



A Tradition of Natural Kinds

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A TRADITION OF NATURAL KINDS

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Few common nouns name natural kinds. How many? That depends. Those who say that all sorts of animals, vegetables, minerals, insects and fish are natural kinds will count the largest number of names of natural kinds in the *Dictionary*, but not many of them are among the nouns that we use. How many do you recognize on this list, from a page unusually rich in such names? Stone bass, stonebramble, stonechat, stonecrop, stone curlew, stonefish, stonefly, stone fruit, stone-lily, stone marten, stone parsley, stone roller, stonewort. The same open page contains 39 other common names of kinds of something or other, but the candidates for names of natural kinds among them are only 'stoma', 'stomach', 'stone' itself, and 'stools', if faeces form a natural kind. Yet you know the meaning of most of the other nouns, nouns such as 'stole' and 'stool' and 'stoker'. They are the kinds that we talk about in daily life, what Nelson Goodman calls "relevant kinds", kinds of garment or furniture or labourer. A student of kinds or classification or categories will want a theory of those, within which natural kinds (whatever they turn out to be) take their proper, rather limited place.

But most philosophers of kinds expect a discussion of kinds to be about natural kinds. Worse: theories of natural kinds seem to me to wreck much reflection on kinds by importing a good deal of obscure philosophy. That is why students of kinds such as Goodman, George Lakoff or John Dupré say or imply that there are no natural kinds, or that the concept of a natural kind is not worth saving. I know their irritation. When I have tried to indicate that there are interesting differences between 'human kinds' — kinds of people and their behaviour — and what are commonly called natural kinds, I found myself assaulted from left and right. The nominalist 'left' says that all kinds are human, or at any rate, there are no kinds in nature. The realist 'right' says that there are indeed natural kinds, and that human kinds — at any rate those susceptible of systematic study — are among them.

I am not 'for' or 'against' natural kinds. The category 'natural kind' is unexceptionable so long as it is kept modest. It can be used to indicate some facts and distinctions about ourselves, the world, our experience and our history. This attitude is in the tradition of Mill (who gave us the philosophical term of art 'Kind'), of Venn (to whom we owe the phrase, 'natural kind'), of Peirce (Mill's wisest critic on this topic), of Russell (who revived natural kinds in 1948), and of Quine. The tradition is nominalist by inclination but realist in agreeing that kinds arise in nature. Among its principles are:

- (1a) *Independence.* It is a fact about nature, independent of psychological or social facts about human beings, that there are kinds of things, of substances, of organisms and so forth.
- (1b) The differences among things, in virtue of which they divide into kinds, "are made by nature, . . . , while the recognition of those differences as grounds for classification and of naming, is . . . the act of man."¹
- (2a) *Definability.* We can devise rough and ready characterizations of 'natural kind'; none are precise, but with good will and a little charity we can agree, in most cases, on what is a natural kind according to a given characterization, even though we lack a precise definition of the concept.
- (2b) (Not part of the tradition, but to be inferred from a good survey of it.) There may be distinct types of natural kinds, characterized in different ways, and such that examples of each type have histories different from those of other types.
- (3a) *Utility.* Recognition and use of such natural kinds plays a significant role in the growth of human knowledge and civilizations, but diminishes with technological and scientific advances.
- (3b) For various purposes and interests there are better and worse, more fruitful and less fruitful classifications of objects, organisms and substances. The utility of kinds varies with time, place and interests.

There is a fourth principle, more implied than stated, to which many philosophers in the tradition may have assented.

- (4) *Uniqueness.* There is a unique best taxonomy in terms of natural kinds, that represents nature as it is, and reflects the network of causal laws. We do not have nor could we have a final taxonomy of anything, but any objective classification is right or wrong according as it captures part of the structure of the one true taxonomy of the universe.

I do not believe (4). One might reject it on relativist, subjectivist or social constructionalist grounds. I reject it for the stronger reason that the idea of a complete exhaustive taxonomic framework does not make sense, not even as an ideal to which we strive. My reasons are those that led P. F. Strawson (no relativist he) to write that “The idea of an ‘exhaustive description’ is in fact quite meaningless in general; though meaning may be given to it in a particular context of discourse.”²

Note that theories about universals and theories of meaning play little role in the tradition that emphasizes just (1)–(3). It distances itself from those philosophical realists who chant Plato’s unsavoury rubbish about carving nature at the joints. It is equally appalled at those nominalists who conjure up slime and original sin, stating that the trail of the human serpent is over everything.³

