes themselves, are *intersections* of property classes. Such classes I shall call *mere intersections*. Not all intersections of property classes are mere intersections, of course, since some are themselves property classes, as when one property is a companion of another. The

TABLE 11.1

	$\mathbf{F^0}$	$\mathbf{G^0}$	$\mathbf{H^0}$
a	1	1	1
b	1	1	1
c	1	1	1
d	1	1	0
e	1	0	0
f	0	1	0

problem is then to distinguish, in terms of resemblances, property classes from mere intersections. This problem, that I call the *mere intersections difficulty*, arises from my rejecting sparse conjunctive properties in Section 3.4. For if conjunctive properties were sparse, mere intersections would pose no problem, and property classes of sparse properties could be identified with (Max)-classes. But if conjunctive properties are not sparse, it takes more to make $\mathbf{F^0}$-particulars $\mathbf{F^0}$ than that they form a (Max)-class. The question is, what more?

First we must note that if a class α^0 is a (Max)-class but not a property class, then it must be a mere intersection. For if the members of α^0 share *one* property and α^0 is not a property class then (i) α^0 is a perfect community of degree 1 and (ii) there is some particular x outside α^0 having the property shared by the members of α^0. And if so $\alpha^0 \cup \{x\}$, of which α^0 is a proper subclass, is a perfect community of degree 1 and so α^0 is not a (Max)-class. Thus, if α^0 is a (Max)-class but not a property class, its members share n properties, where $n > 1$, that is, α^0 is a perfect community of degree n, where $n > 1$. But then, since α^0 is not a property class, for each of the n properties there must be some particular x outside α^0 with that property. But, of course, no such particular x has all the n properties shared by the members of α^0 (or α^0 would not be a (Max)-class of degree n). α^0's members must therefore be all and only the particulars with all those n properties, thus making α^0 the intersection of their property classes. But since α^0 itself is not a property class, it is a *mere* intersection. Thus if a class α^0 is a (Max)-class but not a property class then it is a mere intersection.

This means that all (Max)-classes must be either property classes or mere intersections. So if I can give, in terms of R*, a condition which all and only (Max)-classes that are not mere intersections satisfy, I shall be able to define property classes in terms of R*. How can I do this? First, in the next section, I shall show that a key difference between property classes and mere intersections lies in the number of property classes of which they can be proper subclasses. Then, in Sections 11.3 to 11.4, I shall show how to express this difference in terms of our resemblance relation R*.

11.2 A key difference between property classes and mere intersections

If the members of a (Max)-class α^0 share n properties, α^0 is a subclass of the property classes of those n properties and of no other property classes. For a class β^0 cannot be the property class of a property $\mathbf{F^0}$, shared by the members of α^0, unless α^0 is a subclass of β^0. And of course every property class of which α^0 is a subclass is a property class of some of the properties shared by α^0's members. Thus if the members of a (Max)-class α^0 share n properties, α^0 is a subclass of n property classes. But if α^0 is itself a property class then there is a property class of which it is a subclass but not a *proper* subclass, namely α^0 itself. So, if α^0 is a property class and its members share n properties, then α^0 is a *proper* subclass of n–1 property classes. Whereas if α^0 is not a property class but a mere intersection, then it must be a *proper* subclass of n property classes. This is the difference I need between property classes and their mere intersections. How can I spell out this difference in terms of R*?

First, let us call the degree of resemblance of a perfect community α^0 its *R*-degree*. Thus, if α^0 is a perfect community of degree d, its R*-degree is d, which I shall write in this way: $R^*d(\alpha^0) = d$. And since α^0 is a perfect community of degree d if and only if its members share d properties, the R*-degree of a perfect community is the number of properties all of its members share. So, clearly, we can express the number of properties shared by the members of a perfect community in terms of the resemblance relation R* as its R*-degree.

Now I *cannot* say that a (Max)-class α^0 such that $R^*d(\alpha^0) = n$ is a property class if and only if α^0 is a proper subclass of n–1 (Max)-classes, since not all (Max)-classes are property classes. Thus $\{a,b\}$ in Table 11.2 is a property class α^0 with $R^*d(\alpha^0) = n$ which is a proper subclass of more than n–1 (Max)-classes. For $R^*d(\{a,b\}) = 4$ and $\{a,b\}$ is a *proper* subclass of four (Max)-classes, namely $\{a,b,c\}$, $\{a,b,c,d\}$, $\{a,b,c,e\}$, and $\{a,b,c,d,e,f\}$.

TABLE 11.2

	$\mathbf{F^0}$	$\mathbf{G^0}$	$\mathbf{H^0}$	$\mathbf{I^0}$
a	1	1	1	1
b	1	1	1	1
c	1	1	1	0
d	1	1	0	0
e	1	0	1	0
f	1	0	0	0

How then can I use the difference between property classes and mere intersections to define the former in terms of R*? To use such a difference I first need to introduce the notion of an *ultimate* (Max)-class.

11.3 Ultimate (Max)-classes

Ultimate (Max)-classes are defined as follows:

α^0 is an ultimate (Max)-class $=_{\text{def.}}$ α^0 is a (Max)-class and is a proper subclass of no (Max)-class.

That is, *ultimate* (Max)-classes are *maximal* (Max)-classes. Consider Table 11.3 for example. There are four *ultimate* (Max)-classes in Table 11.3, $\{a,b,c\}$, $\{a,b,d\}$, $\{a,c,d\}$, and $\{b,c,d\}$, which are *ultimate* (Max)-classes, since they are (Max)-classes which are proper subclasses only of $\{a,b,c,d\}$, which, as its members share no one property, is not a (Max)-class. Let me now note three important features of ultimate (Max)-classes.

Table 11.3

	$\mathbf{F^0}$	$\mathbf{G^0}$	$\mathbf{H^0}$	$\mathbf{I^0}$
a	0	1	1	1
b	1	0	1	1
c	1	1	0	1
d	1	1	1	0

(1) If α^0 is an *ultimate* (Max)-class then it is a property class. For suppose α^0 is an ultimate (Max)-class but not a property class. Then, since (Max)-classes exhaustively divide into property classes and their mere intersections, α^0 is a mere intersection. Suppose, then, that there are n properties shared by the members of α^0. Then α^0 is a proper subclass of n property classes, and, since property classes are (Max)-classes, α^0 is a proper subclass of n (Max)-classes and, therefore, α^0 is not an *ultimate* (Max)-class. That is, if α^0 is an ultimate (Max)-class then it is a property class.

(2) If α^0 is an ultimate (Max)-class then $R^*d(\alpha^0) = 1$. For $R^*d(\alpha^0)$ cannot be *less* than 1, since a (Max)-class is a perfect community and so its members must share at least *one* property, which makes it a perfect community of at least degree 1. And $R^*d(\alpha^0)$ cannot be *greater* than 1. For then the members of α^0 would share more than one property, say n. But α^0, being an *ultimate* (Max)-class, is a property class. So the property $\mathbf{F^0}$ of which α^0 is a property class must have n–1 companions. But then α^0 must be a proper subclass of the n–1 property classes of $\mathbf{F^0}$'s companion properties. But as property classes are (Max)-classes, α^0 is a proper subclass of at least one (Max)-class and thus not an *ultimate* (Max)-class. So, if α^0 is an ultimate (Max)-class then $R^*d(\alpha^0)$ must be 1.

(3) If $R^*d(\alpha^0) = 1$ then α^0 is a ultimate (Max)-class. For a (Max)-class α^0 whose R*-degree is n is a proper subclass only of (Max)-classes whose R*-degree is *less* than n. For suppose $R^*d(\alpha^0) = n$ and α^0 is a proper subclass of a (Max)-class β^0 with $R^*d(\beta^0) = m$, where $m > n$. But since the R*-degree of a class is the number of properties its members share, this implies that a class whose members share n properties is a proper subclass of a class whose members share m properties, where m

$> n$, which is impossible. Nor can a (Max)-class α^0 be a proper subclass of a (Max)-class β^0 whose members share the *same* number of properties as α^0's members do, for then α^0 and β^0 would be perfect communities of the same degree and so α^0 would not be a (Max)-class. Thus a (Max)-class α^0 can be a proper subclass only of (Max)-classes whose R*-degree is less than α^0's. So if $R^*d(\alpha^0) = 1$ then α^0 is an ultimate (Max)-class, that is, it is a subclass of no other (Max)-class, since there are no (Max)-classes whose R*-degrees are less than 1.

(2) and (3) together show that

α^0 is an ultimate (Max)-class if and only if $R^*d(\alpha^0) = 1$.

Ultimate (Max)-classes can thus be characterized by their R*-degree, and thus in terms of R*. So, as (1) tells us that ultimate (Max)-classes are property classes, we have that if $R^*d(\alpha^0) = 1$ then α^0 is a property class. This, of course, is only a sufficient condition for property classes, not a necessary one. There are property classes whose R*-degree exceeds 1, since some property classes are not ultimate (Max)-classes, as when a property has a companion. Nevertheless, the facts that the R*-degree of ultimate (Max)-classes is 1, and that ultimate (Max)-classes are property classes, do provide the basis of the full characterization of property classes given in the next section.

11.4 Necessary and sufficient resemblance conditions for property classes

We saw in Section 11.2 that if α^0 is a (Max)-class whose R*-degree is n, then if α^0 is a property class then it is a proper subclass of n–1 property classes, while if α^0 is a mere intersection then it is a proper subclass of n property classes. So, since all ultimate (Max)-classes are property classes, if all property classes were either ultimate (Max)-classes or (Max)-classes that are proper subclasses only of ultimate (Max)-classes, property classes could be characterized as follows:

> α^0 is a property class if and only if $R^*d(\alpha^0) = 1$, or $R^*d(\alpha^0) = n \neq 1$ and the R*-degree of every (Max)-class of which α^0 is a proper subclass is 1 and there are n–1 such classes.

Which can be simplified to:

> α^0 is a property class if and only if subtracting the sum of the R*-degrees of the (Max)-classes of which it is a proper subclass from its own R*-degree equals 1.

