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**No Grist for Mill on Natural Kinds**


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According to the standard narrative, natural kind is a technical notion that was introduced by John Stuart Mill in the 1840s and the recent craze for natural kinds, launched by Putnam and Kripke, is a continuation of that tradition. I argue that the standard narrative is mistaken. The Millian tradition of kinds was not particularly influential in the 20th century, and the Putnam-Kripke revolution did not clearly engage with even the remnants that were left of it. The presently active tradition of natural kinds is less than half a century old. Recognizing this might help us better appreciate both Mill and natural kinds.

# No Grist for Mill on Natural Kinds

P.D. Magnus

In the wake of Putnam and Kripke, no cautious philosopher would write 'natural kind' without minding its technical significance. Yet it was not always this way. Although the phrase 'natural kind' is now a standardized item of philosophical jargon, it is also a perfectly sensible English language construction. As a construction rather than as a fixed phrase, it just means a genuine or real category.

Although enthusiasts for natural kinds might gesture back to Aristotle or Locke, it is generally accepted that the philosophical conception initiated with John Stuart Mill. Bird and Tobin, citing Mill's *Logic*, write erroneously that Mill "was one of the first to use the phrase 'natural kind'" (2009). Importantly, Mill himself did not use the phrase 'natural kind'. However, he does define 'Kind' in a philosophical sense, and his conception of Kinds was later christened to be his doctrine of *natural kinds*.

Ian Hacking (1991b, 1991a, 2007a), who rightly notes that the phrase does not originate with Mill, portrays the historical arc of thinking about natural kinds as beginning with Mill and reaching its apex with Putnam and Kripke. Of course, there are issues which arise in any period which are relevant to or parallel the issue of natural kinds. As Hacking writes, "with any of the enduring themes in Western thought… we can reach back as far as we like to find precursors" (1991a, p. 151). This does not mean, however, that older traditions are fairly understood as arrayed for or against contemporary views about natural kinds. Hacking insists that, although it is possible to see views from the past as "simulacra" of present positions (1991a, p. 151), such an approach risks portraying past philosophers merely as early heralds of the triumphant present. Michael Ayers voices a similar concern about reading contemporary natural kinds into Aristotle and Locke; he writes, "What Aristotle and Locke between them potentially have to offer is something much more valuable than faint 'anticipations': an unfamiliar view of some difficult terrain and, at the very least, a deeper understanding of why Kripke was necessary at all" (1981, p. 249). So it is not mere pedantry when Hacking insists that the natural kind tradition "could not have come into being before about 1800, and is a minor element in a very major redistribution of ideas" (1991a, p. 151).

Hacking's narrative has come to be the standard. It is echoed in the passage from Bird and Tobin, quoted above. And John Dupré writes, "Ian Hacking reminded us that the contemporary tradition of natural kinds arose only in the nineteenth century, and we should be cautious about generalizing the topic to other parts of philosophical history" (2011, p. vii). Mindful that it is only too easy to read our present agenda into the past, I suggest—contra Hacking—that the recent engagement with natural kinds prompted by Putnam and Kripke is only nominally connected to Mill's concerns. They took Mill's conception of proper names to heart, of course, so there are historical lines which run directly from Mill to Kripke. Mill's notion of Kinds, however, is not one of them.

In §1, I discuss Mill's conception of Kinds and how it came to be called his conception of *natural kinds*. This christening was more tenuous than Hacking suggests, and 'natural kind' was not a much-used bit of jargon at the close of the 19th century. In §2, I offer quantitative, bibliometric data to further support this conclusion. In §3, I consider discussions of natural kinds so-called in the decades leading up to Putnam. There is a diminishing sense of the idea's origin in Mill, and a disconnect from the issues which had animated 19th-century debates. In §4, I argue that Putnam and Kripke make an important break both from Mill and from their

immediate precursors. In §5, I suggest how recognizing the discontinuity might be fruitful both for thinking about Mill and for thinking about natural kinds.

## 1. The nineteenth century

Mill follows William Whewell in distinguishing Kinds (with a capital-K) from arbitrary classes of things.[1] Any stipulation of properties can distinguish a class. For example, stipulating the property *white* distinguishes the class of white things. Yet there is no reason to think that members of the class will have anything in common beyond the stipulated property and its necessary consequences. White things are coloured and non-transparent, but they do not have anything non-chromatic in common. Contrariwise, members of a Kind are similar in indefinitely many respects. We can infer general facts about rats on the basis of a laboratory sample of rats, even facts that are not the ones that we specify as distinguishing rats from non-rats. Mill gives several examples of Kinds, ranging from general categories such as *plant* and *animal*, to specific species such as *horse*, to chemical elements such as *phosphorus*. Despite considerable study of these things, Mill says, we have not learned everything that members of each kind have in common—because they are Kinds, there will always be more shared features than however many we have documented. He writes:

> Some classes have little or nothing in common to characterize them by, except precisely what is connoted by the name: white things, for example, are not distinguished by any common properties except whiteness…. But a hundred generations have not exhausted the common properties of animals or of plants, of sulphur or of phosphorus; nor do we suppose them to be exhaustible.... (Mill 1874, p. 97)

Mill is explicit that he means to introduce 'Kind' as jargon. Giving a concise definition, he writes that "a real Kind…is distinguished from all other classes by an indeterminate multitude of properties not derivable from one another" (1874, p. 99). I do not think that the modifier 'real' in this definition should be taken to define a technical compound phrase 'real Kind'. Mill just means 'real' in the plain sense of *genuine*, and he is defining what he means by Kind *simpliciter*.

Kinds are important for Mill's account, because they complement causes. For Mill, many inductions are justified by the *law of causation* which allows us to infer laws of nature from finite experience.[2] Yet the law of causation primarily concerns successive events. The correlation of properties among members of a Kind are simultaneous rather than successive. Kinds can lead us to conclude that a property has an "invariable co-existent, in the same manner as an event must have an invariable antecedent." Because of this difference, Kinds are structures of *non-causal* regularities. Mill discusses them under the heading "Of uniformities of co-existence not dependent on causation" (1874, bk. III, ch. XXII).

