

MILES MACLEOD

THE EPISTEMOLOGY-ONLY APPROACH TO NATURAL KINDS:
A REPLY TO THOMAS REYDON

What I'm going to comment on here mostly are the issues of natural kinds that Thomas Reydon raises with respect to his 'epistemology-first' strategy, rather than specifically the problem of the special sciences, although it is clear that it is with respect to the special sciences and the problem of field demarcation that any notion of natural kind has its most pressing application. I'm going to suggest a perhaps rather pragmatic extension of this strategy which would attempt to provide a degree of philosophical usefulness in this regard but avoid the traditional problems which I don't think we escape unless this strategy is pushed to the logical conclusion of an *epistemology-only* approach.

As Reydon mentions in his text, there is today a rather large shadow looming over those who trade in natural kinds. This has been cast by Ian Hacking, who has in his inimitable way declared the concept to be arbitrary in its many inconsistent formulations, to have failed in its chief ambitions of providing a general account of categorisation in science, and ultimately to be of no consequence to philosophy of science.¹

But if we read Hacking closely what I think we find he is really objecting to is a unified notion of natural kind; namely, that some single unitary logical or metaphysical definition grounds the relations and properties of seemingly diverse class structures in science. "It is the idea of a well-defined class of natural kinds that has self-destructed. ..."² Yet it is precisely in the directions of more pluralistic and more naturalistic understandings of natural kinds away from essentialism that theorists have been heading. Hacking shows his sympathy to this. In the paper I am citing for instance he criticises almost everybody but seems willing to entertain Richard Boyd's Homeostatic Property Cluster conception for species and the like, although he thinks it not relevant for all potential natural kinds (which I don't believe was ever Boyd's claim).³ He does however prefer to regard these more pluralistic approaches to natural kinds as simple evidence of the vacuousness of

1 Ian Hacking, "Natural Kinds: Rosy Dawn, Scholastic Twilight", in: *Royal Institute of Philosophy Supplement*, 82, 2007, pp. 203-239.

2 *Ibid.*, p.209.

3 The cluster theory goes back to papers such as Richard Boyd, "How to be a Moral Realist", in G. Sayre-McCord (Ed.), *Essays on Moral Realism*, Ithaca: Cornell University Press 1988, pp. 181-228; Richard Boyd, "What Realism Implies and What it Does Not", *Dialectica*, 43, 1989, pp.5-29; Richard Boyd, "Realism, Anti-Foundationalism, and the Enthusiasm for Natural Kinds", *Philosophical Studies*, 61, 1991, pp. 127-148.

the natural kind concept. I don't think that's right. If the imperative is that natural kinds be shown to be philosophically useful in our accounts of science and solving the problems that emerge therein, then I think the best hope is an approach that is willing to accept that it is not confined to some unitary metaphysical account of what natural kinds are. While Hacking objects to the epithet 'natural' as applied to kinds, he does appreciate that kinds themselves have certain epistemic value in scientific practice in for instance induction and explanation, and it's exactly I believe along the lines of these observations that *natural kinds* can be given sense and seen to be useful conceptually, if not essential, to our understanding of scientific practice.

The approach to natural kinds which seems more promising in this respect, and I will give some good reasons for thinking this below, treats 'natural kinds' as first and foremost epistemic devices, as epistemically relevant groupings: that is, tools of inductive generalisation and explanation. It lets science decide in each instance through its own investigative processes and in its own language what the underlying reductive basis of this success might be. This is often a natural and central part of a field's investigative processes (investigating its own natural kinds), but it needn't be. Scientists might work at a level of explanation where reduction in this way is simply not the aim. The success itself justifies their belief in it and in turn, reliance on it. Reydon's epistemology-first approach fits him within this line of thought. So let me start by expressing why I think it makes sense to seek an answer to the problems of fields and the status of special sciences, and other problems too, through this epistemically based criterion for identifying kinds.

As Reydon points out a real problem with using natural kinds to resolve philosophical problem such as the status of fields in the special sciences, is the stark dependence this has on the notion of natural kind one chooses to support and the extremes that result. Essentialism includes almost nothing in the special sciences, a Fodorian approach almost everything.⁴ Most would agree however that despite the inconclusiveness of the debate there is a sense to the concept that stems from its role and success in scientific practice, even if a precise ontological formulation of what it is to be a natural kind can't be given. This intuition gets lost perhaps by the attribution to natural kinds of content and structure that tries to classify or account for them in terms for instance of 'essences' or 'functions' which turn out ultimately to be problematic notions.