Unfortunately some property classes are neither ultimate (Max)-classes nor (Max)-classes that are proper subclasses *only* of ultimate (Max)-classes. But we do know, however, that:

(*a*) if α^0 is an ultimate (Max)-class, and so a property class, then its R*-degree is 1;

(*b*) if α^0 is a (Max)-class that is a proper subclass *only* of ultimate (Max)-classes, then if α^0 is a property class its R*-degree minus the sum of the R*-degrees of the (Max)-classes of which it is a proper subclass is 1; and

(*c*) if α^0 is a (Max)-class that is a proper subclass *only* of ultimate (Max)-classes, then if α^0 is a mere intersection its R*-degree minus the sum of the R*-degrees of the (Max)-classes of which it is a proper subclass is 0.

Recursively, these results can be incorporated in the function $R^*diff(\alpha^0)$, which I call *R*-difference*, and which is defined in Figure 11.1.

The first clause in this definition needs no comment. The second makes $R^*diff(\alpha^0) = R^*d(\alpha^0)$ in case α^0 is an ultimate (Max)-class, and so $R^*diff(\alpha^0) = 1$ if α^0 is an ultimate (Max)-class. The third says that if α^0 is a non-ultimate (Max)-class, then α^0's R*-difference is its R*-degree minus the sum of the R*-differences of the (Max)-classes of which it is a proper subclass.

The importance of $R^*diff(\alpha^0)$ is that it allows $R^*diff(\alpha^0) = 1$ if and only if α^0 is a property class, thereby allowing a direct characterization of property classes in terms of $R^*diff(\alpha^0)$. Let us see why this is so.

$$R^*diff(\alpha^0) = \begin{cases} 0, \text{ if } \alpha^0 \text{ is not a (Max)-class.} \\ R^*d(\alpha^0), \text{ if } \alpha^0 \text{ is an } \textit{ultimate} \text{ (Max)-class.} \\ R^*d(\alpha^0) - (R^*diff(\beta_1{}^0) + \ldots + R^*diff(\beta_m{}^0)), \text{ if } \alpha^0 \text{ is a non-} \\ \quad \text{ultimate (Max)-class and where } \beta_1{}^0 \,\&\ldots\&\, \beta_m{}^0 \text{ are all} \\ \quad \text{the (Max)-classes of which } \alpha^0 \text{ is a proper subclass.} \end{cases}$$

Figure 11.1 $R^*diff(\alpha^0)$

First let me call ultimate (Max)-classes *(Max)-classes$_0$*. Then a (Max)-class α^0 is a *(Max)-class$_1$* if and only if all (Max)-classes of which it is a proper subclass are (Max)-classes$_0$. Similarly, a (Max)-class α^0 is a *(Max)-class$_2$* if and only if it is a proper subclass of some (Max)-class$_1$ and every (Max)-class of which it is a proper subclass is either a (Max)-class$_0$ or a (Max)-class$_1$. And so on. In general, a (Max)-class α^0 is a *(Max)-class$_n$* if and only if α^0 is a proper subclass of some (Max)-class$_{n-1}$ and every (Max)-class of which it is a proper subclass is either a (Max)-class$_0$, or . . . or a (Max)-class$_{n-1}$.

Now, if α^0 is an ultimate (Max)-class, that is, a (Max)-class$_0$, then $R^*diff(\alpha^0) = 1$. But suppose α^0 is not an ultimate (Max)-class, but a (Max)-class$_1$ such that $R^*d(\alpha^0) = n$. If α^0 is a *property class*, then it is a proper subclass of n–1 ultimate (Max)-classes, the sum of whose R*-differences is n–1, so that $R^*diff(\alpha^0) = 1$. While if α^0 is a *mere intersection*, then it is a proper subclass of n ultimate (Max)-classes, the sum of whose R*-differences is n, so that $R^*diff(\alpha^0) = 0$. Thus if α^0 is a (Max)-class$_1$ then α^0 is a property class if and only if $R^*diff(\alpha^0) = 1$.

Suppose next that α^0 is a (Max)-class$_2$ such that $R^*d(\alpha^0) = n$. Then it is a proper subclass of n–1 property classes if it is a property class, and a proper subclass of n property classes if it is a mere intersection. But in the sum of R*-differences of the (Max)-classes of which α^0 is a proper subclass, the property classes (which are (Max)-classes$_0$ and (Max)-classes$_1$) will add 1, while the mere intersections will add 0. So if α^0 is a property class then $R^*diff(\alpha^0) = 1$ and if it is a mere intersection then $R^*diff(\alpha^0) = 0$. Thus again, if α^0 is a (Max)-class$_2$ then α^0 is a property class if and only if $R^*diff(\alpha^0) = 1$. Similarly for (Max)-classes$_3$, (Max)-classes$_4$, and so on.

In general, in the sum of R*-differences of the (Max)-classes of which a (Max)-class$_n$ α^0 is a proper subclass, the property classes will add 1, while the mere intersections will add 0. Thus, the sum of the R*-differences of the (Max)-classes of which a given (Max)-class is a proper subclass will always be the number of property classes of which the (Max)-class is a proper subclass. But since if $R^*d(\alpha^0) = n$ (i.e. there are n properties shared by the members of α^0) and α^0 is a property class then α^0 is a proper subclass of n–1 property classes, while if α^0 is a mere intersection then it is a proper subclass of n property classes, a (Max)-class α^0

is a property class if and only if $R^*diff(\alpha^0) = 1$. Thus I define property classes as follows:

(P_{CLASS}) α^0 is a property class $=_{def.} R^*diff(\alpha^0) = 1$.

This definition is correct: it requires that a property class be a (Max)-class and, as we saw in Section 10.2, all property classes are (Max)-classes; furthermore, no (Max)-class other than a property class, that is, no mere intersection, satisfies the equivalence. Needless to say, (P_{CLASS}) is subject neither to the imperfect community difficulty nor to the companionship difficulty. I have finally found necessary and sufficient resemblance conditions for property classes. In the next section, only for purposes of illustration, I shall apply this definition to one example.

11.5 Example

There are several classes in Table 11.4, but let us concentrate only on (Max)-classes, since we know that only (Max)-classes are property classes. There are seven (Max)-classes in Table 11.4:

$\alpha^0 = \{a,b\}$; $\beta^0 = \{a,b,c\}$; $\gamma^0 = \{a,b,g\}$; $\delta^0 = \{a,b,c,d\}$; $\varepsilon^0 = \{a,b,c,h\}$; $\phi^0 = \{a,b,c,d,e\}$; and $\chi^0 = \{a,b,c,d,f\}$.

Now, of these seven (Max)-classes γ^0, ε^0, ϕ^0, and χ^0 are *ultimate* (Max)-classes whose R*-degree is 1, for there is only one property shared by the members of γ^0: $\mathbf{I^0}$; only one property shared by the members of ε^0: $\mathbf{H^0}$; only one property shared by the members of ϕ^0: $\mathbf{F^0}$; and only one property shared by the members of χ^0: $\mathbf{G^0}$. Therefore their R*-differences are their R*-degrees, which equal 1, and so according to (P_{CLASS}) they are property classes. And indeed they are: γ^0 is the class of all and only $\mathbf{I^0}$s, ε^0 is the class of all and only $\mathbf{H^0}$s, ϕ^0 is the class of all and only $\mathbf{F^0}$s and χ^0 is the class of all and only $\mathbf{G^0}$s.

This leaves only the (Max)-classes α^0, β^0, and δ^0. Of these δ^0's R*-degree is 2, for there are two properties shared by its members: $\mathbf{F^0}$ and $\mathbf{G^0}$. Furthermore the only (Max)-classes of which δ^0 is a proper subclass are ϕ^0 and χ^0, the R*-difference of both being 1. Thus, according to our definition of R*-difference:

$$R^*diff(\delta^0) = R^*d(\delta^0) - (R^*diff(\phi^0) + R^*diff(\chi^0)) = 2 - (1+1) = 0.$$

TABLE 11.4

	$\mathbf{F^0}$	$\mathbf{G^0}$	$\mathbf{H^0}$	$\mathbf{I^0}$	$\mathbf{J^0}$
a	1	1	1	1	1
b	1	1	1	1	1
c	1	1	1	0	0
d	1	1	0	0	0
e	1	0	0	0	0
f	0	1	0	0	0
g	0	0	0	1	0
h	0	0	1	0	0

So δ^0's R*-difference is 0 and hence it is not a property class. And this is right, for the two properties shared by is members are $\mathbf{F^0}$ and $\mathbf{G^0}$, and δ^0 is neither the class of all $\mathbf{F^0}$s, for *e* is $\mathbf{F^0}$ but not a member of δ^0, nor the class of all $\mathbf{G^0}$s, for *f* is $\mathbf{G^0}$ but not a member of δ^0.

Let us consider β^0 now. Its R*-degree is 3, for there are three properties shared by its members: $\mathbf{F^0}$, $\mathbf{G^0}$, and $\mathbf{H^0}$. The only (Max)-classes of which β^0 is a proper subclass are δ^0, ε^0, ϕ^0, and χ^0. Thus, according to our definition of R*-difference:

$$R^*diff(\beta^0) = R^*d(\beta^0) - (R^*diff(\delta^0) + R^*diff(\varepsilon^0) + R^*diff(\phi^0) + R^*diff(\chi^0)) = 3 - (0+1+1+1) = 0.$$

So β^0's R*-difference is 0 and hence it is not a property class. And this is right, for the three properties shared by its members are $\mathbf{F^0}$, $\mathbf{G^0}$, and $\mathbf{H^0}$, and β^0 is neither the class of all $\mathbf{F^0}$s, for *d* and *e* are $\mathbf{F^0}$s but not members of β^0, nor the class of all $\mathbf{G^0}$s, for *d* and *f* are $\mathbf{G^0}$ but not members of β^0, nor the class of all $\mathbf{H^0}$s, for *h* is $\mathbf{H^0}$ but not a member of β^0.

It is α^0's time now. Its R*-degree is 5, for there are five properties shared by its members, $\mathbf{F^0}$, $\mathbf{G^0}$, $\mathbf{H^0}$, $\mathbf{I^0}$, and $\mathbf{J^0}$. The (Max)-classes of which α^0 is a proper subclass are β^0, γ^0, δ^0, ε^0, ϕ^0, and χ^0. Thus, according to our definition of R*-difference:

$$R^*diff(\alpha^0) = R^*d(\alpha^0) - (R^*diff(\beta^0) + R^*diff(\gamma^0) + R^*diff(\delta^0) + R^*diff(\varepsilon^0) + R^*diff(\phi^0) + R^*diff(\chi^0)) = 5 - (0+1+0+1+1+1) = 1.$$

Thus α^0's R*-difference is 1 and therefore it is a property class. And this is right, for all and only $\mathbf{J}^0$s are members of it. Thus (P_{CLASS}) has correctly singled out the five property classes present in this example.

