

CHAPTER I

*Metaphysical Realism and essentialism
about kinds*

I.1 KINDS OF THINGS

We are a classifying species. We recognize not just individuals but *kinds* of things, and we sort individuals into kinds. Among the myriad kinds we identify are *protons* and *antineutrinos*, *lithium* and *roentgenium*, *polystyrene* and *DNA*, *radioactive decay* and *polymerization*, *stars* and *meteorites*, *Newtonian fluids* and *gases*, *viruses* and *cancer cells*, *homologies* and *larvae*, *child abuse* and *Alzheimer's disease*, *hysteria* and *ADHD*, and *permanent residents* and *refugees*. These include kinds of entity or object, process or state, and so on. In the face of such a proliferation of kinds, philosophers are prone to ask whether all of them are on a par, or whether some are real and others merely ersatz, artificial, or nominal. Some philosophers would regard only a small minority of such groupings as real or natural. They would claim that the natural kinds are a tiny subset of the kinds that we have identified in the course of our everyday activities and in the course of scientific theorizing about the world. On this way of seeing things, not all categories identified in our natural language, nor even all those featured in scientific discourse, ought to be taken to pick out real kinds of things. Many, if not most, are simply convenient groupings, with limited utility for some purpose or another, but without a claim to “carving nature at its joints.” This supposed contrast between categories that really correspond to the divisions in nature and those that are merely useful crutches designed to enable us to get by in the world (let alone those that are entirely artificial and fail to serve any practical purpose) is the focus of this chapter. I intend to examine the various criteria and desiderata that have been put forward to distinguish natural from artificial kinds, and will try to determine which of them, if any, should be taken as a mark of the natural.

Consider any set of individuals endowed with various properties, whether human beings, artifacts, terrestrial organisms, clouds, celestial bodies, samples of chemical substances, or elementary particles. Each

individual in this set will typically have a large number of properties, and any attempt to systematically describe the whole collection will inevitably involve sorting individuals into groups. Now imagine that a human observer, call her Eve, surveys this scene and wonders how she is to make sense of these individuals, each with its own physical dimensions, spatial location, trajectory, causal powers, patterns of behavior, and so on. After a period of close observation, Eve hits upon a system for dividing the individuals into groups, which helps her make sense of it all, which has explanatory power, and on the basis of which she is able to make surprising predictions. Her sorting scheme consists of a system of categories, K_1, \dots, K_n , each including a number of individuals among its members, based on the properties possessed by those individuals. Each of these categories is associated in her language with a general term; each such general term picks out a particular *kind* of individual. If she finds herself in a philosophical, rather than a purely scientific, mood, she may mull over a number of questions. Having sorted these individuals into a system of kinds, she might ask herself the following: Are these the kinds to which these individuals *really* belong? Do divisions between the various kinds correspond to the world's own divisions, or are they merely a reflection of my perspective? Moreover, can they be further split into subkinds, or further lumped into superkinds? Is there a single unique way of sorting them into kinds, or are there a number of different ways of doing so? If there is no unique way of doing so, are some systems of kinds privileged over others, or are they all on a par?

Having formulated these questions and considered them, Eve might raise a further question: How are we to tell which of these categories really correspond to the world's own divisions? Is there some way of doing so beyond our usual ways of discerning which categories succeed and advance our knowledge and which do not? It is not as if some categories come with a further proof of authenticity or a seal of approval that informs us that they are genuine while the others are not. Thus, Eve may conclude, the question concerning which kinds are real (or natural) would seem to reduce to one about which categories figure in our best theories of the world, or form part of our settled knowledge of nature. It is not that our best theories and settled knowledge actually *determine* which kinds exist, but rather that they serve as the best *guide* to the existence of the kinds of things in the world. We have no other way of delineating genuine groupings from bogus ones, we can imagine Eve concluding. Ultimately, Eve's conclusion is the one that I will be arguing for in this book. But in this chapter I will first examine other proposals for establishing which

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kinds are natural and which are not. Various ways of distinguishing the real categories or ‘natural kinds’ have been proposed, and philosophers have advanced several answers to the question, what makes a kind natural? Some of these have explicitly been put forward as accounts of natural kinds, but others are either implicit in such answers, or emerge in slightly different contexts to distinguish real from unreal kinds of entities.