THE TRADITION

J. S. Mill introduced the word ‘Kind’, with a capital K, to English philosophy in 1843, at the height of debates about the biological species. Whewell’s *Philosophy of the Inductive Sciences* had appeared in 1840, with a long discussion of natural and artificial classes. To what extent are the higher taxa (as opposed to the species) mere intellectual inventions, and to what extent do they reflect biological reality? The issue is as alive today, with the advent of nominalist numerical taxonomy, as it was in the time of Whewell. Mill’s avowed purpose, however, was not biological. He wanted to deflate the logical doctrine of the five predicables, derived from Aristotle by Porphyry, and in 1843 still a staple of English logic books.

The chief site of natural kind talk has been not biology but induction. The phrase ‘natural kind’ was coined by John Venn in 1866 in his *Logic of Chance*, although of course he was well aware that he was

adapting Mill's 'Kind in nature'.⁴ In modern times we owe the revival of the phrase to Russell's 1948 work on induction.⁵ Induction is also central to Quine's "Natural Kinds". He and Russell agreed that although natural kinds may be of some use in understanding our ability to make modest inductions, they are useless when it comes to more reflective science.⁶

Once Russell had re-introduced the phrase 'natural kind' to English philosophy, it was picked up in 'realism' debates, most notably in H. H. Price's 1953 study of universals, which took over Russell's entire phrase, 'the doctrine of natural kinds'.⁷ From there it moved into the philosophy of language, where the most notable contributors have been Putnam and Kripke.

RUSSELL'S NATURAL KINDS

In explaining the tradition of Mill through Russell I shall start with a very defective characterization of natural kinds. It has the virtue of making plain how *ordinary* the idea is. "The essence of a 'natural kind'," wrote Russell, "is that it is a class of objects all of which possess a number of properties that are not known to be logically interconnected." He meant the maximal class of all objects possessing those properties.

Some of the necessary qualifications need only be mentioned. Russell was well aware that his "all" in "all of which possess a number of properties" won't quite do. Manx cats don't have tails. He made a rather charming comparison between natural kinds and topological neighbourhoods, saying that the former may be thought of as intentional neighbourhoods, in which every member is close to a great many other members according to some notion of closeness to be explained. He spoke at first only of properties: we hardly need to remind *him* of relations. His statement suggests that natural kinds are restricted to objects denoted by count nouns, yet of course elements, minerals, and substances denoted by mass nouns have been standard paradigms of natural kinds. One can use well known devices of Quine (who also regarded kinds as sets) to accommodate such stuff.

Russell should have noted that his account is too generous. Cats form a Russellian natural kind, but so do white cats and myriad other

subsets. That was among Locke's objection to an older idea of essences, that we can bundle together any collection of properties we please. We shall find that Mill's more precise characterization avoids this difficulty. And of course there is the quite different point that to the tutored eye of the logician, all members of any batch of things resemble each other in indefinitely many ways. Goodman's artificial kinds support or continue that way of thinking.⁸ But for the present the pressing question is not, "can we capture the idea of natural kinds intended by Russell?", but, what is the point of such a dull category?

DOING NOT RESEMBLING

On the road to an answer I shall point a contrast between Quine and Russell. Following upon attempts by Carnap and others to explain similarity, Quine thought of notions of kind and similarity as close kin, each definable in terms of the other, but neither seriously definable, despite the way in which both have the feel of logical relations or categories.⁹ Now similarity is a passive notion, one that observers can attend to. They note resemblances. As a point of emphasis although not of logic, Russell's talk of properties is better. This is not because 'property' is an expression better understood than 'similar', but because it makes us think of what things do and can have done to them. Bits of copper may 'resemble' each other in being malleable and ductile, but that is an evasive, Latinate and spectator-oriented way of saying something about their dispositional properties. Lumps of copper are easily shaped and can be drawn into thin wires — which then conduct electricity.¹⁰ I emphasize instead that what we can do with, and what can be done to us by, things of a kind, is precisely why natural kinds originated and persist in our interests.