11.6 Summary and conclusion

Our problem was to give necessary and sufficient resemblance conditions for property classes, which are classes whose members are all and only particulars with a certain property $\mathbf{F}^0$, and so they are perfect communities. The imperfect community difficulty consists in distinguishing, in terms of resemblances, perfect from imperfect communities. This I did by introducing the resemblance relation R*, which obtains between particulars and *n*th-order hereditary pairs sharing some property. Thus in Section 9.6 I defined perfect communities as follows:

(D_{PC}) α^0 is a perfect community $=_{\text{def.}} (n)(x)(y)(x \in \alpha^n \,\&\, y \in \alpha^n \supset R^*xy)$

(D_{PC}) says that α^0 is a perfect community if and only if R* obtains between every two members of α^n (for every $n \geq 0$). That is, α^0 is a perfect community if and only if every two of its members resemble each other, every two first-order pairs whose bases are members of α^0 resemble each other, every two second-order pairs whose bases are members of α^0 resemble each other, and so on.

(D_{PC}) of course does not define property classes; it only defines classes whose members share some property. And, as the companionship difficulty shows, adding a maximality condition to (D_{PC}) is not enough to obtain a definition of property classes, since there are property classes which are subclasses of others, as when a property has a companion. To find a condition which applied to all property classes in Section 10.2 I relativized the notion of a perfect community to degrees of resemblance in the following way:

α^0 is a perfect community *of degree d* $=_{\text{def.}}$ α^0 is a perfect community and *d* is the lowest degree to which any two members of any α^n stand in R* to each other.

Then I defined a maximality condition for this notion, as follows:

(Max) α^0 is a *maximal* perfect community *of degree d* $=_{\text{def.}}$ (i) α^0 is a perfect community of degree *d*; and (ii) α^0 is a proper subclass of no perfect community of degree *d*.

I then showed that *all* property classes, even those of accompanied properties, are (Max)-classes. But property classes cannot be defined as (Max)-classes, as we saw in Section 11.1, for mere intersections are also (Max)-classes. To distinguish property classes from mere intersections, which is what the *mere intersections difficulty* consists in, I exploited the fact that a (Max)-class α^0 of degree *n* is a proper subclass of n–1 property classes if it is a property class, and it is a proper subclass of *n* property classes if it is a mere intersection. Then, in Section 11.3, I introduced the notion of an *ultimate* (Max)-class, as follows:

α^0 is an ultimate (Max)-class $=_{\text{def.}}$ α^0 is a (Max)-class and is a proper subclass of no (Max)-class.

I then showed that all and only ultimate (Max)-classes are perfect communities of degree 1, and that only property classes are ultimate (Max)-classes. Then I called the degree of resemblance of a perfect community α^0 its *R*-degree*, written $R^*d(\alpha^0)$. With this notion I defined the function $R^*diff(\alpha^0)$, called *R*-difference* (see Figure 11.1). Thus the R*-difference of a non-ultimate (Max)-class α^0 is its R*-degree minus the sum of the R*-differences of the (Max)-classes of which it is a proper subclass. Since the R*-difference of *ultimate* (Max)-classes, which are always property classes, is 1, and since a non-ultimate (Max)-class whose R*-degree is *n* is a property class if and only if it is a proper subclass of n–1 property classes, the R*-difference of all and only property classes is 1. Therefore:

(P_{CLASS}) α^0 is a property class $=_{\text{def.}}$ $R^*diff(\alpha^0) = 1$.

Thus (P_{CLASS}) defines property classes in terms of a resemblance relation, R*, which obtains between particulars as well as between *n*th-order pairs and which, like any other resemblance relation, comes by degrees.

Thus what makes $\mathbf{F}^0$-particulars $\mathbf{F}^0$ is that the R*-difference of their class is 1. This does not mean that what makes $\mathbf{F}^0$-particulars $\mathbf{F}^0$ is that they belong to the class of $\mathbf{F}^0$-particulars, that is, to the property class of $\mathbf{F}^0$; it just means that what makes them $\mathbf{F}^0$ is that they form a maximal perfect community of some degree n (i.e. a (Max)-class) which is a proper subclass of n–1 (Max)-classes whose R*difference is 1, which makes the R*-difference of the class of $\mathbf{F}^0$-particulars 1.

This is the Resemblance Nominalist's explanation of what makes particulars have their properties. And we have seen in previous chapters that Resemblance Nominalism meets the many objections which have been advanced against it. Thus the Problem of Universals can be solved without invoking universals or tropes, since all Resemblance Nominalism needs are resembling particulars and pairs of them (or pairs of pairs of them, and so on).

12 The Superiority of Resemblance Nominalism

If the preceding chapters are right then Resemblance Nominalism can meet the many objections and difficulties which it faces. That is, Resemblance Nominalism is a viable metaphysical theory on a par with its main competitors, *Universalism* and *Trope Theory*. But one may then ask: is there any reason to prefer Resemblance Nominalism over its competitors? If those competitors were incoherent, absurd, or just plainly false there would be a clear reason to prefer Resemblance Nominalism. But in fact neither Universalism nor Trope Theory are incoherent, absurd, or plainly false.

All three theories try to solve the Problem of Universals and this, as we saw, is to explain how a particular can have many different properties by giving truthmakers for sentences attributing properties to particulars. I think Resemblance Nominalism does this better than its competitors, although I do not think that the main competitors of Resemblance Nominalism can be *proved* to be false. I shall first compare Resemblance Nominalism and its main competitors with respect to different parameters and then I shall argue, in Sections 12.6 to 12.7, that Resemblance Nominalism is the best theory, basically because it avoids postulating ad hoc ontology. I shall then argue, in Section 12.8, that Resemblance Nominalism is superior to other nominalistic theories. The parameters along which I shall compare different solutions to the Problem of Universals are the following:

- coherence;
- preservation of intuitions and received opinions;
- ideological economy;
- quantitative ontological economy;
- qualitative ontological economy;
- avoidance of ad hoc ontology.

12.1 Coherence

A theory is *logically* coherent if and only if it does not entail a contradiction. There is another notion of coherence, *pragmatic coherence*, according to which a theory is coherent if and only if neither formulating, conceiving, nor believing it produces self-refutation. One might also introduce another, broader, notion of *philosophical* coherence by which a theory is coherent if and only if it does not lead to a vicious infinite regress, is not circular, is not extensionally incorrect, and does not commit other serious philosophical vices. The only thing common to these three notions of coherence is that violation of any of them would justify outright rejection of a philosophical theory.

Resemblance Nominalism is coherent in all three senses (the bulk of the previous chapters has been concerned with showing that Resemblance Nominalism is not *philosophically* incoherent; I have not defended Resemblance Nominalism from charges of logical or pragmatic incoherence since it is clearly logically and pragmatically coherent and, to the best of my knowledge, no one has ever thought otherwise). But this does not make Resemblance Nominalism superior to its main competitors because they are also coherent in all of the three senses in question. Thus the three theories are on a par with respect to coherence, however understood.[1]

[1] Armstrong argues that Universalism can stop its infinite regress in (1997*c*: 118–19). I showed in Section 6.5 how Resemblance Nominalism can stop the resemblance regress and I think Trope Theory can stop its own resemblance regress by adopting a parallel line to the one I proposed for Resemblance Nominalism. But Trope Theory has been recently powerfully attacked by Jerrold Levinson in a talk given in Grenoble in 1999 under the title 'Why There are No Tropes'. If Levinson is right, and I think he probably is, then we might say he has shown Trope Theory to be philosophically incoherent.

12.2 Preservation of intuitions and accepted opinions

By *intuitions* I mean pre-theoretical and uncritical beliefs, and by *accepted opinions* I mean generally accepted opinions, whether common sense or scientific. Some philosophers believe that preservation of intuitions and accepted opinions is a theoretical virtue. For them, that a theory preserves intuitions and accepted opinions is a reason (though a defeasible one) to adopt the theory.

Far from believing that scientific knowledge is the best or most perfect sort of knowledge we can have, I believe that philosophical knowledge is as good as scientific knowledge. But no doubt, conflicting with a scientifically validated opinion is a serious thing, since one should believe what our best scientific theories say. After all our best scientific theories, due to the character of scientific methodology, have a considerable likelihood of being true. But fortunately Resemblance Nominalism does not conflict with science in any way. Nor do Universalism and Trope Theory.

But how about intuitions? To what extent, if any, is preserving our intuitions a theoretical virtue? I shall come back to this in Section 12.7. In this section I just want to point out that in this respect my theory, Resemblance Nominalism, is worse off than Universalism and Trope Theory. For Resemblance Nominalism conflicts with our intuition that having a property is an intrinsic matter, it is something that does not depend in any way on how other particulars are. For in Resemblance Nominalism whether a particular has a property and what property it has is somehow an extrinsic fact about the particular, for it depends on what particulars it resembles. Resemblance Nominalism's committal to the existence of *possibilia* also makes it conflict with our intuitions since they are, no doubt, *actualist*. Finally it also goes against our intuitions that there could be necessarily coextensive properties. (It might be alleged that Resemblance Nominalism conflicts with a fourth intuition, namely that particulars resemble each other because they share properties—not the other way round. But I doubt this is a pre-theoretical belief. No doubt we do speak as if particulars literally *shared* properties, but this does not mean we believe that this is what explains particulars' resemblances.)

Neither Universalism nor Trope Theory conflicts with these intuitions. They make the fact that something has a property an intrinsic fact about that particular, they are actualist theories, and they allow for the possibility of necessarily coextensive properties. Some versions of Universalism and Trope Theory might seem to violate the intuition about the intrinsic character of having a property, for in those versions for a particular to have a property is for it to be somehow related to some universal or trope. But the intuition we have is that having a property is an intrinsic fact about a particular *as far as other particulars are concerned*. It would be dishonest to accuse Universalism or Trope Theory of violating the intrinsicness intuition.

But Universalism, for instance, is not free of trouble with intuitions. Universalism, for instance, conflicts with the intuition that entities can be located at many places at the same time, and it is this intuition that makes Universalism unpalatable to many philosophers. Armstrong is aware of the problems produced by the simultaneous multiple location of universals, but he argues that this is a crude way of speaking. Space-time is not a box where states of affairs are put in; space-time is a conjunction of states of affairs—rather, the sense in which universals are 'in' space-time is that they help to constitute it (1989*b*: 99). It may be like Armstrong says it is, but surely this is as much, if not more, counterintuitive as saying that universals can be simultaneously multiply located. Nevertheless I would grant that the most counterintuitive of the three theories we are comparing is Resemblance Nominalism.

