

Why (Most) Kinds are not Classes¹

In the last century many hundreds of experiments were run by psychologists trying to discover how people "classify" or "categorize" items under kind words such as "dog," "chair," and "fruit." The position I have taken on such words is that they do not designate classes but units of another kind entirely. There do exist some, a very few, uncompounded nouns that designate classes, but words like "dog" and "chair" and "fruit" are not among them. Here I will introduce you to this negative position. I cannot attempt to defend it at any length in a short essay, but I will present a portion of it in the most intuitively understandable terms I can muster. The details are spelled out in On Clear and Confused Ideas (Millikan 2000), which I will refer to as "OCCI".

One place to begin is with the claims of biologist M.T. Ghiselin (1974, 1981) and philosopher David Hull (e.g. 1978) about what biological species really are. To be members of the same species, individual animals must belong to historical lineages that have a common origin. They do not have to be similar to one another in any specified way. For example, there are no genes that every dog has in common with every other dog. Every dog gene has alleles. Similarly, there are no properties that every dog has in common with every other dog. Nor is it mere overlap in properties or resemblance to some paradigm that makes a group of dogs be conspecifics. Highly similar species but that have different historical origins do not form one species but several. Species, according to Ghiselin and Hull, are not similarity classes but big, scattered, historical individuals enduring through time. They are entities somewhat like the Kennedy family,

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which is held together, of course, not by "family resemblance" (in Wittgenstein's sense) but by blood relatedness.

On the other hand, in the case of species, blood relatedness is bound to be accompanied by considerable overlap in properties. If the species reproduces asexually, the reason is that progeny are clones. If the species reproduces sexually, then each of the genes in the gene pool has to fit in with a random selection of other genes from the pool so as to help produce a viable individual frequently enough to get itself reproduced often enough not to be eliminated from the gene pool. No single gene that changes the animal in very extreme ways can survive. This results in what is called "homeostasis" in the gene pool. Thus the various individuals within a species mostly resemble one another in a great variety of ways, but do not all resemble one another in any particular ways. But what pulls them together as a group is not just that they have common or overlapping properties, but that they tend to have common and overlapping properties for a good reason. One individual is like the next for a good reason. There is a good explanation of why one is likely to be like the next. Various kinds of inductions drawn over the members of a species are likely to be sound owing to certain kinds of casual connections among these members.

On this analysis of what pulls the members of a species together, species are not classes. Classes are defined by the members having certain common properties. Fuzzy classes may be defined by the members having overlapping properties or by their having many properties in common with a paradigm or paradigms. But the members of a class do not need to be like one another for any reason. They may be like one another quite by

accident. Categories are classes or fuzzy classes. Species names are not names of categories.

Now I need, first, to explain why this point is important and I need, second, to generalize it.

The point is important because it explains why it is possible to study a species as such, to gather stable information about it. If there is a reason why one dog is likely to be like the next in a good number of respects, then there is a reason why studying one dog is likely to yield a considerable amount of probable knowledge about the next dog. In fact, of course, dogs are something it is possible to learn a great deal about. Consider how much time may be spent on learning about dogs by a student at veterinary college. True, all this knowledge is merely probable knowledge. Whatever one learns of the properties of dogs, it won't be analytic or necessary that every individual dog has each of those properties. But mere classes are not things one can learn anything at all about by induction. If there is no reason, given one member of a class, why the next member is likely to be like it, then if any inductions over the class turn out true conclusions, it can only be by accident. For example, it seems likely that there is no reason why one red triangular object should tend to be like the next in any respect other than redness and triangularity, so it is not likely that discovering, say, that one red triangular object is sweet will be of any use in predicting the taste of the next.

The way in which dogs are cemented into a unit is important, then, because it is only when individuals are cemented into a unit in some analogous way, such that there is

a reason why one individual should be like the next, that we can obtain knowledge about this unit, unless, of course, by examining every member separately. It is obvious, then, why this sort of unit is the sort that tends to acquire a name. Names for mere classes are in most contexts quite useless. Names for units of this kind are names for the seeds on which all empirical knowledge is built, for all empirical knowledge is inductive.

The point about dogs is generalized by noticing other kinds of relations that tend to cement a unit together such that there is a reason why one individual within the unit or one part of the unit is liable to be like another. I have a name for units of this general kind, taken from Aristotle. I call them "substances," a word which non-philosophers may need to read as a new technical term but which philosophers may recognize as fairly traditional. Aristotle spoke of "secondary substances" --the unit dog would be an example-- and of "primary substances," which were individuals. (Recall that what Ghiselin and Hull said about dogs was that they were big, scattered, historical individuals enduring through time.) There is a chapter in OCCI detailing many kinds of substances. Here I will discuss only a few, but enough, perhaps, to give you the flavor.