Mill's Kinds come to be called *natural kinds*, but not immediately. In an 1859 review of Mill, James Martineau uses the phrase 'natural kinds'—referring not to Mill's Kinds but to Platonic forms (Martineau 1859, p. 483). In 1866, John Venn uses the phrase 'natural kind' to describe categories that are like Mill's Kinds. Statistical generalizations are only possible, Venn suggests, because the groups about which we gather statistics are relevantly similar. He writes, "The uniformity that we may trace in the results is owing…to this arrangement of things into natural kinds…" (1866, p. 26). In the second edition, on the subject of inferring probabilities from samples, he writes that "for this purpose the existence of natural kinds or groups is necessary" (1876, p. 49). Although Hacking (1991b) thus credits Venn with christening Mill's Kinds to be 'natural kinds', the matter is not so clear. Venn neither mentions

Mill in these chapters nor invokes any of the details of Mill's account (e.g. kinds as non-causal coexistences). Venn's use of the phrase "natural kinds or groups" suggests that he does not mean to be defining a term of art but instead just to be using 'natural' in an ordinary way, as a modifier to indicate that the groups are genuine features of nature.

In 1877, in the second volume of *Mind*, Carveth Read makes the connection explicitly. Mill's view, Read says, is that "every Law of Causation is the Definition of a Class of Causal Instances; and every Definition of a Natural Kind is a Law of Co-existence" (1877, p. 344).[3] In 1887, again in *Mind*, there is a short attack on Mill's view under the title 'On the doctrine of natural kinds' (Towry 1887). The critic, M.H. Towry, provides a fair and concise summary of Mill's position:

> Mill says that a Kind is one of those classes which are distinguished from all others, not by one or a few definite properties, but by an unknown multitude of them; the combination of properties on which the class is grounded being a mere index to an indefinite number of other distinctive attributes, and instances Plant, Animal, Sulphur, Horse, &c., as Kinds. (Towry 1887, p. 435)

There are two short replies to Towry with similar titles: 'Mill's doctrine of natural kinds' (Monck 1887) and 'Mill's natural kinds' (Franklin and Franklin 1888).

Two textbook discussions of Mill in the early twentieth century erroneously attribute the phrase 'natural kind' to him, yet they also reject it as wrongheaded. John Venn writes in 1907, "Mill, as we all know, writing in pre-Darwinian days, greatly overrated the distinctness and the ultimate or primitive character of these various attributes. He introduced the technical term of 'natural kinds' to express such classes as these" (Venn 1907, p. 84). Venn says we should instead to talk about natural substances, which include chemical but not biological kinds. Carveth Read writes in 1920, "Mill also introduced the doctrine of Natural Kinds as a ground of Induction supplementary…. According to the theory of evolution (worked out since Mill wrote), Kinds—that is, species of plants, animals and minerals—with their qualities are all due to causation" (Read 1920, p. 166).[4] It is striking that both Venn and Read, in these late works, simply credit Mill as having coined 'natural kind'. Perhaps they had genuinely forgotten that the phrase does not appear in Mill, or perhaps they felt that it was a harmless misrepresentation. In any case, they both took Mill's notion to be undone by Darwinian biology. Since they had been participants in nineteenth century discussions of natural kinds, their usage is no evidence the phrase had been picked up by the next generation of philosophers. And their textbooks reflected just the old logic, rather than modern formal logic, and so were unlikely to have been especially influential.

In a detailed guide to Mill's *Logic* (Tawney 1909), Guy Allan Tawney devotes ample attention of kinds. Ultimately, he complains that Mill "nowhere adequately grounded" the distinction between kinds and classes (Tawney 1909, p. 16). Although he uses the phrase 'natural kind' twice, he more often uses 'real kind' or just 'kind'.[5]

Perhaps more tellingly, there is no entry for 'natural kind' in James Mark Baldwin's 1901 *Dictionary Of Philosophy And Psychology*. The entry on 'kind', written by Charles Sanders Peirce, treats it (sans 'natural') as Mill's innovation. Peirce rejects kinds (in Mill's sense) as irrelevant to science.

This suggests that, in the turn from the nineteenth to the twentieth-century, the phrase 'natural kind' had not become entrenched as part of the philosophical lexicon. It was just one of several ways that philosophers might talk about Mill's view of Kinds, something which they dismissed if they mentioned it at all.

## 2. Bibliometric evidence

The data set assembled by Michel et al. (Michel et al. 2011, Lin et al. 2012) can be mined to give us a more panoramic sense of how *natural kind* talk developed. Based on a corpus containing over 4.5 million digitized English-language books, they tabulated annual frequencies of words and phrases.

Merely counting up occurrences of the phrase 'natural kind' will be uninformative. Authors sometimes simply pair the two words together compositionally, rather than using the phrase as jargon. In order to provide a base line, we can compare the frequency of 'natural kind' to the frequency of another similar phrase. I will compare 'real kind', which is roughly interchangeable for the non-jargon use of 'natural kind' but has never itself been fixed-phrase jargon.[6]

Figure 1 shows frequencies of use from 1825 to 2000 (see p.10, below). The great separation between 'natural kind' talk and 'real kind' talk does not come until Putnam and Kripke. The height of that crest washes out the earlier fluctuations.

So zoom in: Figure 2 shows just the period from Mill through the beginning of the 20th-century (see p.11). In order to make the comparison explicit, the graph shows the difference between the two frequencies: the number of uses of 'natural kind' and variants *minus* the number of uses of 'real kind'. From 1866 (the year of Venn's *Logic of Chance*) until about 1900, the line is above the x-axis—meaning that 'natural kind' was used more often than 'real kind'. This is exactly the period when Mill's view was actively discussed under the heading of natural kinds. From 1900 to about 1915, the two phrases are at parity. In some of those years 'natural kind' was used less than 'real kind'.