Russell's way of speaking may suggest (as if it made sense), that we first of all form the idea of properties, and then the idea of kinds, i.e. classes of objects with some properties in common. If I were to engage in a priori fantasies about the origin of ideas, I should suppose that natural kinds and properties were coeval in the human mind. We identify properties of only some kinds of things, properties that are signs that things of that kind have other properties. We pay attention to passive qualities such as colours and scents, because they betoken what

we can do with some kinds of things, e.g. eat or escape them. (In jocund and in tranquil mood we glory and marvel at colours; I do not denigrate the spectatorial aspects of life.) When we recognize things to use, modify or guard against, we say they are of certain kinds. Singular properties are not enough. Realizing that a thing has some properties or stands in certain relations prompts belief that it is of a certain kind, i.e. has other properties or stands in other relations. The original Venn/Russell connection of kind and induction was sound and is never to be forgotten. But it should be modified. Induction is the art of spectators. Kinds are important to the agents and artisans who want to use things to do things. Were not our world amenable to classification into kinds that we cognize, we should not have been able to develop any crafts. The animals, perhaps, inhabit a world of properties. We dwell in a universe of kinds. Pigeons peck at properties cunningly singled out by bird psychologists to establish avian intelligence: 'natural kind' is a name for what helps people do better. Natural kinds, in short, seem important for *homo faber*.

There is a practice of telling the history of our species in terms of minerals, mixtures of minerals, and other substances: the iron age, the bronze age, the steam age, the atomic age. Each age is marked by a new natural kind, state of a kind, or kinds in combination, that people were able to put to a wide range of uses because of a number of properties jointly possessed by objects or substances of the kinds in question. Materialistic? The doctrine of natural kinds is in part about materials.

Our history can also be told in terms of our relations with animals and vegetables. That history has less to do with the species than of what we have learned to cultivate, domesticate or breed, choosing to accent some properties and eliminate others. When philosophers casually discuss natural kinds they commonly refer to biological taxa, but those do not furnish us with the most helpful examples. Some philosophical systematicists would expunge natural kind conceptions from biology altogether. I shall not protest. I (and writers in the great tradition) are inclined to say that most of the species recognized in common speech are natural kinds. That does not mean that the species recognized by biologists are natural kinds. (Even in 1843 Mill testily wrote that *they* can mean what they will with the word 'kind'.) One trouble is that in modern systematics, classification and a theory of evolution are

inextricable. Since the theory is about *all* life, the classification must span the globe and all its organic history. In any given ecosystem the species are for a variety of reasons distinct natural kinds on anybody's accounting, but these may not fit into the species concepts needed for evolutionary theory. Quine and Russell thought of natural kinds as fading away in the development of physics; I'd expect the same of a well-developed biology.¹¹

NATURAL CLASSES THAT AREN'T (RUSSELLIAN)
NATURAL KINDS

Most kinds, including those that most people regard as furnished by nature, are not what Russell called natural kinds. Green things do not possess a number of properties in common, of which they form a maximal class. The only property they have in common is that they are green. No one in the great tradition of natural kinds has seriously regarded the colours as natural kinds. Quine momentarily slipped, seeming to allow that colours were intuitive (natural) kinds, and then going on to say that "on a cosmic scale colours would not qualify as kinds." Russell's definition does not even let them in the door. Mill's, as we shall soon see, was partly designed to slam the door in their face.

Many kinds fail to be what Russell called natural kinds because they do not have a number of properties in common. Conversely there is the fact that has long been well known, that many of our common names denote classes that may be said to have no one property in common, nor even to be characterized by what Russell metaphorically called an intensional neighbourhood. Instead the metaphor is family resemblance, cluster, strands in a rope, or whatever. It is sometimes said that Wittgenstein imagined that all common names pick out family resemblance concepts. That is a sorry travesty of the opinion of a man who spent so much of his life rejecting 'alls' about language, but no one now doubts that many names denote classes linked at most by family resemblance.

Thus most common names, even names for what the realist would call 'natural classes' do not satisfy Russell's characterization of natural kinds. Some fail because the classes have only one property in common; many more because the classes have no property in common

but hang together by family resemblance. That is no reason to deny that there are (Russellian) natural kinds. They are unusual classes.

SOCIAL PROPERTIES

My mention of natural classes suggests I follow Russell in begging a question. He said that the essence of a natural kind is that it is a class of objects all of which possess a number of properties — and he evidently meant ‘natural’ properties. What is natural? Let us suppose for a moment that there is a distinction between ‘social’ and ‘non-social’ properties (and relations). I do not mean a distinction between properties that are of concern because of our interests, and those that are in the world independent of our interests. All the kinds of which we are aware occur in the social setting of those interested. Instead I mean to distinguish properties that require a social setting in order to be applicable at all. Even if we stick to animals, vegetables and minerals we have kinds such as guard dogs, weeds and tombstones. These are not natural kinds, but they seem to satisfy Russell’s criterion.