Substances fall roughly into at least three basic sorts which I call "historical kinds," "eternal kinds" and "individuals." Historical kinds are like dogs. They are collections of individuals scattered over a definite spatio-temporal area that are causally related to one another in such a manner that each is likely to be like the next in a variety of respects. The two most obvious sorts of things that cause members of a historical kind to be like one another are these. First, something akin to reproduction or copying has been going on, all the various individuals having been produced from one another or from the same

models. Second, the various members have been produced by, in, or in response to, the very same ongoing historical environment, for example, in response to the presence of members of other ongoing historical kinds. A third and ubiquitous causal factor often supporting the first is that some "function" is served by members of the kind, where "function" is understood roughly in the biological sense as an effect raising the probability that its cause will be reproduced. It is typical for several of these kinds of causes to be combined. Artifacts are often good examples of this.

Consider chairs. Chairs have been designed to fit the physical dimensions and practical and aesthetic preferences of humans, who are much alike in relevant respects for the same reasons dogs are. Moreover, the design of a chair is pretty invariably influenced by the design of previous chairs, typically because these previous chairs have functioned well and were aesthetically pleasing within a cultural setting, relevant aspects of the cultural setting being reproduced elements as well. For these reasons, chairs form a rough historical kind. There are reasons that have nothing to do with any arbitrary points of definition why one knows roughly what to expect when someone offers to bring a chair.

Renditions of "The Irish Washer Woman" or of "The Rite of Spring" form an historical kind. They are copied from one another or from scores that are transcribed from earlier renditions or copied from earlier scores. Macdonalds restaurants form an historical kind. There are causes of their being so much alike. Professors, doctors, and businessmen form historical kinds, especially well integrated ones when these groups are studied as limited to particular historical cultural contexts. Members of these groups are

likely to act similarly in certain ways and to have attitudes in common as a result of similar training handed down from person to person (reproduction or copying), as a result of custom (more copying), as a result of natural human dispositions (compare dog dispositions) or social pressures to conform to role models (copying again) and/or as a result of legal practices handed down from univocal sources. There is a reason why it may be productive to investigate, say, "the attitude of American doctors toward acupuncture." These attitudes are contagious. They spread.

The members of eternal kinds are like one another for a different kind of reason. They are alike because they possess a common inner nature of some sort, such as an inner molecular structure, from which the more superficial or easily observable properties of the kind's instances flow. The inner structure results in a certain selection of surface properties, or results in given selections of properties under given conditions. Popular examples of this sort of kind are the various chemical elements and compounds, along with various forms of these such as ice, liquid water and steam. Portions of water have an inner structure in common that produces the same surface properties given the same temperature conditions. Strictly speaking, I suppose, gold, nitrous oxide, ice and so forth are not kinds but stuffs, but samples of them are members of eternal kinds. Also, water molecules, electrons, protons, and so forth, are examples of eternal kinds. Stars, planets, comets, asteroids, and geodes are eternal kinds, not because their properties flow always from exactly the same inner nature, but because they were formed by the same natural forces in the same sort of circumstances out of materials similar in relevant ways.

Eternal kinds can be said to have "essences" in a very traditional sense, essences that are not nominal but real, often discovered only through empirical investigation. The reason that the members of these kinds have many properties in common, is that they have a few fundamental properties and/or causes in common that account, given laws of nature for all the others. Eternal kinds do form classes, all of whose members are alike in a variety of respects. But they are also much more than mere classes, because they are alike in these respects not by accident but in accordance with a causal explanation.

The last kind of (Aristotelian) substances are individuals. Individuals have been taken in modern times to have a very different sort of unity than the unity of a kind, but there is a way in which the cement that holds a single individual together as it endures through time is quite a lot like the cement that holds an historical kind together. Ghiselin and Hull claimed that species are actually individuals, because they are held together not by a traditional essence but through historical causal connections. The other side of this coin is that individuals are rather like species. A species is a "homeostatic system....amazingly well-buffered to resist change and maintain stability in the face of disturbing influences" (Eldredge and Gould p.114, quoted by Hull, p. 199). Similarly, an individual animal is a "homeostatic system....amazingly well-buffered to resist change and maintain stability in the face of disturbing influences." If a person is tall, brown haired, knowledgeable about electronics and a good piano player today, it is likely, though not certain, that she will have each of these traits also tomorrow. The various members of a species are like one another in part because they are, as it were, copied from one another. An individual physical object tends to have the same physical properties the next

day as it had the last because of natural conservation laws which tend, not to copy of course, but to preserve its properties from day to day. The effect, however, is much the same. The inference that an individual animal or inanimate object will probably have these and those properties tomorrow because it has them today is likely to yield a true conclusion for the same general sort of reason that an inference that other members of a species probably have these and those properties because this member has them is likely to yield a true conclusion. Individual objects are things that inductive knowledge can be collected about over time for the same sort of reason that historical kinds and, more broadly, eternal kinds are things that knowledge can be collected about over time.