This suggests that there was not a continuous use of 'natural kind' from the time of Mill to the present. One can point to several shortcomings of the data, but none entirely defeat the inference:

First, the data does not include terms in languages besides English or variant phrases such as 'kind in nature'. This is not a real worry, because our question is precisely about the English-language 'natural kind' as a fixed phrase.

Second, the data set counts phrases in books but not in periodicals. This does mean that M.H. Towry's article and the responses to it in *Mind* are not counted. Yet those articles are all rather short, totaling only twelve pages altogether. Substantive discussion in journals often appears later in books. The discussion in Read's 1877 article is counted, for example, because it also appears in his 1878 book. Moreover, excluding periodicals leaves out both uses of 'natural kind' and uses of 'real kind'. So the *difference* between the two is still informative.

Third, the total numbers in any year are fairly small. So single authors can make a great difference. A spike in the use of 'natural kind' talk in 1917, for example, is largely the work of G.P. Watkins (1917). A single article of his counts for more than a third of the uses of 'natural kind' in that year. The case is interesting, because it shows something about the reception of Mill's conception. Watkins' article appears in *Business Statistics*, a volume of *Harvard Business Studies*.[7] Watkins quotes Mill, but only once at the outset and without providing any exegesis. Moreover, his treatment of natural kinds is not especially Millian. Watkins writes:

> Demography, or population statistics, has for its principal unit the human individual, and human individuals constitute a natural kind. Other examples of natural kinds in statistics are the various raw products of the animal and vegetable world, the numbers of which are usually obtained by counting discrete units. (Watkins 1917, p. 31)

His idea is that natural things, like humans, cattle, and eggs, can simply be counted up. Manufactured goods cannot, because they vary greatly in size and composition. He gives this example: Ox-hides are a natural kind (since they are necessarily one per ox) but

shoes are not (Watkins 1917, p. 33). Insofar as 'natural kind' had become jargon, it was for a statistician rather than for philosophers.

In addition to the raw number of occurrences of the phrase in each year, the data set records the number of *distinct* books in which the phrase occurs. Where the phrase is merely used because the combination of words seemed apt—where an author merely used 'natural' and 'kinds' together to talk about *genuine categories*—we should expect it to appear only a few times in any particular book. An author who just puts together the phrase 'natural kind' might alternate it with synonyms like 'natural group', 'real kind', or 'genuine category'. Where the phrase is used as a term of art, we should expect an author to use it several times. An author who gives a precise meaning to 'natural kind', as Watkins does, will be careful to use exactly the same words again. So we can glean the difference between the two sorts of use by considering the ratio between total occurrences of the phrase and the number of books in which they occur; the higher the ratio, the more the phrase is being used as jargon. The result is Figure 3 (see p.12).

Unfortunately, because the data set includes (e.g.) 'natural kind' and 'natural kinds' as separate phrases, a book that uses both forms is counted twice in the total of books for that year. So the graph overreports the number of books for some years and thus underreports uses per book. Yet there is still a striking uptick in the use of the phrase in the late 1870s, at the time of Carveth Read's attack on Mill (Read 1878), and it does not rise again above 2 occurrences per book until the 1970s.

The data thus corroborate the claim that 'natural kind' was not a commonly used term of art at the outset of the 20th century.

## 3. Broad, Russell, and Quine

Of course, some philosophers did write about natural kinds in the decades before Putnam and Kripke. Hacking (2007a) identifies three antecedents: C.D. Broad (1920), Bertrand Russell (1948), and W.V.O. Quine (1969). Even in their discussions, however, we can see how far the discussion drifts from the Millian conception.

Broad attempts to determine when induction is legitimate—when it is correct to infer from a sample of *S*s which are *P* to the conclusion that all *S*s are *P*. Such inferences, he writes, "seem plausible when we are dealing with substances which are believed to belong to what Mill would call a Natural Kind" (Broad 1920, p. 16). Broad's use of capital letters for the whole phrase 'Natural Kind' makes clear that he means it as jargon. As we have seen, he is wrong to say that this is what Mill would have called such groups—Mill's term was simply 'Kinds'. Since Broad neither provides a citation nor says anything further about Mill, this slip is not egregious. For Broad's project, the connection to Mill is incidental. However, it does suggest that Broad is not especially concerned with developing Mill's conception.

Broad suggests the following metaphor: Imagine the state space of properties, such that the state of a particular individual corresponds to a point in the space. Then imagine a fluid constituted by the state of every actual individual. This fluid will be dense in some regions and thin in others. The dense regions are blobs of individuals which share a great many properties. "This sort of distribution corresponds to what is meant by natural kinds," Broad writes. "A natural kind is a region containing a blob" (1920, p. 26). Quine employs the clump in state-space metaphor, too. He argues that natural kinds presume a space of similarity judgements and that a natural kind is a "qualitatively spherical" region of such a space (Quine 1969, p. 119). A consequence of the metaphor is that there is no sharp boundary between natural kinds and clusters of things which are not natural kinds. A *blob*,

after all, is just as vague a thing as a heap.[8] Yet, for Mill, the difference between natural kinds and arbitrary classes is not a difference in degree. Kinds, he says, are "classes, distinguished by unknown multitudes of properties, and not solely by a few determinate ones—which are parted off from one another by an unfathomable chasm, instead of a mere ordinary ditch with a visible bottom" (Mill 1874, p. 98). Mill's nineteenth-century critics, such as Read and Towry, insist that there are no natural kinds exactly because (according to them) categories of things lack sharp boundaries.