Reflection on social properties revives interest in nominalism/realism about natural kinds. Every generation must find its own novel bones of contention in that, as in many other philosophical arenas. I believe that one of the most vital present versions of the nominalism/realism debate is a product of two distinct theses about natural kinds. (a) Kinds are constructed along the lines of family resemblance, and what puts things in to a family is not nature but people in concert. (b) The family resemblances that constitute kinds characteristically include not just so-called ‘natural’ properties but also ones that are plainly social. One important statement of (a) and (b), somewhat jumbled up, is George Lakoff’s *Women, Fire and Dangerous Things*. The title itself exemplifies a kind expressed by a word in a Polynesian language, a kind which includes elements identified by social role. The most vibrant ideas of the book concern models for detailed structures of kind-formation, arising for example from bodily and social metaphors. I consider it eminently possible that most common names work on Lakoff’s principles. Perhaps, as his subtitle has it, that teaches us something “about the mind.”

Unless Lakoff claims that *all* kind terms work in his way, and

embody social properties, his theses are consistent with holding that there are what Russell called natural kinds. As I said at the start, few names denote natural kinds. One may also have the materialist conjecture that if one is looking for natural kind terms in a language, one should examine terms for the raw materials with which people make things, a category I find notably lacking in Lakoff's book. It is nevertheless possible to imagine a community in which terms for all usable raw materials embody 'social' properties. The clay for making pots is seen as such only if it is taken from ritually pure river beds, and the ochres for colouring them are of a satisfactory hue only if obtained in a dowry exchange with a neighbouring people. On the one hand I have a whiggish confidence in artisans the world over that makes me suppose that there is no such community anywhere, and on the other hand I wonder about the extent to which for example our own pharmaceutical standards are just like that. *That* is the direction from which a nominalist critique can usefully be mounted.¹²

MILL'S KINDS

Russell's "essence of a natural kind" was actually the essence of an idea of his godfather's. J. S. Mill had a purpose different from Russell's. The word "kind" had been used with no great precision in English scholastic logic textbooks, chiefly to translate a rough version of an idea in Porphyry's bowdlerized version of Aristotle, which had long been the pap of the weaker schoolmen.¹³ This usage languished and would have vanished were it not for a section of *A System of Logic* entitled "Kinds have a real existence in nature."¹⁴

According to Mill, there was exactly one truth in the Aristotelian idea of the five predicables, namely: there are two sharply distinguished types of classification. Members of one type of class share a single property, while members of the other type of class share a manifold of properties. "White things," he wrote, "are not distinguished by any common properties, except whiteness: or if they are, it is only by such as are in some way connected with whiteness. But a hundred generations have not exhausted the common properties of animals or plants, of sulphur or phosphorus; nor do we suppose them to be exhaustible, but proceed to new observations and experiments, in the full con-

confidence of discovering new properties which were by no means implied in those we previously knew.”¹⁵ The latter are real Kinds, a strong version of Russell’s demand that natural kinds should have a *number* of properties in common. Let us call white a “finite kind”. In reserving the label ‘real’ for another sort of kind, Mill was not denying that finite kinds are found in nature. In both cases, the classification is the act of people, but the differences are the work of nature.

I mentioned that in Russell’s off-hand account, not only was cat a natural kind, but also many of its (non-artificial) subsets, such as the class of white cats. There is no quick way of remedying that until we return to Mill, but then it seems quite easy. Let *K* be a real Kind and *P* be a property, and let *L* be a non-empty subset of members of *K* that have *P*. *L* is a real Kind only if it has a large and plausibly inexhaustible set of properties not possessed by members of *K* that lack *P*.

MILL ON KINDS OF PEOPLE

Among traditional writers on kinds, perhaps only Mill seriously discussed kinds of people. His concern was racism and sexism, but I introduce the matter at this juncture only because it well illustrates what Mill meant by Kinds. The classifications “Christian, Jew, Musselman and Pagan,” he wrote, have many consequences, but there is no property that Christians have and Muslims lack, or vice versa, except as follows from their being members of those religions. There simply is no innumerable set of properties peculiar to Christians except such as are implied by their being Christians.