I have explained why historical kinds, eternal kinds and individuals, three basic kinds of (Aristotelian) substances, are similar with respect to the question why it is possible to gain inductive knowledge about one part of the cemented-together unity they compose from other parts. The reason this is possible for each is that it is not merely a class, either focused or fuzzy. Because substances are not classes, not units cemented together merely by some set of common or overlapping properties, to have a concept of a certain substance is not to have a certain set of properties in mind, whether derived from paradigm cases or from exemplars. My next job then is to explain what it is to have a concept of a certain substance if not to have in mind a set of central properties. I am going to do this by explaining, first, what it is to have a concept of an Aristotelian primary substance --of an individual. Then I will generalize to other kinds of substances.

The idea that there are such things as "concepts" of individuals is foreign to many psychologist's and to many philosophers too. This is for interesting historical reasons that

need not detain us here. If this use of the term "concept" bothers you, then interpret me as just talking about thoughts of individuals or ideas of individuals. What is involved in being able to think of an individual?

One traditional twentieth century answer to this question is that to think of an individual is to capture that individual with a description that uniquely identifies it. Another twentieth century answer is that to think of an individual requires that you know how to identify it one way or another, perhaps by description and perhaps just by being able to recognize it, to differentiate it from other individuals, in perception. These views are close enough to the answer I would give myself that they will serve my purposes here. Something that they have in common and that I am sure is correct is the assumption that there is more than one way to think of the same individual, indeed, that there are innumerable ways to think of the same individual. An indefinite number of individuating descriptions apply to every individual. Similarly, there are, in general, numerous ways that the same individual might be recognized by sight, by characteristic sounds that they make, by smell (dogs are good at this) and so forth. Contrast the ways Helen Keller recognized her friends with the ways they recognized one another. Twentieth century tradition had it, then, and I believe correctly, that there is no single or definite set of properties that one must either think of or be able to discriminate in order to have a concept, a thought, of an individual. Nor is there some central set of properties, some or most of which one must think of or be able to recognize in order to think of a particular individual. Similarly, I will soon claim, there is no central set of properties, all or some of which one must be able to think of, recognize or discriminate in order to think of the

(Aristotelian) substance dog, hence in order to learn about dogs, to understand things said about dogs and so forth. But I will come back to that part a bit later.

First, we have to deal with fallibility. The ways we have of recognizing individuals are always fallible in principle. Even supposedly individuating descriptions always presuppose that there is indeed one and only one thing fitting the description, something not guaranteed, for example, merely by the description containing superlatives. It might always be, for example, that no one is tallest or first in line, or first on the moon. More important, if you are actually to use an individuating description for purposes of recognizing an individual, you will have to recognize exemplifications of the properties mentioned in the description. But one's capacities to recognize objective properties are always fallible, for they depend on external intervening or mediating conditions such as lighting conditions, atmospheric conditions, sound absorption and reflectance properties of surrounding objects, obscuring conditions such as intervening objects, masking sounds and odors, and so forth. Nor is there an independent way of ascertaining what these mediating conditions happen to be in a particular case. There are always possible conditions under which you would misidentify or fail to recognize even your own mother or spouse.

Having the ability to recognize an individual, then, cannot be the same thing as being infallible in recognizing it. I have the ability to walk. It is one of my very best abilities. It does not follow that it cannot happen that I trip and fall when trying to walk. These reflections suggest that what we need here is an analysis of what it is to have an ability to do something, such as walking or recognizing your mother, that does not equate

an ability with any simple sort of disposition. That analysis has been given in OCC1. But that all abilities are fallible is common sense, and I propose just to assume it here.

Tradition plus common sense suggest, then, not only that different people can have different kinds of concepts of the same individual by using quite different methods of recognition, but also that the methods any one person uses to recognize, hence to be able to think of, an individual will be fallible. Nor do these methods constitute a definition of the individual. Your mother is not defined by the way you recognize her, say, by the look of her face and the sound of her voice. She doesn't have a definition, a set of properties, that make her be who she is. She is not a class that happens to contain only one member.