Before proceeding, there are a few preliminary issues to be clarified. One such issue concerns philosophical methodology. How should we go about adjudicating the issue of what constitutes a natural kind? One traditional philosophical approach would recommend analyzing the concept *natural kind*, but this immediately raises the question of what we are to go on when we perform such an analysis. Some philosophers might posit a direct metaphysical intuition that would enable us to identify the criteria by which to distinguish natural from nonnatural kinds. But this seems to assume that we have an intuitive knack for discovering the underlying nature of reality, which is not an assumption I am prepared to accept without further justification. Moreover, we cannot go on common parlance and attempt to explicate our common usage of the expression, since ‘natural kind’ is a philosophical term of art, first introduced into discussions by John Venn (1876), following John Stuart Mill (1843/1974), who used the expressions “real kind” and “true kind.”¹ And merely analyzing the usage of these philosophers would be a historical exercise. Instead, it would be more fruitful to adopt the methodology of “reflective equilibrium” (Goodman 1954/1979), throwing into the hamper various relevant factors. One such factor concerns our convictions as to the categories generally regarded as paradigmatic natural kinds, such things as elementary particles, chemical elements, chemical compounds, biological species, and perhaps a few others (beyond that, things are more controversial). A philosophical account of natural kinds that deems all or many of these to be natural kinds is to be preferred over one that does not, other things being equal.² We should also factor past philosophical usage into the equation; it would count against a view of natural kinds if it does not cohere at all with at least some previous philosophical discussions of natural kinds (and this is where the

¹ Although Hacking (1991, 110) credits Venn with coining the expression, Venn (1889, 83) credits Mill, saying that “he introduced the technical term of ‘natural kinds’ to express such classes as these.” But Mill tends to use the terms ‘real kind’ and ‘true kind’ instead of ‘natural kind’; I will discuss Mill’s view in Chapter 2.

² Some contemporary essentialist accounts of natural kinds have the consequence that biological species are not natural kinds (Ellis 2001; Wilkerson 1993). While such accounts should not be dismissed out of hand, this consequence can be considered a drawback.

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views of Mill and others would at least be relevant). An account that did not overlap at all with previous ones may well be accused of changing the subject. A third factor that should figure in our deliberations concerning natural kinds consists of a set of considerations drawn from actual scientific practice as to which categories are regarded as genuine as opposed to mere artifacts, and as to the methods that are used to make such judgments. The attempt to take scientific evidence seriously in this philosophical inquiry is in line with a “naturalist stance” in contemporary philosophical discussions. Moreover, scientific evidence can also be brought to bear in a different way in this philosophical inquiry. If a philosophical account of natural kinds holds that all natural kinds should have some feature *F*, and if our current best scientific theories of what are commonly regarded as natural kinds tell us that these kinds lack *F*, then that would cast doubt on this philosophical proposal. (Of course, it may be possible for us to save *F* at the expense of deeming that those kinds that lack *F* are not natural kinds after all, but that is a price we should try to avoid paying, other things being equal.) Yet another factor to subject to reflective equilibrium is the sum of considerations derived from other areas of philosophy, such as discussions of natural laws, properties, and causation, as well as broader questions in epistemology and philosophy of language. In the final analysis, there will be choices to be made – for instance, in regarding how to rank these considerations, and when to revise convictions in one area at the expense of others. I will endeavor, whenever there are judgment calls to be made, to make them explicit and to flag them as such.

Another issue worth pausing to consider is a terminological one. The term ‘natural kind’ has come to be central to this philosophical debate and I have used it several times in the previous paragraphs. As I have already indicated, the term has a venerable history and there is a clear rationale for using it, since it points to a contrast between categories that exist *in nature* and those that do not (existing perhaps only in our minds). But the term is also unfortunate, since it may suggest a connection with the natural sciences (conventionally, physics, chemistry, and biology) as opposed to the social sciences. Now, some philosophers would indeed restrict natural kinds to the natural sciences (and some would further restrict them to a subset of those sciences and to a subset of the categories therein, as we shall see), but the very use of the term should not lead us to prejudge the issue. At least, I want to consider it an open question and will try to determine whether the restriction of natural kinds to the natural sciences is justifiable. The word “natural” in the term ‘natural kind’ is more plausibly regarded as alluding to the fact that the kinds in question are