12.3 Ideological economy

Resemblance Nominalism is better than its rivals. But what makes it better if not that it fits our intuitions better? Is it that it is a simpler theory? In one sense simplicity is just ideological economy, that is, having a small number of primitive or undefined extra-logical predicates, and so the simpler theory is the one with fewer such predicates. No doubt ideological economy is a theoretical virtue, for the more ideologically economical theories achieve higher systematicity and internal unity, two desirable features of theories.

Thus that a theory is ideologically economical is a reason (though a defeasible one) to adopt the theory. Can we then base our preference for Resemblance Nominalism on ideological economy? Is Resemblance Nominalism more ideologically economical than Universalism and Trope Theory?

It appears that Resemblance Nominalism has one primitive predicate, 'R*' or '*x* resembles* *y*', while both Universalism and Trope Theory have two primitive predicates each. For Universalism has the predicates 'is a particular' and 'is a universal' and Trope Theory needs a predicate to express resemblances among tropes, 'resembles', and another predicate that applies to tropes that compose a concrete particular, 'is compresent with'.[2]

But does Resemblance Nominalism have a single predicate? Does the fact that resemblance comes by degrees not mean that it needs many—if only finitely many—resemblance predicates, one for each degree? If so, then the primitive predicates of Resemblance Nominalism will be predicates like '*x* resembles* *y* to degree 1', '*x* resembles* *y* to degree 2', etc. Perhaps. But there is a way around this, namely to have a single primitive resemblance predicate incorporating a variable ranging over positive numbers: '*x* resembles *y* to degree *d*'. ('*d*' needs range only over those numbers that correspond to different resemblance degrees, that is, it needs range over no more positive numbers than the number of sparse properties a particular can have.)

But even if Resemblance Nominalism needs only a single primitive predicate, this may not make it better off than Universalism. For in fact Universalism needs a single predicate: 'instantiates'. On Universalisms like Armstrong's, where there are no bare particulars and no uninstantiated universals, the predicates 'is a particular' and 'is a universal' can be defined in terms of 'instantiates' as 'nothing instantiates it' and 'is instantiated by something' respectively. So it seems Resemblance Nominalism and Universalism are on a par.

In fact Resemblance Nominalism may be worse than Universalism because it needs classes to solve the imperfect community difficulty and to account for relations. Thus it needs the class-membership predicate,

[2] I am considering the bundle version of Trope Theory; *substratum* versions of Trope Theory will need a different second primitive.

and it takes it as a primitive. Does this put Resemblance Nominalism at a disadvantage? Assuming that Universalism admits classes, it depends on whether Universalism can account for them in terms of particulars and universals. But this account is an account of singletons, the classes for which Lewis recognizes his mereological account does not apply (Lewis 1991: 31). So even if Universalism can account for singletons in Universalist terms, it still relies on an account of classes as mereological wholes of their (non-empty) subclasses. But, first, this mereological account of classes is dubious, for reasons given by Oliver (1994). And, secondly, the Universalist account of singletons needs a mereological predicate as a primitive in order to account for the other classes. So it looks as if parity of ideological economy is restored between Resemblance Nominalism and Universalism because given classes Resemblance Nominalism can do without mereology.

If this is so considerations of ideological economy do not constitute a reason to adopt Resemblance Nominalism. Let us look elsewhere for what makes Resemblance Nominalism superior to its main alternatives.

12.4 Quantitative ontological economy

There are two kinds of ontological economy, *qualitative economy* and *quantitative economy*. A theory is *qualitatively* economical if it postulates relatively few *kinds* of entities, while it is *quantitatively* economical if it postulates relatively few *entities*, of any kinds. Thus a theory might be economical qualitatively but not quantitatively, or vice versa. An example of the former would be a theory which postulated only the pure sets of set theory: only one kind of them, namely sets, but infinitely many entities. (I cannot think of any remotely plausible example of the latter, but such a case is possible in principle.)

Some philosophers, like Lewis (1973: 87), Ellis (1990: 55), and Bacon (1995: 87), think that only qualitative economy is important. And indeed, when Resemblance Nominalism, or any other nominalistic theory, is said to be more economical than its competitors, what is normally meant is *qualitative* economy. But I think that quantitative

economy *does* matter; furthermore Daniel Nolan (1997) has shown that it has been employed in the history of science to recommend theories.[3]

I think that quantitative economy is a theoretical virtue on the basis of which, in certain circumstances, one might rationally adopt a theory. Why is it a virtue? The ontological commitments of a theory can be seen as a conjunction each of whose conjuncts asserts the existence of a certain entity. *If* the conjuncts of **T** and **U** are mutually independent and *if* the conjuncts of **T** and **U** have the same initial probability then, in these circumstances, if **T** postulates fewer entities than **U**, **T** is more probable than **U**.[4] And of course that **T** is more probable than **U** is a reason to adopt **T** over **U**.

So, which of the three theories under consideration is quantitatively more economical? At first sight it looks as if Universalism is quantitatively more economical than Resemblance Nominalism and Trope Theory. For Resemblance Nominalism postulates a presumably infinite number of *possibilia* and an infinity of classes (it needs some of them, pairs, to account for perfect communities and some others, *ordered n*-tuples, to account for relations—but once one class is admitted all of them are). But neither Universalism nor Trope Theory postulate *possibilia*, and for each universal there are as many tropes as particulars instantiate the universal. Thus it looks as if Universalism is the more economical theory here.

But actually things are not so clear. For if every theory needs classes then Universalism and Trope Theory will have to accept them. True, some have tried to account for classes in terms of states of affairs, that is, in terms of particulars and universals (see Armstrong 1991*b*, 1997*c*: 194–5). But whether or not they succeed in reducing classes to other kinds of entities, they will postulate the same number of states of affairs if the reduction is a good one. Such reductions

[3] Some, like Oliver (1996: 7), think that the distinction between qualitative and quantitative economy is misconceived. I think the distinction is very well conceived, but I shall not argue for this since, as we shall see, even if the distinction were misconceived (and even if, although the distinction were well conceived, quantitative economy did not matter) this would not affect the main result of this section.

[4] A similar claim is made by Sober (1981: 145) concerning *qualitative* economy. More on this in Section 12.5.

effect only qualitative, not quantitative, reduction. (For a brief criticism of Armstrong's reduction of classes see the next section.)

Furthermore, putting classes aside, Universalism is quantitatively more economical than Resemblance Nominalism only if the cardinality of Universalism's actual entities is smaller than the cardinality of Resemblance Nominalism's *possibilia*. But whether this is so or not depends on certain assumptions about the nature of space-time and the cardinality of *possibilia* that no solution to the Problem of Universals can decide by itself.

So far I have assumed that theory **T** is quantitatively more economical than theory **U** only if **T** postulates fewer entities than **U**. But one may have a broader notion of quantitative economy according to which theory **T** is quantitatively more economical than theory **U** if either **T** postulates fewer entities than **U** or the entities postulated by **T** are a subset of those postulated by **U**.

Does this broader notion of quantitative economy provide reasons to choose one of our theories? It seems not, for none of the ontologies in question is a subset of any of the others (for only Resemblance Nominalism admits *possibilia*, only Universalism admits universals, and only Trope Theory admits tropes). So it seems as if we cannot decide between these theories in respect of quantitative economy.

Or does it? Could we not compare those portions of their ontologies that are proper to each theory and declare the best with respect to quantitative economy the theory whose proper ontology is smaller than the others'? This is what we should do, I think. And so it might seem that Universalism is the best in this respect, since for each universal in the actual world there will be more tropes and more *possibilia*. But this assumes that there are only a finite number of universals in the actual world (or that, if there are infinitely many, their cardinality is smaller than that of alternative ontologies) while there might be infinitely many (if, for instance, the infinitely many temperatures are instantiated). Furthermore even if there are a finite number of universals instantiated in the actual world, Universalism may still be committed to an infinity of entities in its proper ontology. For Universalism is committed to states of affairs over and above ordinary particulars and universals (Armstrong 1997*c*: 116–18) and so if there are (undenumerably)

infinitely many actual particulars, there will be (undenumerably) infinitely many states of affairs proper to Universalism.[5]

I conclude that, although quantitative economy matters, we cannot decide—at least for the time being—which of the three theories is the best with respect to it.

12.5 Qualitative ontological economy

As I said before, a theory is *qualitatively* economical if it postulates relatively few *kinds* of entities. Qualitative economy is also a theoretical virtue and so it constitutes a reason (though a defeasible one) to adopt a theory.

Why is qualitative economy a virtue? The best answer to this question is, I think, that postulating fewer kinds raises a theory's probability because, as Elliot Sober says, 'removing an existential claim from a theoretical system has the effect of raising the probability of what remains. This is simply because a conjunction must have a lower probability than either conjunct, provided that the conjuncts are mutually independent' (Sober 1981: 145). Thus *if* the kinds of entities postulated by **T** are a subset of the kinds of entities postulated by **U**, this raises the probability of **T** over **U** and so constitutes a reason to prefer **T** over **U**.

But note that qualitative economy constitutes a reason to adopt a theory **T** over a theory **U** even when the kinds postulated by **T** are not a subclass of those postulated by **U**, provided **T** postulates fewer kinds than **U** does and the initial probability of the existence of the kinds postulated by **U** is at most the same as the initial probability of the existence of the kinds postulated by **T**.

Whether or not the kinds postulated by Resemblance Nominalism are more probable than those of Universalism and Trope Theory, does Resemblance Nominalism postulate fewer kinds than the other two? How many kinds of entities are postulated by these theories?

[5] I am not implying that Resemblance Nominalism does not admit states of affairs; it does, as we saw in Section 4.8. But there are states of affairs that are unique to Universalism and therefore belong to its proper ontology, like the state of affairs that a certain tile instantiates the universal *squareness*.