Similarly, the species dog is a unity that different people can have quite different kinds of concepts of, by using quite different methods of recognition. Whatever method a person uses for recognizing dogs, this method may always be fallible. Nor does the method that a person uses for recognizing dogs constitute a definition of what dogs are, even for that individual. The species dog is not just a class that happens to contain so and so many members.

What makes substances interesting is that there is often a great deal that can be found out and known about them. Often they have a great many properties. And it is typically so that numerous of these properties and numerous sets of these properties will each be diagnostic of the substance. That is, each of these properties or property sets will be found only or typically when the substance itself is encountered. At least this will often be so within the spatial and temporal area inhabited by the person needing to

recognize a substance. Mistakes that people might have made had they lived in different places and times are not relevant to their actual abilities to recognize substances. This is why it is possible for different people to have concepts of the very same substance by very different means. Children and chemists have different ways of recognizing sugar. You and Helen Keller have different ways of recognizing nearly every secondary substance, nearly every ordinary stuff and nearly every ordinary eternal and historical kind.

Further, none of the ways that a person knows to diagnose the presence of a substance need to be infallible ways. No particular set of properties used to diagnose a substance are ever definitional of it, although in the case, especially, of eternal kinds, empirical investigation may reveal (with probability) that, in fact, some sets are always correctly diagnostic. It is always logically possible that there is some other substance that has parts of its cemented-together unity that share the very same properties as the properties one is using, with practical success, for diagnosis of a certain substance. I can put this for philosophers by saying that the possibility of "Twinearth water," certainly of "Twinearth dogs" and, indeed, of "Twinearth Mama," indistinguishable from your mother, is never ruled out by logic alone. It takes more than a set of properties in your mind to determine a substance. It takes a certain sort of causal glue in the world, holding that substance together. But given that glue in the world, conceptual access to that glued-together unity may be had by reference to any of many of its different parts or

properties.²

2 Philosophers may detect a missing link in this analysis. The link is needed to connect the ability one has to recognize a particular substance to prior encounters with that particular substance rather than with similar substances on Twinearth or wherever. That link is supplied in the description of abilities given in OCC1. What an ability is an ability to do is determined not merely by current dispositions but by the histories of the mechanisms responsible for those dispositions.

In talking about what is involved in having a concept of a substance, I have quietly been making an assumption that I must now bring into the foreground as a claim. I have spoken of ways of recognizing a substance, and I have said that your ability to recognize a certain substance can depend on your inhabiting a certain space-time locale, one where certain diagnostic properties do mostly signify encounters with that substance rather than with others. The assumption I am making is that thinking of a substance involves the ability to recognize it, as it were, in the flesh, not merely the ability passively to contemplate its properties. We have thoughts of substances in order to be able to collect information about substances, which information we pick up on some occasions and then apply on others. To pick up information about a substance you must be in a position to interact with the substance, or with other things that interact with the substance, other things that are influenced by the substance or that influence it. Natural information is transmitted in the causal order, and you have to be in the causal order with whatever the information is information about in order to receive it.³

³ I am using the notion natural information in a way somewhat like the way Dretske uses it in Knowledge and the flow of Information, yet not quite that way. For our purposes

here the difference probably does not matter, but a careful description of the kind of information I have in mind is in (Millikan 2004), Chapters 3-5 where I call it "local information."

Now if you think about that claim for a moment, you will see that it is a fairly radical one. Surely you can have a concept of the last dinosaur species on earth to go completely extinct and of the first baby to be born next year, and of any other substance which, although you have never encountered it, you do know for it an identifying description. And you have these concepts without having the slightest idea how to identify these things in the flesh. Surely you can have a concept of molybdenum --you can think about it and ask questions about it-- without being able to identify it in the laboratory. Surely you can have a concept of Socrates without being able to identify him in the flesh, even if you were to be transported back to ancient Athens. Let me tackle the descriptions first, then come back to molybdenum and Socrates, for they will prove far more interesting.

The descriptions are handled this way. That your circumstances are such that you never get a chance to use an ability that you have does not take that ability away from you. You won't lose the ability to swim just because they chain you to a post in the middle of the Sahara desert for the rest of your life. If you understand the terms in any description and know how to apply them, that is, you know how to recognize the other objects and properties and relations mentioned in the description, and if you are right that the description is identifying, then you know a way to identify the substance that the description describes. You would do so by encountering something that you can recognize directly as fitting that description, or by coming across something else that you recognize as carrying information telling what fits that description. There are many cases in which you just aren't at all likely to come across any such information, but that is

irrelevant to whether you have a capacity to recognize the substance. I am assuming here a fairly usual reading of the notion of natural information, according to which information about the past and about the future are entirely routine kinds of information (but see footnote #2 above). And I am about to claim that language is a standard medium through which natural information is transmitted, hence a standard medium through which substances are recognized exactly as they are recognized "in the flesh" through other media such as light and sound.