really found in nature or in the universe (not merely in the mind or in language). It might have been better to use Mill's expression "real kind" instead, but unfortunately that expression has never caught on and is not a widely used expression. Since 'natural kind' has come to be used to distinguish real from nonreal kinds, that is the term I will deploy. Another issue raised by the use of the term 'natural kind' concerns the appropriate complementary term. Of course, the least controversial expression to denote the complement of 'natural kind' is 'nonnatural kind', though that is not a commonly used term and is not very informative. On the other hand, some of the terms that have been used in this connection seem committed to substantive answers to questions that, once again, I would like to keep open. 'Nominal kind' suggests that kinds that are not natural exist in name alone, or are present only in language. 'Artificial kind' implies that they are a product of human artifice. 'Artifactual kind' conjures up human-made artifacts. Thus, for lack of a better alternative, I will opt for the more neutral 'nonnatural kind', despite its awkwardness. Furthermore, as I will use it, the term 'kind' on its own is meant to encompass both natural and nonnatural kinds. I will also use the term 'category' to denote a kind-concept, a concept that refers to a kind, whether natural or not. Roughly speaking, a 'category' belongs to our language, theories, or discourse whereas a 'kind' pertains to the world. Finally, I will tend to italicize the names of kinds and categories when they are being considered as kinds or categories but not when discussing their instances or manifestations (though the distinction is occasionally hard to draw).

1.2 KINDS AND UNIVERSALS

Some philosophers would say that what distinguishes natural from non-natural kinds is that the former correspond to real entities, and that these entities are abstract objects endowed with metaphysical reality. This is Realism in the classical sense, as found in various guises in the history of philosophy, from Plato to David Armstrong. In what follows, I will use 'Realism' (uppercase *R*) when referring to the thesis that properties and kinds refer to universals, distinct metaphysical entities, rather than sets of particulars. This thesis is not to be confused with a more limited thesis of realism (lowercase *r*) about kinds, which regards them as objective features of reality (to be discussed in Chapter 6), not necessarily corresponding to distinct metaphysical entities like universals.

Kinds, like properties, are thought on this Realist view to have metaphysical reality over and above the particulars that belong to those kinds.

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Why posit an entity, such as a kind or property, as distinct from the members of that kind or the instances of that property? Historically, philosophers have put forward several considerations for doing so, but two will suffice for our purposes. One is that the very same collection of individuals can sometimes constitute all and only the members of more than one distinct natural kind. If we were to identify a kind with its individual members, then we would sometimes be unable to maintain that these were indeed distinct kinds. The kind *creature with a heart* is often said to be actually coextensive with the kind *creature with a kidney*, yet they seem to be distinct kinds. More plausibly, in the phylogenetic taxonomy of living organisms a genus sometimes contains a single species (or a family a single genus, and so on). Even though the individual members of the species are identical to the members of the genus, the species and genus would seem to be distinct natural kinds. A second reason for positing properties over and above their instances, or kinds over and above their members, and for thinking of them as entities in their own right, is that we often have occasion to refer to them or quantify over them in our theoretical or scientific pursuits. Armstrong (1980/1997, 106) uses statements such as the following to make this point:

- (1) There are undiscovered fundamental physical properties.
- (2) Some zoological species are cross-fertile.

In these statements, it is not a trivial matter to paraphrase away occurrences of the terms ‘properties’ and ‘species’, or to replace the statements with ones that refer only to sets of particulars. Hence, we seem to be committed to the existence of properties and kinds in some of the statements that we make. This argument is particularly effective against metaphysical anti-Realists, or Nominalists, since many of them follow Quine’s ontological dictum that “to be is to be the value of a variable.”³ If we find ourselves quantifying over properties and kinds and if we are unable to do away with them in our considered scientific theories, then we need to posit entities that correspond to them, or to admit such entities into our ontology. What sort of entities, then, would correspond to properties and kinds?