Russell uses the phrase 'natural kinds' in writing about Keynes' *postulate of limited variety*, without mentioning Mill. Russell says that Keynes' postulate "is closely akin to, if not identical with, that of natural kinds" (Russell 1948, p. 439). Although the postulate of natural kinds would suffice to underwrite induction in some cases, Russell says, it is not implicit in the inductive inferences that we actually perform. So he dismisses natural kinds as a basis for induction. Moreover, he suggests that natural kinds are not especially useful for science—what matters more is the reliable correlation of properties.[9]

Quine (1969) considers *natural kinds* as clusters of similarity. Like Peirce and Russell, he rejects the suggestion that natural kinds matter to science. The expressed context for Quine's essay is Goodman's New Riddle of Induction, and Quine makes no connection to either the history or the details of the 19th-century tradition. In following Goodman, Quine is concerned with categories which would not have been natural kinds on Mill's view. In considered *whether emeralds are grue*, the question is whether there is any way to distinguish *green* from *grue* as the right category for induction. Indeed, Quine takes *yellow* and other colour categories to be specimens of natural kinds. He argues that they are useful in daily life but insignificant in the grand scheme of things; he writes, "Cosmically, colors would not qualify as kinds" (Quine 1969, p. 127). Something funny has happened here, because Mill offered things of a specified colour as his chief example of a class which *fails* to be a Kind. The class of *white things* is only similar in respect to the specified feature, being white, but members of a Kind are similar in the respects that we know about and indefinitely more besides. Quine's problem is how predicates can apply to things at all, so any predicates are equally puzzling. Mill's problem is how a class can be more than what we stipulate it to be, so he is interested only in the classes which do seem to be connected by more than the predicates which we stipulate.

One might suggest that the discussions by Broad, Russell, and Quine still preserve the central motivation of Mill's discussion: namely, induction. For Mill, the question is how we can infer from an observed feature of some *X*s to an unknown feature of other *X*s, and his answer is that *X*s which are of a Kind will be similar in many respects. A similar concern animates the 20th-century discussions which I've surveyed in this section. As we will see in a moment, though, this is not the concern which animates more recent discussions of natural kinds.

## 4. Putnam, Kripke, and everything after

The recent vogue for natural kinds stems from Hilary Putnam's and Saul Kripke's work in semantics. In 'Is semantics possible?', Putnam introduces natural kinds without argument. He appeals to "natural kinds—that is…classes of things that we regard as of explanatory importance; classes whose normal distinguishing characteristics are 'held together' or even explained by deep-lying mechanisms" (Putnam [1970] 1975, p. 139). This is not really a definition, but rather a gesture to whatever categories figure in a scientific description of the world. Whereas prior authors had introduced natural kinds in the context of thinking about inductive inference, Putnam introduces them in the context of semantics. Within a few years, Putnam accepts Kripke's machinery of *rigid*

*designation* as the way that reference to natural kinds is accomplished. Although there are differences between Putnam's view and Kripke's the differences are irrelevant for our purposes.[10] Since the late 1970s, philosophers have often considered them together. It is common for both proponents and detractors to talk about the *Kripke–Putnam* view of reference and natural kinds.

The Kripke–Putnam synthesis breaks with tradition in several significant respects.

First: Peirce, Russell, and Quine had all argued that natural kinds were scientifically irrelevant. Contrariwise, Putnam takes them in the first place to be the scientifically significant classes. This suggests that Putnam just has *something different* in mind than Peirce, Russell, and Quine did.

Second: The Kripke–Putnam focus on natural kind terms leads to a corresponding focus on words that predate or even lack a scientific analysis. For example, Putnam ([1970] 1975) considers 'lemon' and 'tiger'. This is significant because one might well wonder whether the common word 'tiger' has the same meaning as the species name '*Panthera tigris*'. Mill distinguishes *terminology*, the vocabulary of a discipline, from proper *nomenclature*, the discipline's names for Kinds (Mill 1874, p. 492). His concern is scientific nomenclature, and his examples are conspicuously given as species names; e.g., he writes '*Viola odorata*' rather than 'common violet' (1874, p. 493).

Third: The Kripke–Putnam approach is closely associated with the search for essences.[11] Mill is centrally in a tradition which adamantly rejected essences.

Members of a Kripke–Putnam natural kind must share an essence but need not be superficially similar. Writing in the early days of the Kripke–Putnam synthesis, Stephen Schwartz suggests that "natural kind terms occur where the same stuff or thing characteristically takes a lot of different forms" (1979, p. 314). His idea is that natural kind terms are only introduced when members of an important category *differ* in a great many respects. Ice, liquid water, and steam have very different observable properties, but share their unobservable material basis. Infants, adolescents, and adults differ in a great many respects but a single individual passes through each stage. Males and females of a species may differ a great deal, but are connected by membership in the species. In such cases, Schwartz says, it is profitable to think about an underlying, unified kind just because there is systematic polymorphism. Schwartz's suggestion would simply be nonsense given the prior conception of natural kinds. For Mill, a Kind is constituted by the indefinite list of shared properties possessed by its members. For Quine, a natural kind is constituted merely by the similarity of its members. Yet for Putnam and company, a natural kind is constituted by an essence which (initially, at least) is just characterized as whatever 'holds together' the kind. Schwartz suggests that categories held together in this way are most useful when members of the category *do not* share most or all of their properties, whereas similarity is just definitional of kind for the prior tradition.[12]

All of these factors indicate a wide gap separating *natural kinds* after Kripke and Putnam from anything that Mill could have recognized. Except perhaps for the second, they separate the Kripke-Putnam account even from its immediate precursors (such as Quine). This strongly suggests that 'natural kind' as it is used in more recent discussions is simply a novel phrase of philosophical jargon which does not mean the same thing as 'Natural Kind' meant when Carveth Read and M.H. Towry attacked Mill's view. Of course, judging when meaning is continuous and when not is a major application of the Kripke-Putnam approach. To sort that out, we would have to decide whether 'natural kind' itself is a natural kind term. Let's retreat from that recursive abyss.