But the fact is there remains a practice of using kinds generally in science for epistemic purposes. And it is not just explanation and generalisation that gives the

4 See Jerry Fodor, "Special Sciences (or: the Disunity of Science as a Working Hypothesis)", *Synthese*, 28, 1974, pp. 97-115. On Fodor's approach "the natural kind predicates of a science are the ones whose terms are the bound variables in its proper laws" (p. 102). This of course leaves open the notion of what a 'proper law' is which Fodor admits he can't say, except that later in the text he argues that 'lawlikeness' itself depends on its relata being natural kind terms. It appears he has some kind of equivalence relation in mind between laws and natural kinds.

use of these kinds their epistemic character. They form the very conceptual basis of scientific systems of thought and reasoning and the basis upon which research is organised and directed, since it is in terms of kinds that research questions and issues of investigations are often realised and posed, and at the same time resolved by assigning new properties to them and forming new relations between them. They are *epistemic* in so far as they are a basis upon which scientific knowledge is sought for, obtained and formulated. Now if ultimately our intention is to understand the basis of various elements of scientific practice, such as the practice of organising science in fields, including what makes them distinct from one another, then I think it is natural to perceive that *natural kinds* when evaluated and identified in these epistemic terms are critical to this. After all a scientific field is in practice itself 'epistemic'. One way of looking at a field is as a grouping of phenomena on the basis of connections, patterns and relations that suggest there exist revealing generalisations and underlying explanations to this order. A persisting field is one in which such generalisation occurs and successful explanatory frameworks have developed. Discovering what defines or makes a field then depends on what underlies these generalisations and explanatory successes, and here of course is where we would anticipate the primary and active epistemic role of natural kinds as the bases of these.

I take it that this is a much more epistemic approach to fields and natural kind. But I think this is the way 'natural kind' emerges as a relevant concept. The governing presupposition is that the status of a field is not *directly* underwritten by metaphysical considerations, but by epistemic ones, such as its investigative and explanatory activity, and success in this regard.

This is a perspective which adds support to what Reydon is doing. On this basis I think he is right to think that there are good principles at least to favour the epistemological approach, as he calls it, in the attempt to discover a more astute and useful notion of 'natural kind'. His novelty in this regard is to pose heuristically, what we might plausibly think is also a standard for scientific practice for identifying 'natural kinds', which is the success of a kind in multiple different generalisations. Let me give some broader reasons for thinking that kinds for which there are multiple generalisations should be exactly the basis which is relied on in practice to identify 'natural kinds' since it underwrites the kinds of special epistemic roles they have, which includes the organisation of fields. After all if a kind can be associated with various different generalisations then there is an obvious established usefulness to the concept as a systemising element for which the role as a unifying principle no doubt gives it explanatory value ... think of the kind 'acid' for instance which is explanatorily useful in many different circumstances because of the number of generalisations that are made about it. As Reydon puts it natural kinds are those kinds that lie at the 'intersection' of many of the field's generalisations, which suggests a centrality to those kinds in just this regard. At the same time, a point noticed by Millikan but not quite put in the epistemic terms I'm putting it, the success of many generalisations underwrites the expectation

that the kind is a subject of investigation (by having a reality) and thus has further discoverable properties, relations, ultimately generalisations ... and thereby further explanatory applications.⁵ In fact it's on the basis that we can explicate what the sense of 'natural' contributes to the concept in epistemic terms. Part of what 'natural' implies of a kind like phosphorous for instance is that there is always more to say of it and discover of it: that it is not exhausted by any set of properties or one description. As Millikan puts it, "science begins only when, at minimum, a number of generalisations can be made over instances of a single kind".⁶ This identification of 'natural' with 'many generalisations' thus reflects, I would postulate, the decisions scientists themselves make in many cases about what counts as a natural kind which in turn governs how they employ it and rely upon it (particularly if, like Fodor, we think reductionism is not necessarily a regulative constraint on the establishment of natural kinds in scientific practice). If so then the 'multiple generalisations' test for identifying natural kinds picks out a significant aspect of the epistemic basis of such kinds, and by virtue picks out the groupings from which fields themselves acquire epistemic value and success, and present as productive scientifically. The meaning of 'natural' here then plays out in terms of the central belief scientists have in the kind and the corresponding application that is made of it as a result of those beliefs.

Of course all this is mostly supportive, but I think it compels a different but nonetheless logical outcome from the one Reydon aspires to. I suggest that to take the kind of approach I'm expressing one really has to be willing to concern oneself solely with the practice of natural kinds as so defined. Attempting to prescribe any kind of ontological criterion I think compromises this usefulness, because it will inevitably cut across this practical dimension, especially with respect to the special sciences.