Now consider molybdenum and Socrates. It seems an obvious fact that many of our concepts of substances have been acquired without encountering those substances directly but only by hearing about them. Moreover, as Kripke (1972), Putnam (1975) and Burge (1979) have observed, we often have no unique descriptions of these substances in mind either. How then can we be said to know how to recognize them? The answer, I claim, is that speech is just as direct a medium for the perception of objects and events and their properties as is the light reflected off objects, the smells emanating from objects, the sounds emanating from events in the environment, or the mechanical stimulations caused by objects in direct contact with one's body. This is a thesis that requires defense, and I have defended it at length both in OCCI, Chapter Six and in (Millikan 2004) Chapter Nine. Here I can only throw out the rough idea, hoping that if it strikes you as dubious, you will look to these longer versions and defenses before final judgment.

The claim is that hearing and immediately believing a sentence about a fact or occurrence is in relevant respects just like, for example, seeing that something is the

case or seeing that something has occurred and immediately believing it. There is experimental evidence that what one is told goes directly into belief unless cognitive work is done to prevent this, just as what one perceives in other ways, through other media, does. Loading the cognitive systems with other tasks, such as having simultaneously to count backwards by threes, has the effect of facilitating belief fixation regarding whatever one hears or reads (Gilbert 1993). Recognizing a linguistic reference to a substance is as much a way of recognizing the substance "in the flesh" as any other way of recognizing it. It is identifying it and recognizing natural information concerning it through one more medium of manifestation. Think of this medium, the speech of another person, as like an instrument that aids perception. The lens of one's eye is, of course, an instrument that aids perception. If one wears corrective lenses, they are another such instrument. The speech of another person is analogous to somewhat more complicated instruments of this kind. Like a camera, a radio, a cat scan, or a microscope, another person who talks to you picks up information-bearing patterns from his environment, focuses them, translates them into a new medium and beams them at you. Think of living in a language community as like being inundated in one more sea of ambient energy. Like the surrounding light, surrounding people transmit the structure of the environment to you in ways that, barring certain interferences, you have become tuned to interpret. Becoming tuned to interpret the information-bearing patterns that are common in a certain language community is coming to understand the language of that community. Similarly, a radiologist must learn to interpret the information contained on X-ray images and the auto mechanic must learn to interpret the information contained in the sounds

emanating from ailing automobile engines.

The notion that understanding and believing what is said to you is just one more level of natural-sign reading on the same level as ordinary perception is to many people quite unintuitive. One reason is that what is given to you in ordinary perception is always given as in some quite definite current relation to you. It is given as happening at the time you perceive it, as happening relatively nearby, and often as bearing quite an exact spatial relation to you. This kind of information is needed to guide action, for how one can presently act on a thing always depends on its present relation to oneself. Ordinary perception is for immediate action, whereas what one learns through language is not typically used that way. Usually you are not told what exact spatial and temporal relations the objects and events being presented to you through language have to you here and now. But there are intermediate cases, for example, video recordings. It is clear enough that you perceive things happening when you watch a video, but as in the case of language understanding, you do not perceive the spatial and temporal location to yourself of what occurs on video.

A second reason that the comparison between ordinary perception and language comprehension is unintuitive is that ordinary perception is so much more reliable than what one hears said, at least under common circumstances. It is not easy to fool ordinary perception. To create strong perceptual illusions requires a good deal of knowledge about the perceptual mechanisms and often quite special equipment, of the kind, for example, that optometrists have in their examination rooms. This is a difference of degree, however, a mere difference in frequency, not a difference in kind. Recalling

that film dubbing is currently the rule rather than the exception, what differences are there, for example, among (1) believing what you apparently see when you look through the peephole into an Ames room (2) believing what you see when a film has been dubbed and (3) believing what you hear someone say when it's false? In the modern world, if you want to believe only what's true, you often have to apply heavy filters to other methods of perception as well as to perception through language.

The upshot of these reflections is that we can understand how it is possible to recognize a substance through the information that language bears, indeed, how it is possible to come to be able to recognize a substance pretty much merely by learning a word for it. This is how we manage to have concepts of Socrates and, for most of us, how we manage to have concepts of molybdenum. To have a word for a substance is to have an essential part of an ability to recognize manifestations of it that are generated in a particular language community. That, I have argued, is why it is possible for small children to learn, as Chomsky puts it, "a word an hour" between eighteen months and six years of age (Chomsky 1995, p. 15).

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