One might object to my claim of discontinuity by noting that there is a connection between Mill and the Kripke-Putnam ac-

count. Kripke extends Mill's idea that names can refer without describing. However, being Millian about names does not mean being Millian about natural kinds. The approach to names launched by Mill does get extended in the Kripke–Putnam approach, but the approach to natural kinds does not. Mill's *Logic* is a large book, and it should be no surprise if some parts should be influential and others less so—some celebrated and some forgotten. Perhaps the fact that Putnam and Kripke use the phrase 'natural kind' at all is due to Quine and Russell, perhaps they in turn only used it because of Broad, and Broad associated the phrase with Mill. But the phrase is a perfectly sensible compound of English language words. What it is to be a *natural kind* in recent thinking is not usefully framed as the same thing that Mill worried over.

## 5. Conclusion

My argument has been meant to show an important discontinuity in 'natural kind' talk. Contra Hacking, it is a mistake to tell a grand narrative in which natural kinds dawned with Mill and have dimmed to darkness in recent years.[13]

Of course, the views of any two philosophers will be similar in some respects and different in others. So I am not making the extreme claim that there are no lines at all connecting Mill on Kinds to contemporary work on natural kinds. Yet the lines that do connect seem more like strands in proverbial ropes than like strands of spider silk. Mill's 19th-century critics clearly had Mill in view, Broad probably had the 19th-century discussions in view, Quine perhaps had Broad in view, and Putnam certainly knew of Quine. One can tell this altogether as one story. I argue, however, that it is not philosophically enlightening to do so. There is little to connect the earliest moments with the latest ones besides the sort of philosophical homologies which inevitably hold between any two views.

Since cross-pollination can happen between distant philosophical blooms, I have not proven that Putnam and Kripke did not reflect on Mill's account of Kinds in their quiet moments. In fact, when asked recently where he got the phrase 'natural kind', Putnam points to Mill's *Logic* which he recalls having read in the 1950s and notes ways in which Mill anticipated semantic externalism (2012, personal communication). My argument here is not about intellectual biography, but about the phrase 'natural kind' and the various concepts that have been associated with it. Whatever their genesis, Putnam's natural kinds are not much like Mill's Kinds. I suggest, then, that we understand both Mill and natural kinds better if we do not fit them into an overdramatic grand narrative. Here I can only gesture toward the possible rewards.

Regarding Mill: In addition to defining 'Kinds' (bk. I,ch. VII) and discussing Kinds as 'uniformities of co-existence' (bk. III,ch. XXII), Mill has an extended discussion of classification (bk. IV). Some of his critics argued that the latter section was overreaching. For example, W.H.S. Monck (1887) argues that classification is a task for specialists, not for philosophers and certainly not for logicians. Yet it is in the discussion of classification that Mill actually uses the word 'natural'. Putnam comments, "I think what Mill calls 'natural groups' are exactly what I meant by 'natural kinds' " (2012, personal communication). Perhaps, but the historical point is that Mill did not use 'natural group' as a synonym for 'Kind'. When Mill's critics attacked his *doctrine of natural kinds*, they meant the latter. So if we plumb Mill's *Logic* for thoughts on *natural kinds* in our contemporary sense, we should look beyond his account of capital-K Kinds. And if 19th-century debates about Mill's Kinds are to be related to present concerns, we should not presume that the lessons will be about our *natural kinds*.

Regarding natural kinds: Work on natural kinds is often written as if it is some well-defined item of philosophical machinery. If I am correct, however, there is no use trying to analyze 'natural kind'. The term in the hands of philosophers does not simply mean 'kind' as modified by 'natural', nor is there a uniform tradition of its use across history. Natural kinds are categories that support induction, they are the right categories for giving a scientific account of the world, they are categories we name without fully understanding, and so on. These and other assumptions guide how we talk about them. Coming to grips with *natural kinds* requires facing up to this not-entirely-coherent heritage.


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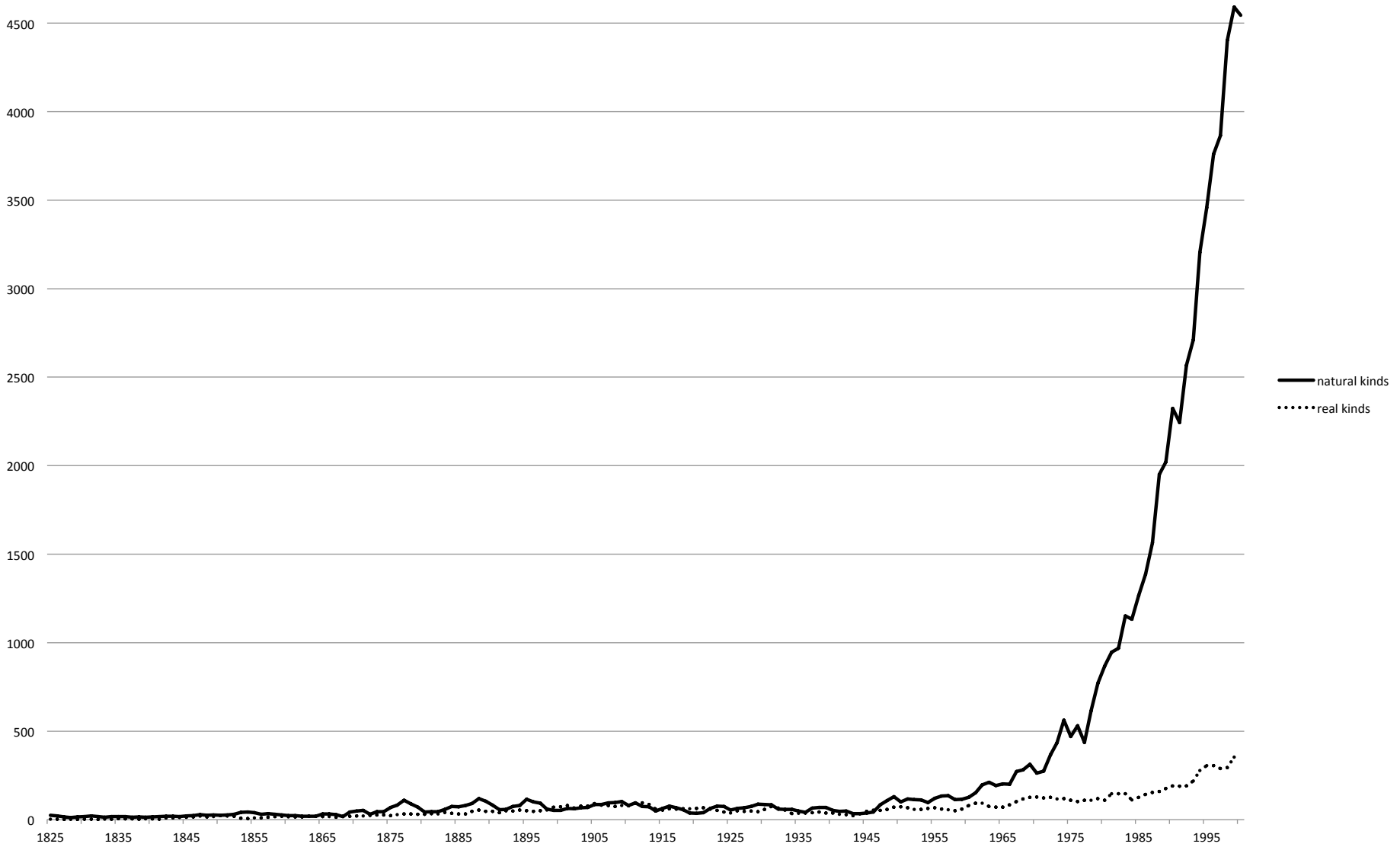