One historically influential view of properties is that they are identical with universals, which can be construed either as being transcendent (along the lines of Plato’s ‘forms’) or immanent in the particulars that possess the relevant properties. On the latter view, which has been

³ Curiously, (2) is mentioned by Quine (1948/1953), though he does not explain how a nominalist might rephrase it.

defended by Armstrong (1978a, 1978b, 1989), universals are wholly present in each of their instances, as nonspatiotemporal parts of them. For example, the universal *positive charge of 1.6×10^{-19} C* is present in each proton particle, though it is not a detachable part of each such particle. This view of universals has certain unintuitive consequences, since it entails, for example, that something can be entirely present in two distinct instances at the same time. Moreover, it countenances such things as ‘parts’ that are neither spatiotemporal nor detachable. Should one reject this entire conception of universals based on the fact that these entities violate some of our most basic intuitive assumptions about reality? Lewis (1983, 345), who is not exactly sympathetic to this view, thinks not. After all, he asserts, our intuitions about such matters “were made for particulars”. Be that as it may, positing strange entities of this sort exacts a price.

According to Realism about properties, each real property corresponds to a universal, a metaphysically independent entity that is repeated in each of its members. In Armstrong’s terminology, each universal is the “truth-maker” for a particular having a certain property. How would Realism deal with kinds? Kinds differ from properties in that their instances are individual entities or objects (as well as, perhaps, events, processes, and so on), while properties are instantiated by property instances, which are sometimes referred to by metaphysicians as ‘tropes’ or ‘modes’. The kind *elephant* has individual elephants as its instances (e.g., Dumbo), while the property *gray* has particular manifestations of shades of gray as its instances (e.g., Dumbo’s grayness). In addition, kinds are “associated with”⁴ collections of properties (the nature of this association will be discussed shortly, as well as in section 6.2), since individuals belong to kinds on the basis of possessing a number of properties, and indeed there may be nothing more to being a member of a kind than possessing a certain set of properties. Incidentally, I will assume that members of kinds are similar to each other because they share at least some of these properties. Some philosophers (e.g., Heil 2003) think that there can also be brute similarity between individuals and property instances, and that membership in a kind is based on similarity. But I find this notion of brute similarity to be obscure and prefer to understand similarity in terms of shared properties; in this,

⁴ I am following many contemporary authors in using this (somewhat vague) locution. One exception is E. J. Lowe, who thinks that kinds are characterized by properties just as their instances are. He thinks that it is acceptable to say that “certain kinds are characterizable by certain characterizing universals,” and that this is consistent with “saying that particular instances of those kinds are *also* characterizable by those universals” (Lowe 2004, 155; original emphasis). But the kind *elephant* is not gray in the same way as Dumbo is gray.

I agree with Mill (1843/1974, IV vii §4), who writes: “And this resemblance [among members of a kind] itself is not, like resemblance between simple sensations, an ultimate fact, unsusceptible of analysis. Even the inferior degree of resemblance is created by the possession of common characters.” I will also assume, following a number of contemporary philosophers, that properties are individuated by their causal powers and are closely associated with them (Armstrong 1978b). Properties are sometimes considered either *categorical* or *dispositional*, the latter being causal powers that are manifested under certain conditions. But this distinction does not seem to run very deep, and some philosophers have proposed that every property has both a dispositional and categorical aspect (Heil 2003). Further, properties can be determinable (e.g., *mass*) or determinate (e.g., *mass of 67 kg*), but we shall see in due course that the properties associated with natural kinds tend to be determinate rather than determinable.

What does Realism about properties have to say about kinds? There would seem to be two ways of accommodating kinds on the Realist picture. On one account, in addition to the fact that each property corresponds to a universal, the kind associated with a collection of properties also corresponds to a universal. Consider the kind *proton*, whose members are individual protons. This kind is associated with the properties of having a *positive charge of 1.6×10^{-19} C*, having a *mass of 1.7×10^{-27} kg*, having *spin $\frac{1}{2}$* , and so on. Each of these properties corresponds to a universal, so the question arises as to the relationship between the universal corresponding to the kind *proton* and the universals corresponding to each of its associated properties. Possessing a certain collection of properties is both necessary and sufficient for being a proton, so we would expect the universal that corresponds to the kind *proton* to have some intimate connection to the universals corresponding to each of its associated properties. How exactly this is to be spelled out is a delicate matter.