Mill noted that the biologists of his day had so defined the species in terms of interbreeding that the human race is one species with no subspecies — the “biological species concept” given new life in recent years by Ernst Mayr. So human beings form one biological species. But however the biologists choose to define their terms, people *might* still divide into several “logical Kinds,” i.e. Kinds meeting Mill’s condition. “The various races and temperaments, the two sexes, and even the various ages, may be differences of kind, within our meaning of the term. I do not say that they are so.”¹⁶ In fact Mill conjectured that as physiology grows, “the differences which really exist between different races, sexes &c, follow as a consequence under laws of nature, from a

small number of primary differences.” Hence on his definition, these are not real Kinds. But he grants that the progress of knowledge could turn out differently, in which case we would conclude that “man and woman, Caucasian, Mongolian and Negro &c would really be different Kinds of human beings” (in the sense of the logician, though not of the naturalist).¹⁷

PEIRCE ON MILL'S KINDS

Peirce was Mill's finest critic. Mill spoke of “discovering new properties which were by no means implied in those we previously knew.” How *implied*? That's the issue. It is made pressing by a phrase just quoted, “follow as a consequence under laws of nature, from a small number of primary differences.” Peirce was dry and exact:

Mill says that if the common properties of a class thus follow from a small number of primary characters, ‘which, as the phrase is, *account for* all the rest,’ it is not a real kind. He does not remark, that the man of science is bent upon ultimately thus accounting for each and every property that he studies.¹⁸

One aim of science is to find laws of nature that do account for the manifold of properties associated with Mill's real Kinds: and hence to move them into Mill's other category of finite kinds.

How would Peirce improve on Mill? “The following definition might be proposed [for ‘real kind’]: Any class which, in addition to its defining character has another that is of permanent interest, and is common and peculiar to its members, is destined to be conserved in that ultimate conception of the universe at which we aim, and is accordingly to be called ‘real.’” Peirce did not much care to write of laws of nature; where Mill did so, Peirce said that “he means any absolute uniformity.” We may reverse the translation. Philosophers less hesitant about laws of nature will say that Peirce's kinds are such that laws of nature about the kind account for its properties of lasting interest to people.

MILL-KINDS AND PEIRCE-KINDS

Russell put the word “known” into his sketch of natural kinds. Mill and Peirce also invite an epistemological distinction. In addition to finite kinds I shall speak of Mill-Kinds and Peirce-kinds, and use Russell's

shorthand of properties of objects (as a portmanteau for substances, diseases etc.). A *Mill-Kind* is a class of objects with a large or even apparently inexhaustible number of properties in common, and such that these properties are not implied by any known systematized body of law about things of this Kind. A *Peirce-kind* is such a class, but such that there is a systematized body of law about things of this kind, and is such that we may reasonably think that it provides explanation sketches of why things of this kind have many of their properties. This is a very cautious way of putting things. Anyone who attends to the messy details of applied science knows that almost everything is sketchy and approximate. But such sketches do bring us the feeling of understanding why things of a kind behave in the very numerous distinct ways in which they behave. Then the following assertions are, I hope, truisms:

1. Natural sciences sometimes develop Peirce-kinds from Mill-Kinds. Finite kinds such as colours might also reappear in a science as a Peirce-kind, but — an insight part of the ‘secondary quality’ distinction — the odds are against it. Certainly neither Russell nor Mill expected original intuitive finite kinds to be Peirce-kinds.

2. A great many Peirce-kinds did not have Mill-Kinds as predecessors. That is, the kinds were invented to create classifications of groups that behaved in a law-like way, but which were recognized as a group only because a law had been conjectured. There was no prior lawless Mill-Kind that was captured by law.

3. Kinds (as I have been using the word) are classes, extensions. The same common noun may, in different discourses, sometimes denote a Mill-Kind, and elsewhere a Peirce-kind. Here I am using Mill’s own theory of naming and denotation. Usually it makes not the slightest difference, and if there is a possibility of confusing the slightly different extensions, we make plain what we’re talking about.¹⁹

KINDS AND STRUCTURE: LOCKE AND LEIBNIZ

In Book III of the *Essay* and the *New Essays* the modern reader commonly supposes that Locke and Leibniz were disagreeing about natural kinds, although the phrase ‘natural kind’ had not yet been invented. Locke believed that the properties and behaviour of objects was determined by their “inner constitution.” He also supposed we could not know the inner constitution. Hence it could not help us in

characterizing kinds of things. Hence our definitions of kinds must be nominal. Not only are the names of our classes of our own invention but also the classes themselves the work of the human mind. This is not because there are no true classes in nature, but because the principles on which they are formed is permanently hidden from us.²⁰

Leibniz agreed that we could never completely know the inner constitution. But we can produce increasingly detailed and rich models of the underlying constitution, and have every hypothetico-deductive reason for supposing that we are correct.