**Figure 1:** Number of occurrences of 'natural kind' (solid line) versus 'real kind' (dashed line) in books published between 1825 and 2000. The curve is smoothed by averaging over a three year window.

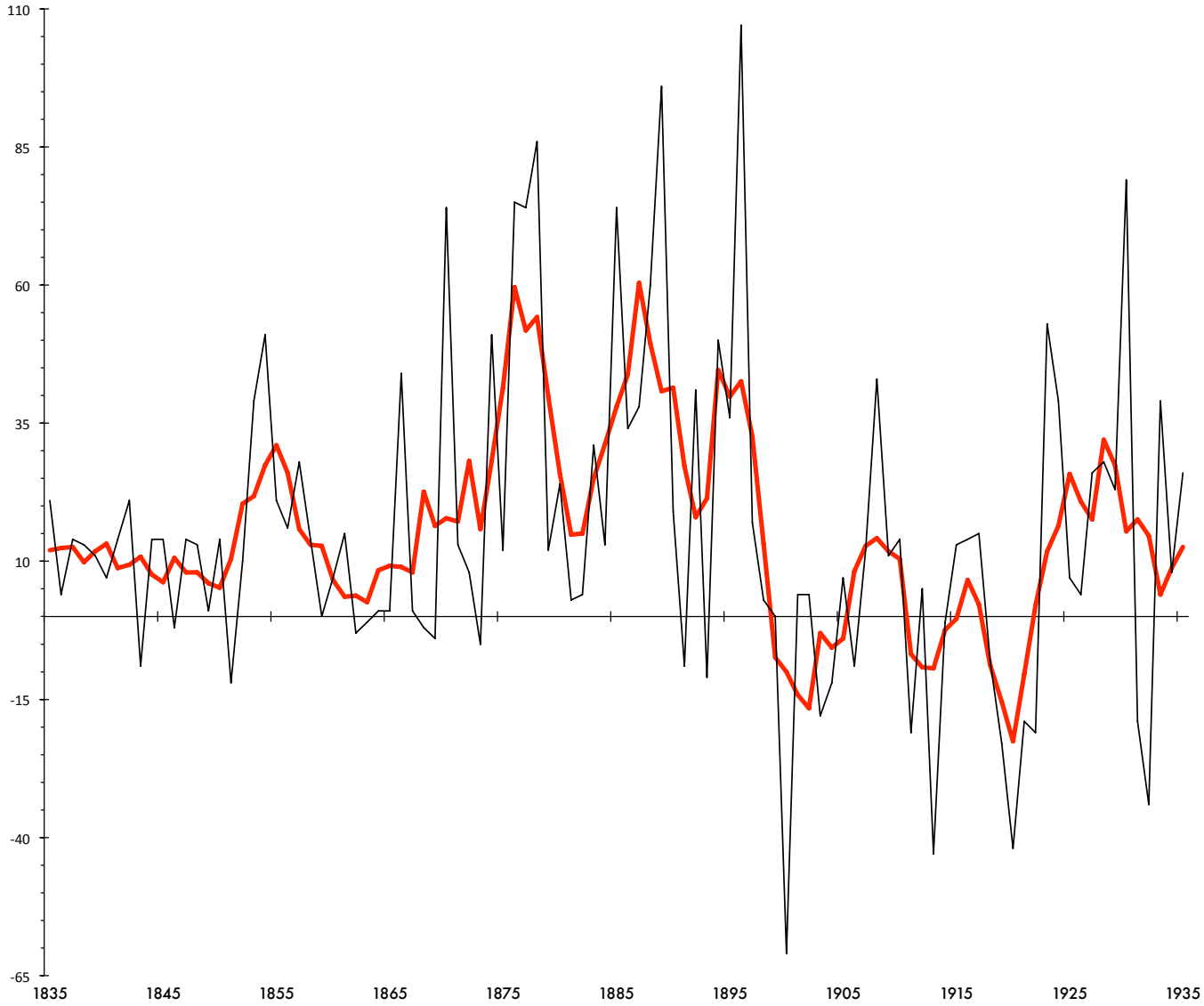


**Figure 2:** The difference between occurrences of 'natural kind' and 'real kind' in books published between 1835 and 1935. The thin black line represents each year separately. The bold red line is smoothed by averaging over a five year window. When the line is below the x-axis, 'real kind' was used more than 'natural kind'.