Reydon expresses that the 'many generalisations' viewpoint is to be treated as a heuristic strategy for finding natural kind candidates, but not itself as a way of demarcating natural kinds. To find 'real' natural kinds we still must turn ourselves to discovering whether or not there is a *causal structure* underlying those kinds. There must be in other words some naturalistic explanation for the success of a potential natural kind term, i.e. some basis for treating its members as a group with which one can project and explain, to consider it a natural kind. I want to put however that if our aim is a useful notion of natural kind for fathoming scientific practice then this added condition is counterproductive. Firstly in many instances fields employ terms as natural kinds, relying on them in these sense above, without being able to reduce them or explain them at a different level their success. It is often taken for granted that there is an underlying basis which might be complex or multiply-realizable but has the coherence nonetheless to provide this success

5 Ruth Millikan, "Historical Kinds and the Special Sciences", *Philosophical Studies*, 95, 1999, pp. 45-65.

6 *Ibid.*, p. 48.

and make it a concept that can be relied upon further. Thus setting these kinds of conditions threatens our chance of accounting for one highly important aspect of practice; using kinds as natural kinds without reduction. Secondly I would take it however that there is still the problem of what to do about multiple-realizability. How do we treat kinds that are discovered to have more than one causal basis? Are they natural kinds or not? Eventually this is the kind of question one presumably has to resolve if one wishes to demarcate the special sciences ‘metaphysically’ by natural kinds. Which means we are right back somewhat where we started with these old familiar metaphysical problems. These however run adverse to the conception of a useful notion of natural kind. Certainly if your goal is describing the boundaries of a field, as opposed to say the scientific recognition of a field, then taking a position seems to predetermine the answer. Yet in terms of their epistemic roles generating inductions and explanations for instance the natural kinds function in similar ways in those deemed to be fields and those deemed not by a metaphysical standard. Surely the answer to what demarcates fields is a question of practice in respect of the use of concepts and the beliefs involved, but not one of metaphysics.

As Reydon points out Fodor’s viewpoint, which treats functionally-defined kinds as natural kinds, is criticised because a functional kind seems like a different kind of thing from a natural kind and because ‘functional’ is not interpretable in any one precise way. But of course Reydon’s heuristic itself would seem to accept that at least at the outset functional kinds, however one defines functional, as potential natural kinds because functional kinds might well also be kinds that are successfully involved in multiple generalisations. But if we attempt to pare kinds down by their causal basis in such a way then presumably we lose the connection we might otherwise be able to establish in a general way in scientific practice between the epistemic value of natural kinds and the demarcation and status of a field.

So I want to put I suppose the following question. If our aim is *contra* Hacking to have a useful concept of natural kind, why not just employ it as an epistemic category for which we cache out ‘natural’ in terms of the way in which scientists place their beliefs and use the concept by virtue of those beliefs. Natural kinds in this way are seen as tools of practice and are explanatory for philosophers as devices that explain how scientific practice functions, including its division into fields. Do we really need to more than this? Is it just counterproductive to expect more? We note this view isn’t as wide-open as Fodor’s because the epistemic criterion of many-generalisations is stricter and a more compelling basis for beliefs in an underlying reality to the kind. But we don’t need to specify what this reality needs to consist in, or to put it another way, it’s not our interests to do so.

Yet the rather obvious observation should be made that even though I think there’s good reason to pursue this epistemological approach, as Reydon does, it seems to fail in the task set for it in his proposals here. Relying on a ‘many generalisations’ heuristic won’t in fact *alone* help with the task of demarcating fields and

giving them status thereby. It doesn't seem like fields are themselves simply built atop a set of refined natural kinds. After all identifying natural kinds by 'many generalisations of a field' requires first picking out what the *generalisations of a field* are. Let me say that I think the impression that a field in the special sciences is more complex than a set of natural kinds is surely true. One can't define a field simply in terms of them. But this doesn't stop us maintaining as I have above, that natural kinds are an essential part of the way a field operates as an epistemic unit and essential to any understanding of this. This is where the usefulness of the natural kind concept lies. And however we choose to define fields, natural kinds will be integrated essentially into this definition. After all a field may well have central problems but those problems themselves may well be problems of the natural kind structure, or at least expressed in the vocabulary of these kinds. The methodology of the field will itself organise itself around the kinds it considers fundamental and so on. Natural kinds represent a central part of the categorical structure with and through which a field's scientists interpret the world, organise and understand the phenomena. They guide how the world is further investigated. Obviously the theory we need must be sensitive to the complexity involved, but natural kinds as part of the basic epistemic structure of a field will surely be part of the tools of philosophers for understanding the 'field' as a unit of scientific practice and finding what gives one status, at least for the scientists involved.

Initiativkolleg ‚Naturwissenschaft im historischen Kontext‘
Universität Wien
Rooseveltplatz 10/9
1090 Wien
Austria
miles.macleod@univie.ac.at