Mill and Peirce wrote in terms of laws of nature or at least absolute uniformities. Locke and Leibniz instead supposed that the growth of knowledge was more a matter of determining underlying structure. That is an alternative presentation of what a natural science can do to kinds. It is not immediately incompatible with a picture of increasingly rich new laws of nature, but at least different in emphasis. I shall venture to speak of Leibniz-kinds, i.e. classes for which there are associated known structures from which can be inferred properties in common among objects of that class.

DONELLAN ON KRIPKE AND PUTNAM

Mill's theory of denotation has been revived and augmented by Kripke and Putnam, but his conception of real Kinds in terms of an inexhaustible number of properties has fallen into desuetude. The Peircian conception seems to rule, at present. Thus Hilary Putnam describes one his earlier selves:

the extension of certain kinds of terms (later I was to speak of 'natural kind words', meaning names for such things as natural substances, species and physical magnitudes) is not fixed by a set of criteria laid down in advance but is, in part, *fixed by the world*. There are *objective laws* obeyed by multiple sclerosis, by gold, by horses, by electricity; and what it is rational to include in these classes will depend on what those laws turn out to be.²¹

Multiple sclerosis is a kind of disease; I'm not quite sure what electricity is a (natural) kind *of* — energy? Leaving aside such pedantry: Putnam is saying that there are natural kinds, and that what makes something a natural kind is its role in a systematic interconnected web of laws of nature.

Very roughly speaking, Putnam and also Kripke typically start with

examples of Mill-Kinds that we have transformed or are transforming into Peirce-kinds. Then Putnam urged that the term denoting the Mill-Kind has the same denotation (i.e. extension) as it later does when it denotes a Peirce-kind. Hence the extension of the former is fixed by the latter, i.e. by the laws into which the kind denoted by the latter enters. Mill had a less arbitrarily regimented conception of denotation, and one may query whether there is a fact of the matter (independently of a chosen system of linguistic analysis) as to whether the denotation of 'water' in 1689 is the same as that of 'H₂O' three centuries later. I am not the first to notice that Putnam and Kripke seem always to use as examples names that once denoted Mill-Kinds and now, in some uses, denote Peirce-kinds. In one of the wisest papers on this body of doctrine, Keith Donellan shrewdly observed:

Most of the examples [Putnam and Kripke] use are words and expressions in everyday use, such as 'water', 'tiger', 'gold' and 'heat'. While the theory calls for a certain relationship between the semantics of these terms and science, the terms obviously are not borrowed from the vocabulary of science and were part of English long before the advent of modern science. I think it is no accident that terms with these characteristics were chosen. In the first place, although one might suppose that if terms for natural kinds are to be found anywhere the language of science would be replete with them. It is not obvious that the Kripke-Putnam theory is applicable to terms in science.²²

I agree wholeheartedly (as I do with the important argument that ends Donellan's paper, an argument that turns the tables on "twin-earth" arguments).

TYPES OF NATURAL KINDS

Many theories of natural kinds are unsatisfactory because they assume there are only one or perhaps two types of natural kinds. But the great tradition of natural kinds need not be not dogmatic, and can adopt thesis (2b) from the beginning of this paper: among types of natural kinds are finite kinds, Mill-Kinds, Peirce-kinds and Leibniz-kinds. Undoubtedly many realists who favour natural kinds write as if there were only one type of natural kind. They also subscribe to thesis (4), fantasizing a unique ultimate taxonomy, presumably consisting of inter-related kinds all of the same type. A little examination of the motley of kinds may help us see that there are interestingly different kinds. Those of us who care about other relevant kinds need not be bullied into

saying that they are, or are not, just like natural kinds. There is not just one type of kind to be like. One type will be like another type in some ways, unlike in others. We shall also realize that a name denoting natural kinds may on different occasions, and certainly in different eras or when used by different people, denote kinds of different types. Now it may denote a Mill-Kind, later, a Peirce-kind, and so on; on many occasions of use, the kind denoted may not be fully specified.