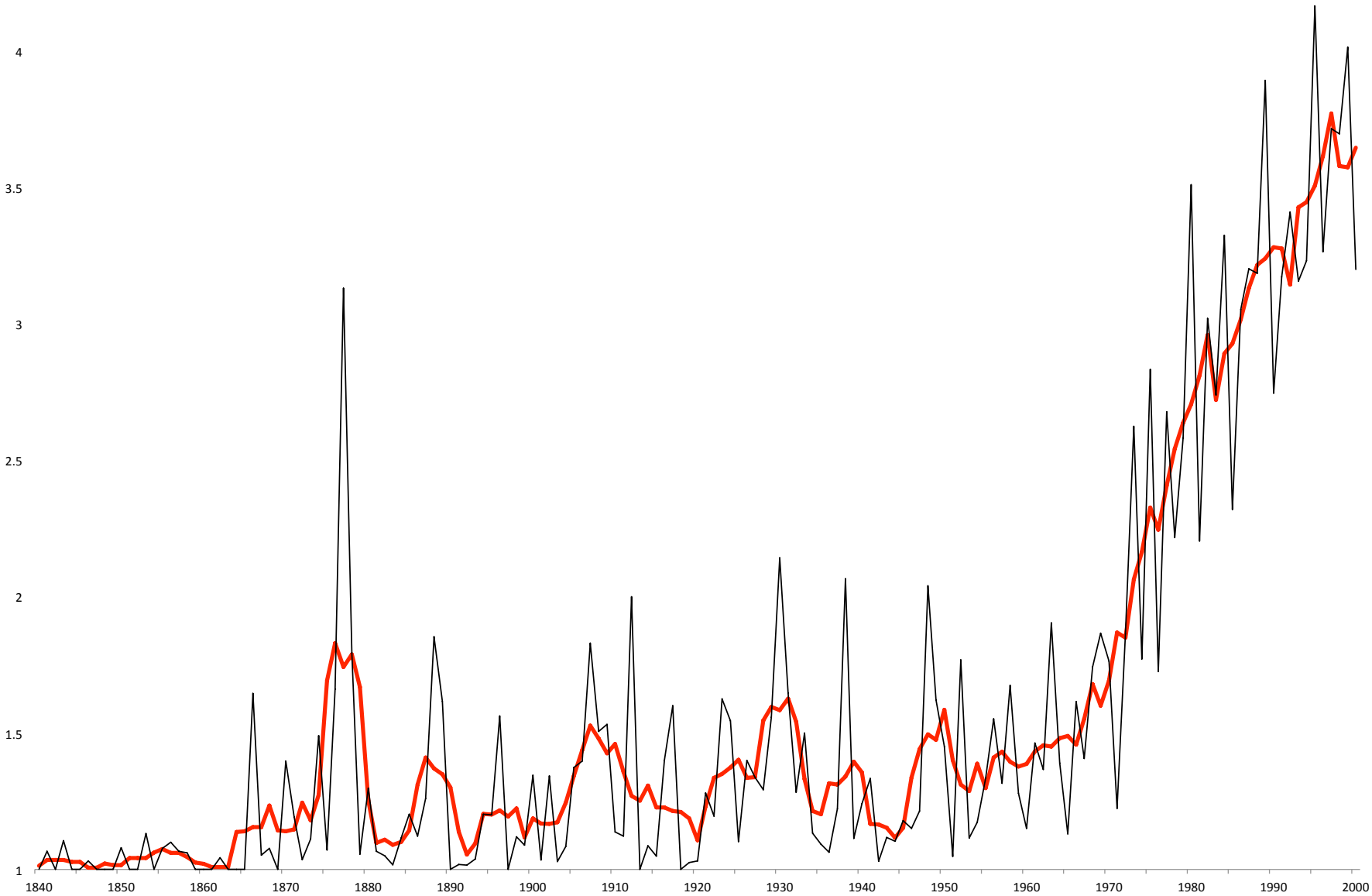


**Figure 3:** The number of occurrences of 'natural kind' each year divided by the number of distinct books in which those occurrences appear. Where the phrase is used as jargon, an author is likely to use it more than just once. The thin black line represents each year separately. The bold red line is smoothed by averaging over a five year window.

## Notes

[1] Regarding this overlap between Whewell and Mill, see McOuat (2009).

[2] The law of causation is the general principle "that among the circumstances which actually existed at the time of its commencement, there is certainly some combination, on which the effect in question is unconditionally consequent, and on the repetition of which it would certainly again recur" (Mill 1874, p. 410).

[3] The eccentric capitalization is Read's.

[4] Note that this passage was added in the fourth edition. There is no mention of natural kinds in the prior edition (Read 1909).

[5] Tawney's guide was published by the house journal at the University of Cincinnati, where he taught. It is unclear whether it had any significant readership.

[6] I have combined results for both the singular and plural (e.g., counting both 'natural kind' and 'natural kinds') and for all capitalizations (e.g., counting both 'Natural Kind' and 'natural kind').

[7] The article had earlier been published in a journal (Watkins 1912) and appears in the data set because it was reprinted in the book.

[8] Russell offers the similar metaphor of properties being sociable, according to which the properties that characterize a natural kind are ones which huddle together (Russell 1948). Such association can come in degrees. Chakravartty has recently defended property sociability as an account of natural kinds (2007, p. 170).

[9] I am not entirely clear on what the contrast is supposed to be. On Mill's view, as we saw above, regularities of correlation just are natural kinds.