Many proponents of universals already recognize that they need to posit (higher-order) relations between universals, specifically relations corresponding to natural laws. Indeed, some, like Armstrong (1992/1997, 164–165), take this to be one of the attractions of admitting universals into our ontology – namely, that universals are involved in providing “ontological correlates” to true statements of natural laws. On Armstrong’s view, the truth-makers for laws of nature are the necessary connections that obtain between some universals. Thus, if it is a law of nature that negative charges and positive charges attract each other, this is made true by a necessary connection between the property-universal *negative charge* and the property-universal *positive charge*. Now if the kind *proton*

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corresponds to a universal in its own right, we would need to explain the relationship between the universal corresponding to the kind and the universals corresponding to each of its associated properties. We would also need a way of distinguishing this relationship from that obtaining between universals linked by natural laws, as well as from that obtaining between universals structurally linked to other universals (e.g., the universal *proton* and the universal *hydrogen atom*, or in the other direction, the universal *proton* and the universal *up quark*). There may indeed be ways of spelling out the truth-makers for these relationships between universals, but this does not seem to have been worked out in detail, and there are considerable problems that confront some attempts to do so.⁵

This brings us to the second way of dealing with kinds on a Realist view of properties: One might hold that the kind itself does not correspond to a single metaphysical entity, but rather to a conjunction of such entities. The Realist thesis would then apply not to the kind so much as to the cluster of properties that members of the kind have in common. In some of his work, Armstrong (1997, 67) casts doubt on the need for separate universals to correspond to natural kinds, writing that “it is not clear that we require an independent and irreducible category of universals to accommodate the kinds.” But if that is the case, it does not seem as though we have endowed the kind itself with any metaphysical status, but rather have done so for its associated properties. The kind would then correspond to a conjunction of universals rather than a single universal. Moreover, conjunctions of universals do not seem to have any more claim on reality than conjunctions of particulars (e.g., David Armstrong and Louis Armstrong, or my favorite pen and the Rock of Gibraltar). In an inventory of the objects that exist in the universe, we would not count individuals twice over, once on their own and again as members of twosomes or couples. This would seem to apply to the realm of universals too. Moreover, though Armstrong (1978b, 30–39, 1989, 84) thinks that conjunctions of universals are themselves universals (unlike, say, disjunctions or negations of universals), other Realists dissent from this judgment. For instance, Ellis (2001, 89–90) thinks that there are no conjunctive universals corresponding to conjunctive properties. Though he does admit conjunctions of properties that correspond to natural kinds, he does not appear to justify this exception to the denial of conjunctive universals.

⁵ For some of the problems faced by structural universals, see Lewis (1986); for a response, see Armstrong (1986).

Even if we satisfactorily resolve the question as to whether a conjunction of universals can be considered a universal, when it comes to kinds, identifying them with conjunctions of universals is particularly unhelpful. If one were to consider the kind *proton* to correspond to the conjunction of properties associated with that kind, this would not constitute a ringing endorsement of the existence of kinds. We would have no more reason to think that the kind *proton* exists as a conjunction of the properties associated with protons than we have to believe in the existence of the conjunction of any two or more of those properties. If the kind *proton* is taken to be equivalent to a conjunction of property-universals, it would have no more claim to existence than the conjunction of *positive charge of 1.6×10^{-19} C* and *spin $\frac{1}{2}$* . But that conjunction is not a natural kind whereas *proton* is. The difference between the two cannot be explained by a view that considers kinds to be simply conjunctions of universals. Realists could say that the natural kinds are only those that correspond to single properties, not those kinds that are associated with a number of different properties. But if they were to say that the only natural kinds are those that correspond to single properties, they would be left with a rather unsatisfactory account of natural kinds. It would turn out that having a *positive charge of 1.6×10^{-19} C* is a natural kind, and that its members include all protons as well as all pion particles and others, but that *proton* itself is not a natural kind. However, an account of natural kinds that deems natural only those kinds that correspond to single properties is not really an account of natural kinds at all, since few of the natural kinds that are widely accepted are thought to coincide with single properties.⁶ One might as well say that there are no kinds over and above the properties with which they are associated.

To summarize, the first version of Realism owes us some account of the relationship (presumably, a necessary connection) between the universal that corresponds to the kind and those corresponding to its associated properties. And the second version seems not to endow kinds with an independent metaphysical existence. However, there is another problem with considering kinds to be universals. A more pertinent problem, at least for our purposes, is that it does not give us a way of distinguishing natural from nonnatural kinds. To see this, consider again Realism about

⁶ Another problem with this move for Realists is that many of them take properties and kinds to belong to different ontological categories (e.g., Ellis 2001; Lowe 2006). Hence, the universal corresponding to the kind cannot be the same as the universal corresponding to the property even in the case of a single-property kind.