For all but the purposes of the natural sciences, common nouns that work by family resemblances are more interesting than the various kinds that I have discussed. I have nowhere implied that they are not natural kinds. Indeed it can be argued, in my opinion wrongly, that all kinds are held together by family resemblance. In the spirit of the present paper, I suspect that there are substantially different sorts of family resemblances. Resemblances within the family of games are different in kind from resemblances in the family of crows. Wittgenstein's early metaphor of the strands in a hemp rope — they form a taut rope, but the strands at one end do not overlap the strands at the other — is apt for some families but not for most. The family resemblances that connect different tokens of handwritten letters 'a' may be different in kind from those that connect different examples of people with Alzheimer's disease. Without pausing to debate these points, I conjecture that a great many family resemblance nouns collect the objects to which they apply in a 'non-natural way' — that is, they rely on social factors and may properly be called social kinds, in the spirit of my section above titled *Social properties*. Most 'human kinds' — kinds of people and their behaviour — are social rather than natural kinds.

One way in which better to understand natural kinds is to take an historical perspective. It is important that some kinds are essential to some crafts. Those are the kinds that we can do things with. It is important that some kinds are important for knowing what to expect from the fauna and flora of the region in which we live. There is no reason to expect that the kinds that matter to the artisan should be identical (barring error) in extension or in logic to the kinds that Leibniz or Peirce thought part of the end of science. There is no reason to think that the kinds that matter to the natural history of a region should be identical (barring error) in extension or in logic to the taxa best suited to evolutionary biology. There is no reason to think that the

passage from the metallurgy of Hyphaestus to solid state physics is a model for other enquiry or advances in knowledge.²³ There are many curious questions about natural kinds, but traditional versions of nominalism and realism are no longer among them. When we turn our attention to social kinds we shall pose many new problems that philosophers have scarcely touched upon. In the course of those investigations we may see that there are implications for realism about human kinds — we who are traditionalists about natural kinds may be constructionalists about human kinds — but that is not why they will prove interesting.

NOTES

¹ J. S. Mill, *A System of Logic*, in *Collected Works of John Stuart Mill*, J. M. Robson, ed., Toronto: University of Toronto Press, 7, p. 123.

² P. F. Strawson, *Individuals*, London: Methuen, 1959, p. 169, discussing Leibniz.

³ "Let us carve them according to their natural divisions as we would carve a sacrificial victim". *Statesman*, 287c. I don't know the first usage of carving at the joints. A recent one is David Lewis, "Putnam's Paradox," *Australasian Journal of Philosophy*, 62 (1984): 221–36, esp. 227f. That is a response to Putnam's recent extreme nominalism, expressed for example in his Carus lectures where we find "The Trail of the Human Serpent is Over All", *The Many Faces of Reason*, LaSalle, Ill.: Open Court, 1987, p. 16. The source of Putnam's recent attitude to his former realism is his realization that (4) is false; he throws out the baby (1)–(3) with the dirty bathwater of (4). See my "Putnam's Change of Mind," *The London Review of Books*, 4 May 1989.

⁴ John Venn, *The Logic of Chance*, London: Macmillan, 1866, p. 245f: "There are classes of objects, each class containing a multitude of individuals more or less resembling one another . . . The uniformity that we may trace in the [statistical] results is owing, much more than is often suspected, to this arrangement of things into natural kinds." Very much revised in 2nd edn, London: MacMillan, 1876, p. 49.

⁵ Bertrand Russell, *Human Knowledge, Its Scope and Limits*, London: Allen and Unwin, 1948, p. 335f, and Part VI, ch. ii.

⁶ Russell: "I conclude that the doctrine of natural kinds, although useful in establishing such pre-scientific inductions as 'dogs bark' and 'cats mew', is only an approximate and traditional assumption on the road towards fundamental laws of a different sort. Both on this ground and because of its arbitrary character I cannot accept it as one of the postulates of scientific inference." *Human Knowledge*, p. 461f. Quine: "It is a very special mark of the maturity of a branch of science that it no longer needs an irreducible notion of similarity and kind." "Natural Kinds", in *Ontological Relativity and Other Essays*, New York: Columbia, 1969, p. 138. Both men held that the notion of kind gives way, with the progress of natural science, to one of structure.

⁷ H. H. Price, *Thinking and Experience*, London: Hutchinson, 1953, p. 7.