[10] For an elaboration of differences, see Hacking (2007b).

[11] Putnam himself resisted reading *essence* in too metaphysical a way, but Kripke was less cautious. In any case, a new essentialism has been part of the trajectory that they helped launch.

[12] Moreover, Schwartz reports that there was no sense at the time of Mill being an important predecessor. He writes, "As a philosophy student in the 1960s, I can say that for us Mill's *System of Logic* was considered a relic of only historical interest if even that" (2012, personal communication).

[13] Here I am mirroring the title and guiding metaphor of a Hacking essay (2007a).

## References


Michael R. Ayers. Locke versus Aristotle on natural kinds. *The Journal of Philosophy*, 78(5):247–272, May 1981.

James Mark Baldwin, editor. *Dictionary Of Philosophy And Psychology*, volume 1. The Macmillan Company, New York, 1901.

Alexander Bird and Emma Tobin. Natural kinds. In Edward N. Zalta, editor, *The Stanford Encyclopedia of Philosophy*, Spring 2009. URL http://plato.stanford.edu/archives/spr2009/entries/natural-kinds/.

C.D. Broad. The relation between induction and probability—(part II). *Mind*, 29(113):11–45, January 1920.

Anjan Chakravartty. *A Metaphysics for Scientific Realism*. Cambridge University Press, 2007.

John Dupré. Foreword. In Joseph Keim Campell, Michael O'Rourke, and Matthew H. Slater, editors, *Carving nature at its joints: Natural kinds in metaphysics and science*, pages vii–viii. The MIT Press, Cambridge, Massachusetts, 2011.

F[abian] Franklin and C[hristine] L[add] Franklin. Mill's natural kinds. *Mind*, 13(49):83–85, January 1888.

Ian Hacking. On boyd. *Philosophical Studies*, 61:149–154, 1991a. Ian Hacking. A tradition of natural kinds. *Philosophical Studies*, 61:109–126, 1991b.

Ian Hacking. Putnam's theory of natural kinds and their names is not the same as Kripke's. *Principia*, 11(1):1–24, 2007a.

Ian Hacking. Natural kinds: Rosy dawn, scholastic twilight. *Royal Institute of Philosophy Supplement*, 82:203–239, 2007b.

Yuri Lin, Jean-Baptiste Michel, Erez Lieberman Aiden, Jon Orwant, Will Brockman, and Slav Petrov. Syntactic annotations for the Google Books ngram corpus. In *Proceedings of the 50th Annual Meeting of the Association for Computational Linguistics*, pages 169–174, July 8–14 2012. Jeju, Republic of Korea.

P.D. Magnus. Scientific Enquiry and Natural Kinds: From Planets to Mallards. Palgrave MacMillan, Basingstoke, Hampshire, 2012.

James Martineau. John Stuart Mill. The National Review, 9(18): 474–508, October 1859. A review of Mill's *Dissertations and Discussions, Political, Philosophical, and Historical*.

Gordon McOuat. The origins of 'natural kinds': Keeping 'essentialism' at bay in the age of reform. *Intellectual History Review*, 19(2):211–230, 2009. doi: 10.1080/17496970902981694.

Jean-Baptiste Michel, Yuan Kui Shen, Aviva Presser Aiden, Adrian Veres, Matthew K. Gray, The Google Books Team, Joseph P. Pickett, Dale Hoiberg, Dan Clancy, Peter Norvig, Jon Orwant, Steven Pinker, Martin A. Nowak, and Erez Lieberman Aiden. Quantitative analysis of culture using millions of digitized books. *Science*, 331(6014):176–182, January 14 2011. doi: DOI: 10.1126/science.1199644. Published Online December 16 2010.

John Stuart Mill. *A System of Logic*. Harper&Brothers, New York, eighth edition, 1874.

W. H. S. Monck. Mill's doctrine of natural kinds. *Mind*, 12(48): 637–640, October 1887.

Hilary Putnam. Is semantics possible? In *Mind, Language, and Reality: Philosophical Papers volume 2*, pages 139–152. Cambridge University Press, [1970] 1975.

W[illard] V[an Orman] Quine. Natural kinds. In *Ontological Relativity & other essays*, pages 114–138. Columbia University Press, New York, 1969.

Carveth Read. On some principles of logic. *Mind*, 2(7):336–352, July 1877.

Carveth Read. *On the theory of logic: An essay*. C. Kegan Paul & Co., London, 1878.

Carveth Read. *Logic Deductive and Inductive*. Alexander Mooring Limited, London, third edition, 1909.

Carveth Read. *Logic Deductive and Inductive*. Simpkin, Marshall, Hamilton, Kent & Co., London, fourth edition, 1920. URL http://www.gutenberg.org/1/8/4/4/18440/.

Bertrand Russell. Human Knowledge: Its Scope and Limits. Simon and Schuster, New York, 1948.

Stephen P. Schwartz. Natural kind terms. *Cognition*, 7:301–315, 1979.

Guy Allan Tawney. J.S. Mill's theory of inductive logic. *University Studies*, II.V(1–2), 1909.

M. H. Towry. On the doctrine of natural kinds. *Mind*, 12(47): 434–438, July 1887.

John Venn. *The Logic of Chance*. Macmillan and Co., London and Cambridge, 1866.

John Venn. *The Logic of Chance*. Macmillan and Co., London and Cambridge, second ('rewritten and greatly enlarged') edition, 1876.

John Venn. *The Principles of Empirical or Inductive Logic*. Macmillan and Co., St. Martin's Street, London, second edition, 1907.

G.P. Watkins. The relation between kinds of statistical units and the quality of stastical material. *The Quarterly Journal of Economics*, 26(4):673–702, August 1912.

G.P. Watkins. Statistical units. In Melvin T. Copeland, editor, *Business Statistics*, volume III of *Harvard Business Studies*, pages 29–52. Harvard University Press, Cambridge, 1917.