Resemblance Nominalism admits not only concrete particulars, but also classes. Thus Resemblance Nominalism is committed to at least *two* kinds of entities. It might be thought that this is really a commitment to *three* kinds of entities, as the particulars it admits are both actual and merely possible ones. But this is confusion. As Lewis emphasizes, other possible worlds and particulars are of a kind with the actual ones (Lewis 1986: 2). A merely possible table, atom, planet, house, or person is as concrete and as particular as an actual table, atom, planet, house, or person. Thus all particulars admitted by Resemblance Nominalism are of a kind, and so the admission of *possibilia* does not amount to admitting an extra kind of entities.

So the ontology of Resemblance Nominalism comprises two kinds of entities, particulars and classes. Universalism, on the other hand, postulates particulars and universals.[6] At first sight, then, both theories posit two kinds of entity and so are on a par as far as qualitative economy is concerned.

But is it not possible for Resemblance Nominalism to get rid of classes by accounting for them in mereological terms, à la Lewis (1991)? But Lewis's idea that subclasses are parts of classes is philosophically dubious (Oliver 1994). Furthermore, even if that idea turned out to be philosophically sound, the account does not apply to singletons (Lewis 1991: 31). It is impossible to get rid of all classes in purely mereological terms.

But, anyway, even with classes Resemblance Nominalism is really a one-kind ontology. For classes, as Armstrong recognizes (1997*c*: 188), are also particulars, since they are neither repeatable nor instantiable. Of course, they differ from concrete particulars by being *abstract*. But they are abstract *particulars*, and so Resemblance Nominalism has a monistic ontology with only particulars in it. Since Universalism admits an extra kind, namely universals, Resemblance Nominalism postulates fewer kinds than Universalism does.

But if Resemblance Nominalists admit only one general kind, namely particulars, they must admit two irreducible subkinds, namely membered and memberless particulars. So if Universalists could account for

[6] Universalism admits states of affairs, but these are particulars, if—but not only if—they are first-order states of affairs, or universals (Armstrong 1997*c*: 126).

classes in terms of particulars and universals then, even if they still admitted two general kinds—particulars and universals—they would arguably have restored parity of economy with Resemblance Nominalism. What Resemblance Nominalism gains by eschewing universals, Universalism would gain by reducing classes to particulars and universals, as some Universalists, like Armstrong (1997*c*: 185–95), have tried to do.[7] But Armstrong's account has odd consequences, namely that the world lacks a singleton (Armstrong 1997*c*: 194–5), and so I think his theory is unsatisfactory, which does not of course prove that no reductive account of classes can be given.[8]

However this may be, there are other versions of Universalism which are as economical as Resemblance Nominalism. These are versions which reduce concrete particulars to bundles of universals. Although some people believe that bundle theories face fatal difficulties, I think these can be overcome, though I cannot show that here. If so, bundle versions of Universalism could be as economical as Resemblance Nominalism.

How about Trope Theory? Trope Theory also admits *one* kind of entities, namely particulars, and so is on a par with Resemblance Nominalism. But how many kinds of particulars does Trope Theory accept? Different versions of Trope Theory admit different kinds of particulars. But *bundle* Trope Theories are, I think, clearly superior to

[7] Strictly speaking Armstrong claims to account for classes in terms of particulars and *unit-determining properties*, that is, properties which make particulars instantiating them just *one* instantiation of the property. *Being a cat* is thus a unit-determining property but *being scarlet* is not. Roughly, Armstrong (1997*c*: 189) says, unit-determining properties are the ontological correlates of count-nouns. Some unit-determining properties are universals but many are not. In general, these non-universal unit-determining properties are what Armstrong calls *second-class properties*, that is, properties where when truly predicated of a particular the resultant truth is a contingent one (Armstrong 1997*c*: 44). But Armstrong argues that these second-class properties supervene upon universals and so, he concludes, second-class properties are not properties ontologically additional to the first-class properties or universals they supervene upon (Armstrong 1997*c*: 45). So, given Armstrong's views on supervenience and ontic addition—which I do not share (see Sect. 6.3)—his account of classes in terms of particulars and unit-determining properties is really an account in terms of particulars and universals.

[8] Strictly speaking Armstrong does accept that the world has a singleton, but what he calls a *non-empirical* singleton. But by this all he means is that the world *could* have had a singleton! So saying that the world has a non-empirical singleton is a confusing way of saying that it has none, although it could have had one.

substratum Trope Theories. This is because bundle Trope Theories do not face some of the grave objections that bundle versions of Universalism face, like apparently being committed to a false version of the Principle of Identity of Indiscernibles. Indeed a third and powerful version of Trope Theory, Simons's *Nuclear Trope Theory* (Simons 1994: 567–9), seems to me a sophisticated version of a bundle Trope Theory.[9] Thus I think Trope Theory is on a par with Resemblance Nominalism in qualitative economy, for its basic entities are just tropes and classes. Resemblance Nominalism is therefore no more economical than Trope Theory.

I conclude that Resemblance Nominalism's advantage over its rivals should be sought in features other than the number of kinds postulated.

12.6 Avoidance of ad hoc ontology

The sixth respect in which I shall compare our theories is the ad hoc character of their ontologies. Consider Russell's 'supreme maxim of scientific philosophising', namely that *wherever possible, logical constructions are to be substituted for inferred entities* (Russell 1917: 155). At first sight it might seem that this suits the version of Resemblance Nominalism that takes properties to be *classes* of resembling particulars (see Sect. 4.2), for it needs some entities to substitute for the inferred ones. But even the version of Resemblance Nominalism which refuses to identify properties with any classes can fit the essence of Russell's thought, for this is just that 'in dealing with any subject-matter, find out what entities are undeniably involved, and state everything in terms of these entities' (Russell 1926: 112).

Basically what Russell is proposing here is to avoid postulating ad hoc entities. By the ad hoc ontology of a theory **T** I shall understand those entities postulated by **T** the only or main reason to believe in which is that they, in the context of **T**, play a certain theoretical role (e.g. contribute to the explanation of a phenomenon X or the solution

[9] Although, as Simons says, the nucleus of the substance, which is a bundle of tropes forming the substance's individual essence, *serves* as the substratum to the looser bundle of accidental tropes (Simons 1994: 568), it *is not* a substratum, but a bundle of tropes.

of a problem Y). Thus minimizing ad hoc ontology has the healthy effect of reducing acceptance of entities especially tailored to play a specific theoretical role.

No doubt avoiding ad hoc ontology is a theoretical virtue. Why is this? Basically because belief in a theory is in part belief in its ontology. So how credible a theory is partly depends on how credible its ontology is. If a theory **T** does not postulate ad hoc entities while a theory **U** does, then, other things being equal, this makes **T** more credible than **U**. For **T**'s ontology has an independent credibility that **U**'s ontology lacks. **U**'s ad hoc ontology is credible only if, and to the extent that, **U** itself is credible. Thus in this case credibility is transmitted from the theory as a whole (including its ontology) to one of its parts, namely its ontology. Credibility is also transmitted from **T** as a whole to its ontology, but this is a case of reinforcing, or adding to, the credibility of **T**'s ontology, for **T**'s ontology has a credibility independent from the credibility of **T** as a whole. Thus **T**, but not **U**, gains credibility from its ontology. So, in general, that a theory **U** postulates ad hoc entities while an alternative theory **T** does not, constitutes a reason (though a defeasible one) for preferring **T** over **U**.

Which one of our theories is the best with respect to ad hoc ontology? Resemblance Nominalism. For the main reason to believe in the existence of concrete particulars is not that they help to solve the Problem of Universals. On the contrary, that they exist is a presupposition of the Problem of Universals. But the main, if not the only, reason to believe in universals and tropes is that they, in the context of their respective theories, help to solve the Problem of Universals.

A sign of this is that *all* parties to the Problem of Universals agree that concrete particulars exist, even those theories that, like bundle theories, reduce them to other entities. But, on the other hand, not all parties to the Problem of Universals admit universals or tropes. Indeed the existence of universals and tropes is less credible than that of the entities normally postulated by different sorts of Nominalists, as even a champion of universals, like Armstrong, recognizes:

> . . . although predicates, concepts, classes and resemblances, upon which the different species of Nominalists rely, are reasonably familiar entities, it is a controversial question whether there are such things as universals. The

universal **F** and the relation of participation may possibly be thought to be theoretical or postulated entities in a way which the entities employed in Nominalist analyses are not. This may be one reason why Nominalism has appealed to Empiricists, who have a distrust of postulated entities. (Armstrong 1974: 193)

Now, of course, there is a limit to the credibility of the entities in Resemblance Nominalism's ontology. For universals and tropes are perhaps no less credible than *possibilia*. But the introduction of *possibilia* involves a less radical departure from an ontology entirely populated by actual concrete particulars than the introduction of universals or tropes, for, as Lewis (1986: 2) has emphasized, *possibilia* are of a kind with actual concrete particulars. Furthermore, the main reason to believe in *possibilia* is not that they help to solve the Problem of Universals in a Resemblance Nominalist way. They are not just postulated in order to solve the Problem of Universals; they do useful philosophical work elsewhere, notably in providing truth-conditions for modal discourse. Similarly with classes, ordered and unordered, which are a different kind of particulars and more controversial than concrete ones, but which we have independent reasons to accept (Quine 1960: 237, 266–70).

The main if not the only reason for believing in universals or tropes, by contrast, is that they might solve the Problem of Universals by providing truthmakers for sentences attributing properties to particulars. Thus universals and tropes are ad hoc entities and so Universalism and Trope Theory make use of ad hoc ontology in their explanations. This is why they are not favoured by considerations of avoidance of ad hoc ontology.

But is this so? Is it not a distinctive characteristic of contemporary theorizing about universals and tropes that they are employed to account for a wide range of different phenomena, like natural laws, modal facts, and mathematical facts?[10] True, this *is* a distinctive characteristic of contemporary theorizing about universals and tropes. But this fails to show that universals and tropes are not ad hoc entities, for what makes universals and tropes capable of accounting for natural

[10] I am indebted to an anonymous referee for urging me to consider this point.

laws, modal facts, and mathematical facts is that they are thought to be what *properties* are. Indeed on Armstrong's view laws are relations between universals, and therefore laws are accounted for in terms of universals, *because* on that view properties are universals. Armstrong is quite explicit on this:

. . . for it to be a law that an **F** is a **G**, it must be necessary that an **F** is a **G**, in some sense of necessary. But what is the basis in reality, the truth-maker, the ontological ground, of such necessity? I suggest that it can only be found in *what it is to be an **F** and what it is to be a **G***. . . . We need, then, to construe the law as something more than a mere collection of necessitations each holding in the individual case. How is this to be done? I do not see how it can be done unless it is agreed that there is something identical in each **F** which makes it an **F**, and something identical in each **G** that makes it a **G**. (Armstrong 1983: 77–8)

It is clear from this passage that universals can play the role they are thought to play in accounting for laws only if they are properties. And deciding whether or not properties are universals is deciding how good Universalist theories are as solutions to the Problem of Universals. No wonder then that in his book on laws Armstrong does not give arguments in favour of universals but says those arguments are to be found only in his previous book on them (1983: 8).