⁸ The new riddle of induction seems a slap in the face to philosophers who would use natural kinds to study induction, but given the nominalist bent of philosophers in my tradition, I expect they would be content to incorporate Goodman's entrenchment. I shall assume for present discussion that we have agreed to avoid Goodmanic properties. Natural kinds collect properties that interest us to the extent of entrenching their

names in our language. Goodman noted long ago that entrenchment was one way to distinguish natural from artificial (his word) kinds. Philosophers in the tradition did take for granted that kinds are classes that interest us: we shall find Peirce saying of Mill that: “when he talks of ‘properties,’ [of things of a kind] he has in mind, mainly, characters of interest to us.” The point that natural kinds are interest-relative is well made by Ronald de Sousa, “The Natural Shiftiness of Natural Kinds,” *Canadian Journal of Philosophy*, 14 (1984): 561–80.

⁹ Strictly he argued that there was a halting definition of similarity using the notion of kind, but doubted one could go the other way. He found it worthless to try to explain ‘kind’ in terms of ‘property’ for he thought the latter even more obscure than the former.

¹⁰ Quine was anxious to have dispositional properties fade away, if not by logical devices, then by the growth of knowledge itself, which would replace them with structural descriptions. I hold out for dispositional properties in “Natural Kinds,” in R. Gibson, ed., *Perspectives on Quine*, Oxford: Blackwell, 1989, 129–141.

¹¹ The single paper that most overlaps my own views is John Dupré, “Natural Kinds and Biological Taxa,” *The Philosophical Review* 90 (1981), 66–90.

¹² One based, for example, on Bruno Latour and Steve Woolgar, *Laboratory Life*, Princeton: Princeton University Press, 2nd edn 1986.

¹³ Peirce cites for example Blundeville’s *Art of Logicke*, and Wilson’s *Rule of Reason* (1571).

¹⁴ Mill, *System*, I. vii. 4. Cf. IV. vi. 4., VI. xxii. 1. Page references below are to the definitive edition, note 1 above.

¹⁵ p. 122. Fearing that his readers were missing the point he added some hyperbole to the fourth edition of 1856. The members of two different real kinds “are parted off from one another by an unfathomable chasm, instead of a mere ordinary ditch with a visible bottom” (p. 123).

¹⁶ Original MS: “I say they may be; I do not say, they are” (p. 124).

¹⁷ *Ibid.*, quoting from the MS. The sexes were deleted from the printed edition. Because Mill was more dedicated to the equality of women, than to the equality of the races? I don’t think that Mill was at all clear in his own mind, what the consequences of such a conclusion would be. If men and women form different real Kinds should that have some moral, political or institutional consequence? Mill, I suspect, thought so.

¹⁸ C. S. Peirce, “Kind,” Baldwin’s *Dictionary of Philosophy and Psychology*, New York: Ginn, 1903, 1, p. 60f.

¹⁹ “Please fill up both the humidifier and the espresso machine with water.” That won’t do; the latter will get gummed up if any old water is used. “Please fill the humidifier with tap water, and the espresso machine with distilled water.”

²⁰ This statement oversimplifies in ways that are not at present germane, evading, for example, Locke’s distinct views about mixed modes and substances. The point of his doctrine as a critique of the Porphyry/Aristotle theory of classification has been well described by Michael Ayers, “Locke versus Aristotle on Natural Kinds,” *The Journal of Philosophy*, 78 (1981): 247–272.

²¹ H. Putnam, “Reference and Truth,” in *Realism and Reason: Philosophical Papers* Cambridge: Cambridge University Press, 1983, 3, p. 71.

²² Keith S. Donellan, “Kripke and Natural Kind Terms” in Carl Ginet, ed., *Knowledge and Mind: Philosophical Essays*, New York: Oxford University Press, 84–104.

²³ Disease — recall Putnam’s example of multiple sclerosis — is of particular interest to the student of those human kinds of which sociology tries to make a science. Disease terminology has been radically altered in the past century. Very few older terms for disease had extensions even loosely approximating that of the modern commonplace extensions. The symptoms of multiple sclerosis — visual and speech disorders, tremor, lack of muscular coordination, partial paralysis etc. pick out at best a vastly wider class

of disorders. By the beginning of this century pathology had recognized a certain type of damage to nerve fibers, which it connected with the symptoms and called disseminated or insular sclerosis. Here a kind became recognized, in a way substantially different from the kinds of physics or zoology; what we have today, for multiple sclerosis, is not a Mill-Kind, nor a Peirce-kind, nor a Leibniz-kind. A medical kind, perhaps. For an important discussion of medical kinds criticizing Putnam/Kripke, see Avishai Margalit, "Sense and Science," in E. Saarinen et al., eds., *Essays in Honour of Jaakko Hintikka*, Dordrecht: Reidel, 1979, 17–48.

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