The same is true of Armstrong's account of classes in terms of universals. Basically, Armstrong's proposal is that a singleton is a state of affairs consisting in the member of the singleton having some unit-determining property. Since Armstrong believes unit-determining properties are universals or supervene upon universals, his account of singletons is an account in terms of universals (Armstrong 1991*b*, 1997*c*: 185–95). But his account of classes in terms of states of affairs—and so partly in terms of universals—can work only if universals deserve to play the role of properties, and this is something that is decided by how universals fare as a solution to the Problem of Universals.

Similarly for accounts of causation, numbers, and modality in terms of universals. It is because particulars act to bring about an effect in virtue of some of their properties that universals, given that they are thought to be what properties are, can account for causation. For Armstrong a number is a relation between a second-order property and an aggregate (1997*c*: 176), and although second-order properties are not universals, they are supervenient on first-class states of affairs, which have first-class properties, which for Armstrong *are* universals, as their constituents (Armstrong 1997*c*: 44–5).

Another account of numbers in terms of universals is John Bigelow's. According to Bigelow (natural) numbers are universals, more precisely they are relations of mutual distinctness (1988: 52). But Bigelow's account presupposes that relations *are* universals; indeed Bigelow says that universals are 'the properties, relations, patterns, structures, and so forth, which can be shared in common by many diverse individual, particular things' (1988: 11). So, again, universals can account for numbers only if they can account for, or can be identified with, properties and relations.

The same can be said of accounts of modality in terms of universals. In Armstrong's account possible atomic states of affairs are simply combinations of the constituents or elements of states of affairs, namely particulars, properties, and relations (1989*b*: 47). And it is only because Armstrong interprets properties and relations as universals that he can account for modality in terms of universals.

Thus the primary thing universals are introduced for is to account for properties and relations. If they do not succeed as an account of what properties and relations are, they cannot succeed in helping to account for classes, number, laws, causation, and modality.

Similarly for tropes. Tropes are introduced as an alternative to universals as to what properties and relations are. The main reason to believe in tropes is that they help to solve the Problem of Universals and therefore tropes are ad hoc entities. Tropes are thought to account for causation, being introduced as the terms of causal relations, as when the weakness of the cable caused the collapse of the bridge. But if this causal case can be accounted for in terms of tropes, it is simply because tropes—like *the weakness of the cable*—are thought to be *properties*. The effect in this case, the collapse of the bridge, is not a property but an event. And events are, for Campbell, changes in which tropes (properties) are replaced by one another (Campbell 1981: 480). Tropes are primarily properties (indeed they are particularized properties), as this quote from Campbell shows: 'the trope philosophy emphatically

affirms the existence of properties (qualities and relations). Indeed it holds that there is *nothing but* properties (or nothing but properties and space-time). However, it insists that these properties are not universals but, on the contrary, particulars with a single, circumscribed occurrence' (Campbell 1990: 27).

Campbell finds further ground for the belief in tropes in the analysis of local qualitative change and he thinks this is different from the Problem of Universals (1981: 478). He is right that they are different, but the problem of change is just the problem of explaining how it can be that the same thing can have different properties at different times. And Campbell solves it by making tropes play the role of properties. The basic point remains: the credibility of tropes is their credibility as properties.

No doubt tropes can also account for many different things, but my point is that they, like universals, can succeed in accounting for causation etc. only if they succeed in their claim to be what properties are, that is, only if Trope Theory, or Universalism, succeeds as a solution to the Problem of Universals.

This point can be reinforced with the help of a thought-experiment. Suppose Universalism, or Trope Theory, is eventually refuted as a theory of properties, that is, as a solution to the Problem of Universals. Will the philosophical community still believe accounts of causation, natural laws, classes etc. in terms of universals, or tropes? The answer is clear: no. Universals and tropes are postulated as what properties really are, and if they fail to convince as candidates for properties, they fail to convince at all.

But Mulligan, Simons, and Smith, who are aware that tropes can be disposed of because their job can be done with other, less controversial, entities, have argued that there is an independent reason to believe in tropes (Mulligan *et al.* 1984: 304–8). They argue that tropes can be the objects of acts of perception, for example, when one perceives the scarletness of a table. Thus according to them in many cases, if not all, what we perceive are tropes.[11] Campbell is another author who thinks that tropes are the immediate objects of perception (1981: 481).

[11] As I said in note 11 to Chapter 4, their actual example is not 'the scarletness of the table' but the 'the smile that just appeared on Rupert's face'.

But this is an independent reason only if it is clear that what we perceive in those cases are tropes. And that is not clear. For those cases where Susan seems to perceive the scarletness of the table may be cases where she perceives that the table is scarlet. And, as I argued in Section 4.12, Mulligan *et al.*'s case against this possibility is far from conclusive.

Although Mulligan, Simons, and Smith recognize that reserves of ingenuity may turn up new ploys to keep moments or, for that matter, tropes, at bay, they predict that such attempts will not succeed (Mulligan *et al.* 1984: 308). I, however, am inclined to believe that the correct account of perception, whatever it is, does not postulate tropes. Indeed, it would be most surprising if after meeting formidable objections like Russell's regress, the imperfect community and companionship difficulties, and what I have called the mere intersections difficulty, Resemblance Nominalism had to be abandoned because no satisfactory account of perception could avoid tropes.

12.7 The superiority of Resemblance Nominalism I

We have compared Resemblance Nominalism, Universalism, and Trope Theory in six different respects and we have found that while Universalism and Trope Theory have the advantage with respect to the preservation of our intuitions, Resemblance Nominalism has the advantage with respect to avoiding ad hoc ontology. Thus there are reasons to prefer Resemblance Nominalism and reasons to prefer its main alternatives. These reasons are expressed by the following two methodological principles:

Principle of Preservation of Intuitions and Accepted Opinions: If **T** and **U** are theories competing in the explanation of phenomenon X and/or solution of problem Y, and **U** violates more or firmer intuitions and accepted opinions than **T** does, then this is a reason (though a defeasible one) to prefer **T** over **U**.

Principle of Avoidance of Ad Hoc Ontology: If **T** and **U** are theories competing in the explanation of phenomenon X and/or solution of problem Y, and **U** alone postulates kinds of entities the only or main reason to believe in which is that they help to explain phenomenon X and/or solve problem Y, then this is a reason (though a defeasible one) to prefer **T** over **U**.

But even if both preserving intuitions and accepted opinions and avoiding ad hoc ontology are reasons to prefer a theory, these reasons need not have the same force. In other words, one of the two principles listed above may be stronger than the other. Is that the case? Which, if any, of those principles should take precedence? What is more important in the case of metaphysical theories: fitting our intuitions or avoiding ad hoc ontology?

I claim that, when the theories in question are metaphysical theories about certain features of the basic structure of reality, avoiding ad hoc ontology is a more important virtue than preserving intuitions. Preserving scientific opinion is a good thing (and Resemblance Nominalism *does* preserve scientific opinion), but I cannot see why theories in general should preserve intuitions, that is, pre-theoretical and uncritical beliefs.

No doubt there are areas, like some areas of Philosophy of Language, where intuitions are of paramount importance. Do definite descriptions *name* things? Are proper names rigid designators? Is a 'simple' sentence like 'Superman went into the telephone booth' extensional? Intuitions are of great importance in answering these and similar questions having to do with meaning. The reason for the importance of intuitions in this area is that, after all, meaning is something *we* do and so we can reasonably expect that our intuitions about meaning will be approximately correct.

But with metaphysical theories about the basic structure of the world, like Resemblance Nominalism and other solutions to the Problem of Universals, there is no reason to expect that our pre-theoretical beliefs and opinions will be true. Intuitions are, basically, instincts. They are the product of evolution and it is therefore highly unlikely that they are a reliable guide to metaphysical truth, since metaphysical insight has no survival value in the evolution of our species.

This does not mean that intuitions can and ought to be excluded from our metaphysical investigations. For although strict adherence to intuitions, in *any* area of research, would make the progress of knowledge impossible, it is inevitable, in *any* area of research, to incorporate some of our intuitions into our theorizing. But the impulse to let one's metaphysical investigations be guided fundamentally by intuitions can only be a hangover of a philosophical period now already past—a period when Philosophy was seen as mainly reflection on our use of language. Thus one should always keep a critical eye upon intuitions and be ready to discard those that are not validated by a rational and critical assessment or those that conflict with scientific or philosophical theories. Merely preserving certain intuitions does not make a theory better (although preserving certain intuitions, those that are validated rationally or theoretically, might make a theory better). The intuitions violated by Resemblance Nominalism are validated not by independent theories but by Universalism and Trope Theory, the two other theories in question.

On the other hand it is very important for one to have as much independent evidence as possible for the entities one believes in, and this is something that is done by avoiding having to postulate ad hoc entities. Thus given that there is less evidence for tropes and universals than for concrete particulars, Resemblance Nominalism has an advantage over Universalism and Trope Theory. For if there is a philosophical job that Resemblance Nominalism does as well as Universalism and Trope Theory, Resemblance Nominalism does it better, since it uses entities that are both less controversial and not ad hoc. To justify the admission of universals or tropes what needs showing is that there is some job that can be done *only* with tropes or universals. And while I cannot of course prove that there is no such job, I do claim to have shown that the job of solving the Problem of Universals is as well done by Resemblance Nominalism as by any other theory, and is therefore better done than by Universalism and Trope Theory.[12]

[12] It has been suggested to me that while Resemblance Nominalism faces difficulties—like the imperfect community and companionship difficulties—which require complex and industrious solutions, these problems are not even faced by Universalism and Trope Theory, which makes them less complex and more straightforward theories. But I think that the fact that a theory requires industry is often a positive sign, indicating that one is avoiding easy and ad hoc ways to solve the problem one is concerned with.

Thus, with respect to the theories we are comparing, avoidance of ad hoc ontology defeats preservation of intuitions. The reason to prefer Resemblance Nominalism is thus stronger than the reason to prefer whichever of Universalism and Trope Theory preserves intuitions better. This is what makes Resemblance Nominalism superior to and preferable over Universalism and Trope Theory.

But is not our belief in concrete particulars another intuition of ours? Yes, but it is not *merely* an uncritical and pre-theoretical belief. Most of our successful theories require concrete particulars—and so this belief is backed up by theory, not mere intuition.

Thus the superiority of Resemblance Nominalism, I claim, lies in its avoidance of ad hoc entities. What makes Resemblance Nominalism better than its rivals is that it does not postulate *new* kinds of entities, like universals or tropes, to solve the Problem of Universals. The advantage of Resemblance Nominalism thus lies not in the *number of kinds* it admits, but in *what those kinds* are. For the main reason to believe in the existence of concrete particulars is not that they help to solve the Problem of Universals. On the contrary, that they exist is a presupposition of the Problem of Universals. But the main, if not the only, reason to believe in universals and tropes is that they, in the context of their respective theories, help to solve the Problem of Universals.

I have argued that avoidance of ad hoc ontology is more important than preservation of intuitions when comparing theories like Resemblance Nominalism, Universalism, and Trope Theory. But how about the other respects? How do they compare in importance with avoidance of ad hoc ontology? This question is important because it may turn out that I was wrong that Resemblance Nominalism is not worse than its rivals with respect to the other four parameters.

If Resemblance Nominalism is incoherent then it *must* be abandoned. Coherence is the most important respect of comparison. But if Resemblance Nominalism turned out to be worse in ideological economy, I would still claim advantage for Resemblance Nominalism. For solutions to the Problem of Universals are theories about the world and what they say about the world is more important than how they say it. Choosing between theories is choosing what to believe—and surely when faced with alternatives about what to believe it is more important to focus on features of the entities postulated by the theories than in features of their formulation. Thus when comparing theories ontological considerations—like quantitative economy, qualitative economy, ad hoc character of ontology—should weigh more than considerations of ideological economy.

What if there is a conflict between these ontological considerations? Consider quantitative and qualitative economy. Which one is a superior virtue? This may perhaps vary from case to case: in some cases we should prefer qualitatively economical theories and in others quantitatively economical ones. But with *metaphysical* theories, like the ones we are considering now, qualitative economy should take precedence, with quantitative economy being used only to rank theories which are qualitatively on a par. This is because the *generality* of metaphysical theories makes the existence of a certain *kind* of entities matter more in assessing their truth or falsity than the number of entities of that kind.

This is particularly clear when we compare Resemblance Nominalism, Universalism, and Trope Theory. These theories purport to give an answer to the Problem of Universals. This is the very general question of what the truthmakers for any true sentences attributing a property to a particular are, not a string of particular questions about what makes specific sentences like '*a* is scarlet', '*b* is square', and so on, true. Answers to the Problem of Universals cannot therefore produce lists of particular entities, but only of *kinds* of entities, and this is what our theories do—resembling particulars; universals; tropes.

This is confirmed by the fact that one traditional way of formulating the Problem of Universals is the simple question: are there universals? This question obviously asks about the existence of a certain *kind* of entity, not about the existence of any particular number of instances of it. In short, the Problem of Universals is essentially a problem about *kinds* of entities, which is why postulating the existence of a certain kind plays the explanatory role in Universalism. Similarly for Resemblance Nominalism and Trope Theory: they postulate certain kinds of entities to account for certain general phenomena, and are not

concerned with how many members of those kinds there are. Thus in this case qualitative economy must take precedence over quantitative economy.

How about avoidance of ad hoc ontology and qualitative economy? Which one is more important? Suppose there are two theories T and **U** that differ only in that **U** postulates fewer but ad hoc kinds of entities and T postulates more but not ad hoc kinds of entities—which one should we prefer? I am inclined to say that T, the less parsimonious and not ad hoc one, should be preferred. For in that case there will be some independent evidence for the entities postulated by T and that will be independent evidence for the existence of that number of kinds. In other words, in that case there will be some independent evidence that the world is not as parsimonious as **U** takes it to be. Thus even if Resemblance Nominalism turned out to be worse than its main competitors in respect of the other parameters of comparison—putting coherence aside—Resemblance Nominalism would still keep an advantage over them.

But although avoidance of ad hoc entities makes Resemblance Nominalism superior to Universalism and Trope Theory, it cannot make it superior to other nominalistic theories which also invoke no ad hoc entities. Resemblance Nominalism's superiority to these theories must lie elsewhere, as we shall now see.

12.8 The superiority of Resemblance Nominalism II

In Section 1.2 we saw that—apart from Resemblance Nominalism—there are five other nominalistic theories. These are *Ostrich Nominalism, Predicate Nominalism*, *Concept Nominalism*, *Mereological Nominalism*, and *Class Nominalism*. The question now is whether, and if so why, Resemblance Nominalism is superior to these five nominalistic alternatives.

In Section 3.1 I argued against the relevant version of Ostrich Nominalism, on the basis that it makes unintelligible the Many over One, a phenomenon for which the Resemblance Nominalist must, can, and does account (see Sect. 4.1). That Resemblance Nominalism is superior to Predicate Nominalism and Concept Nominalism is clear, for the reasons Armstrong (1978*a*: 25) gives, namely that the latter are *subjectivist* solutions to the Problem of Universals, since they take properties to be dependent upon our words or concepts. That is, they make *a*'s being **F** depend on the existence of language users or thinkers. But, as Armstrong (1978*a*: 17, 27) insists, this gets the direction of explanation wrong: it is because *a* is **F** that '**F**' or the *concept of* ***F*** applies to *a* rather than the other way around. I think this consideration on its own suffices to rule out Predicate and Concept Nominalism. What about the other two Nominalisms?

I touched on the problems with Mereological Nominalism when discussing Goodman's mereological solution to the imperfect community difficulty in Section 9.1. These were that, even if the theory worked for some properties, it clearly does not work for others. Thus even if what makes something scarlet were that it is a part of the sum of scarlet particulars, what makes something square cannot be that it is a part of the sum of square particulars, for many such parts are not square, for example, any sum of two squares is not a square (compare Armstrong 1978*a*: 35). This problem is very grave and I cannot envisage any solution for it.

This leaves only Class Nominalism, which faces many of the objections against which I have defended Resemblance Nominalism. Armstrong, for instance, objects, among other things, that Class Nominalism wrongly identifies coextensive properties (Armstrong 1978*a*: 35, 1989*b*: 25–6), that it is committed to an infinite regress (1978*a*: 42), and that it cannot give a proper account of relations (1989*b*: 29–32). I think Class Nominalism might well be defended from many if not all of these objections.

So let us compare Resemblance Nominalism and Class Nominalism in relation to the six parameters distinguished above. Class Nominalism is as coherent as Resemblance Nominalism; it is also on a par with Resemblance Nominalism as far as the size and the ad hoc character of their ontologies is concerned, since they postulate the same entities. Class Nominalism may appear to be better with respect to ideological economy, since its only primitive appears to be the class-membership predicate. But this in fact is not so. For Class

Nominalism needs another predicate to separate those classes that are natural (i.e. property classes) from those that are not. So they seem to be on a par in this respect as well.

Nevertheless Resemblance Nominalism is better than Class Nominalism, and this is recognized even by those who oppose both, like Armstrong (1997*b*: 162).[13] Since they have the same ontologies, the superiority of Resemblance Nominalism over Class Nominalism does not lie in the entities it postulates but in what it says about those entities. Consider Armstrong's (1978*a*: 36) and Mellor's (1997: 262) objection to Class Nominalism, namely that properties determine class-membership, not the other way round. To Armstrong (1978*a*: 36), for instance, it seems clear that the relation between *a* and the class of **F**s 'does not *constitute* *a*'s being **F** but rather depends upon *a*'s being **F**'. This, as I said in Section 4.2, seems to me a fatal objection to Class Nominalism, but not to Resemblance Nominalism, which does not make *a*'s belonging to the class of **F**s a primitive and unexplainable fact, but accounts for it in terms of *a*'s resemblances to the other members of the class. Thus, according to Resemblance Nominalism, it is because *a* resembles the other **F**s, and therefore because it is **F**, that it belongs to the class of **F**s, so that what in the end determines *a*'s being **F** is its resemblances to other particulars.

One may believe that all this means is that Class Nominalism conflicts with our intuitions about the order of explanation, namely about what explains what. And this is true: Class Nominalism is in clear conflict with this intuition, which gives a slight advantage to Resemblance Nominalism. But the advantage of Resemblance Nominalism is not so slight, for it is not simply a pre-theoretical and uncritical belief that properties determine class-membership but not vice versa. All we know about classes we know from Class or Set Theory, which is very well developed, and there is nothing there that says, entails, or suggests that some classes may make their members share a property, resemble each other, or have similar causal powers.

[13] In the passage in question Armstrong is thinking of an *aristocratic* version of Resemblance Nominalism, which is the kind of Resemblance Nominalism he always has in mind.

Resemblance Nominalism's superiority over Class Nominalism derives from the latter's explanatory impotence—at least if what we want explained is what makes particulars have their properties. What makes a scarlet particular scarlet on Class Nominalism? That it belongs to a certain natural class, the class of scarlet particulars. But what makes some classes natural? Is it something about their members? If so, what? One option is to say that what makes some classes natural is that their members share some property. But this leads nowhere, because what we need explained is precisely what makes particulars have properties. Is it that all their members instantiate some universal, or that all of them have resembling tropes? This leads somewhere, but to Universalism and Trope Theory, not Class Nominalism. Is it then that their members resemble each other? This is promising if properly developed, as I have already argued at length—but this is Resemblance Nominalism, not Class Nominalism.

So it cannot be something about their members that makes some classes natural. But then that a class is natural *must* be, as Lewis says it is (1997: 193), a brute, ultimate, primitive fact, a fact not explainable in terms of any other facts nor determined by any other facts. In other words, nothing *makes* any class natural—some classes just happen to be natural, others happen not to be so.

Here we see another advantage of Resemblance Nominalism over Class Nominalism. For since the fact that a class is natural is primitive, Class Nominalism cannot explain what distinguishes natural from non-natural classes. And in the version of Class Nominalism in which properties are identified with natural classes, Class Nominalism fails to explain what distinguishes properties from other entities, which amounts to endowing properties with a fundamentally opaque nature. Indeed, one can and must ask: what makes *these* classes, rather than *those*, natural? Class Nominalism can only offer the unilluminating answer that their being natural is a primitive fact, an answer that again highlights the superiority of Resemblance Nominalism, which says (roughly) that classes are natural if and only if their members resemble each other. Resemblance Nominalism shows here greater explanatory power than Class Nominalism, since it offers an explanation where Class Nominalism has an ultimate, brute fact.

But there is an even bigger problem for Class Nominalism and this is that its explanation in terms of natural classes explains nothing. For Class Nominalism claims that what makes something have a property is that it belongs to a primitively natural class. Now natural classes are property classes, that is, classes of all and only the particulars having a certain property, even if in Class Nominalism the predicate 'natural' is primitive and is not explained in terms of other predicates. So Class Nominalism's claim can be understood in either of the following ways: (*a*) it is a primitive fact that the members of natural classes have a property, and having a certain property is what makes particulars belong to natural classes; (*b*) it is a primitive fact that certain classes are natural, and belonging to such classes is what makes any particular have a property.

If (*a*) is what Class Nominalism has to say, this simply manifests its explanatory inadequacy. For having a property is the *explanandum*, not the *explanans*. If the claim is (*b*), things are not really better for Class Nominalism. How could a primitive fact about a *class*, a fact not determined in any way by its members, make its members have a property? Even if somehow it could, can we really understand this explanation given that all we know about the primitive *explanans* is that it is primitive? What is this primitive fact about certain classes that gives them the power to make their members have a property? The problem with this fact is not that it is primitive, ultimate, or brute—the problem is that it is mysterious, and therefore any appeal to it is unenlightening. The explanatory powers of Class Nominalism are frankly null.

Resemblance Nominalism, on the other hand, explains what makes, say, scarlet particulars scarlet by saying that the R*-difference of their class is 1. This just means that the scarlet particulars form a maximal perfect community of some degree n (i.e. a (Max)-class) which is a proper subclass of n–1 (Max)-classes whose R*difference is 1 (see Sect. 11.6). And this involves facts of resemblance between the scarlet particulars and between nth-order pairs having them as bases. It is facts of this sort that make particulars have their properties and so make them belong to certain property classes. Resemblance Nominalism, unlike Class Nominalism, explains property classes in terms of facts about particulars (and pairs duly related to them), not the other way around.

Thus the superiority of Resemblance Nominalism is explanatory superiority. It is superior to Universalism and Trope Theory because its ontology is less ad hoc. It is superior to Class Nominalism because, with the same ontology, it explains what makes particulars have their properties, while Class Nominalism does not.

Thus Resemblance Nominalism not only gets a place in the Problem of Universals' 'grand final', it wins the contest.

Appendix: On Imperfect Communities and the Non-communities they Entail

The considerations in Section 9.5 made clear why, for the imperfect communities of Tables 9.5, 9.8, and 9.9, there is some class α^n that is a non-community. However, the n such that α^n is a non-community varies from one imperfect community to another: as we saw $n = 1$ for the imperfect community of Table 9.5, $n = 2$ for that of Table 9.8, and $n = 3$ for that of Table 9.9. This, I said, had to do with the different cardinality of the imperfect communities in question. And, as I said there, it is an interesting question what the numerical relation is between the number of members of an imperfect community α^0 and the value of n such that α^n is a non-community.

I showed that if the bases of the nth-order pairs x and y jointly exhaust the members of an imperfect community α^0 then those pairs share no property and so α^n is a non-community. Can we then calculate the n given that α^0 is m-membered? Notice first that there is more than one n such that α^n contains two pairs whose bases jointly exhaust the members of α^0. Consider, for instance, the imperfect community $\alpha^0 = \{a,b,c\}$. The bases of the first order pairs $\{a,b\}$ and $\{a,c\}$ jointly exhaust the members of α^0, and so α^1 is a non-community; but so is α^2, which contains pairs like $\{\{a,b\},\{a,c\}\}$ and $\{\{a,b\},\{b,c\}\}$, whose bases also jointly exhaust the members of α^0; and so on. In short, for every class α^0 there are infinitely many values of n such that α^n contains two pairs whose bases jointly exhaust the members of α^0 and so for every imperfect community α^0 there are infinitely many values of n such that α^n is a non-community.

I should look then for the *least n* such that the bases of two nth-order pairs jointly exhaust the members of a given α^0. Now if n is the *least* number such that the bases of some two nth-order pairs x and y jointly exhaust the members of α^0, that is, if n is the *least* number such that α^n contains pairs x and y such that their bases jointly exhaust the members of α^0, then α^{n+1} contains a pair whose bases exhaust the members of α^0, namely the pair $\{x,y\}$. Furthermore there is no number $k < n+1$ such that α^k contains a pair whose bases exhaust the members of α^0. For suppose there is such a kth-order pair $\{w,z\}$; then w and z are pairs of order $k-1$ and their bases jointly exhaust the members of α^0; but if $k < n+1$ then $k-1 < n$ and so n is not the *least* number such that the bases of some two nth-order pairs jointly exhaust the members of α^0. Thus if n is the least number such that α^n contains two pairs x and y whose bases jointly exhaust the members of α^0, then α^{n+1} is the *lowest*-order class containing a pair $\{x,y\}$ whose bases exhaust the members of α^0.

Thus, if given a class α^0 one can calculate the lowest-order class containing a pair $\{x,y\}$ whose bases exhaust the members of α^0, one can then calculate the lowest-order class containing some two pairs x and y whose bases jointly exhaust the members of α^0: the second class is one order less than the former. Let us now see how given a class α^0 one can calculate the lowest-order class containing a pair $\{x,y\}$ whose bases exhaust the members of α^0 and then calculate the lowest-order class containing some two pairs x and y whose bases jointly exhaust the members of α^0. To simplify the exposition of the following I shall from now on let '$\Delta(x)$' stand for the bases of pair x. Consequently, instead of saying that the bases of x exhaust the members of α^0 I shall now say that $\Delta(x) = \alpha^0$ and instead of saying that the bases of x and y jointly exhaust the members of α^0 I shall say that $\Delta(x) \cup \Delta(y) = \alpha^0$.

Now, since an nth-order *hereditary* pair can have at most 2^n bases, if α^0 is m-membered the least n such that some nth-order pair $\{x,y\}$ is such that $\Delta(\{x,y\}) = \alpha^0$ is the least n such that $2^n \geq m$, that is, the n such that $2^{n-1} < m \leq 2^n$. Thus, if α^0 is m-membered and n is such that $2^{n-1} < m \leq 2^n$ then α^n is the lowest order class containing a pair $\{x,y\}$ such that $\Delta(\{x,y\}) = \alpha^0$. But then if α^0 is m-membered and n is such that $2^{n-1} < m \leq 2^n$ then α^{n-1} is the lowest-order class containing some two pairs x and y such that $\Delta(x) \cup \Delta(y) = \alpha^0$. But now, if to simplify one replaces 'n' by '$n+1$' throughout the inequality, one gets $2^n < m \leq 2^{n+1}$, and one can then say that if α^0 is m-membered then α^n, where n is such that $2^n < m \leq 2^{n+1}$, is the lowest-order class containing some two pairs x and y such that $\Delta(x) \cup \Delta(y) = \alpha^0$. And so, since if a class α^n contains some two pairs x and y such that $\Delta(x) \cup \Delta(y) = \alpha^0$ and α^0 is an imperfect community, then α^n is a non-community, if α^0 is an m-membered imperfect community then α^n, where $2^n < m \leq 2^{n+1}$, is a non-community.

But if α^0 is an m-membered imperfect community, what is the least n such that α^n is a non-community? In particular, is it the n such that $2^n < m \leq 2^{n+1}$? Not necessarily, for an imperfect community α^0 may contain another imperfect community, that is, α^0 may be *non*-minimal (see Sect. 9.7). But if α^0 is a

minimal imperfect community then the *least* n such that α^n is a non-community *is* the n such that $2^n < m \leq 2^{n+1}$. For suppose that *(a)* α^0 is an m-membered *minimal* imperfect community, *(b)* n is such that $2^n < m \leq 2^{n+1}$, and *(c)* there is a $k < n$ such that α^k is a non-community. From *(a)* and *(b)* it follows that α^n is the lowest-order class containing some two pairs x and y such that $\Delta(x) \cup \Delta(y) = \alpha^0$. But then, since $k < n$ and α^k is the class of kth-order pairs whose bases are members of α^0, it follows that for every two pairs w and z in α^k, $\Delta(w) \cup \Delta(z) \subset \alpha^0$, that is, the union of the bases of every two pairs in α^k is a proper subclass of α^0. From *(c)* it follows that there are some kth-order pairs w and z such that $f(w) \cap f(z) = \varnothing$. Consider now two such pairs w and z and let $\beta^0 = \Delta(w) \cup \Delta(z)$; those pairs w and z are, of course, members of β^k as well as members of α^k. Now since β^0 is a subclass of α^0, which is a *minimal* imperfect community, β^0 is a perfect community. But if β^0 is a perfect community then it follows that β^k is a community. But if β^k is a community then $f(w) \cap f(z) \neq \varnothing$, which contradicts what follows from *(c)*. Thus if *(a)* and *(b)* are true, *(c)* is false, that is, if α^0 is an m-membered *minimal* imperfect community then the n such that $2^n < m \leq 2^{n+1}$ is the *least* n such that α^n is a non-community.

In general, then, for every imperfect community α^0 the least n such that α^n is a non-community is the n such that $2^n < m \leq 2^{n+1}$, where m is the number of members of the smallest imperfect community which is a (proper or improper) subclass of α^0.

Notice that this also tells us something about *perfect communities of a degree d*, introduced in Section 10.2. α^0 is a perfect community *of degree d* if and only if it is a perfect community and d is the lowest degree to which any two members of any α^n stand in R* to each other. According to the above, then, if α^0 is an m-membered perfect community then the lowest degree of resemblance to which any two members of α^n, where $2^n < m \leq 2^{n+1}$, stand in R* to each other, *is* the lowest degree to which any two members of any α^n stand in R* to each other. For α^n, where $2^n < m \leq 2^{n+1}$, contains some pairs x and y such that $\Delta(x) \cup \Delta(y) = \alpha^0$ and no two members of any α^n can resemble to a degree lower than any such pairs x and y do.

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