

Review of *The Logical Structure of Kinds*, by Eric Funkhouser. Oxford University Press 2014.

Reviewer: Katherine Hawley. To appear in the *Philosophical Quarterly*.

Do crimson, scarlet, and maroon stand to red as various brain states stand to the mental state of pain? No, says Eric Funkhouser, who sharply distinguishes the determinate-determinable relation from the realiser-realised relation, arguing that they are mutually exclusive. Red is a determinable, with crimson, scarlet and maroon amongst its determinates. Pain is multiply realisable, by a range of brain states. Or so it seems; Funkhouser is reluctant to commit to specific concrete cases of multiple realisation, arguing that it is for science, not armchair philosophy, to investigate the real nature of pain, for example. The philosopher's role is to articulate the possible structures and relationships, both for the inherent interest of this project, and with the hope that this may help clarify some methodological issues. But, like Funkhouser, I will use the toy brain-state/pain example to illustrate realisation.

The book title is initially distracting, since (i) it is not obvious why structures based on determination and realisation relations are in any sense logical rather than metaphysical, and (ii) properties, rather than kinds, are fundamental to Funkhouser's ontology. Logic versus metaphysics needn't detain us here, but properties versus kinds deserves our attention.

For Funkhouser, a property is an abstract particular, i.e. a trope. He is a realist about such properties, which he distinguishes from the particular objects which possess the properties (i.e. we distinguish the apple's redness from the apple itself), and he rejects the existence of multiply-located universals. Just as we can group particular concrete objects into types, so we can group particular properties into types; such types are what Funkhouser regards as kinds. So the kinds are not just the natural kinds, but also include mathematical, aesthetic, artifactual and social kinds. It is kinds, rather than properties, which stand to one another as determinate-determinable, or as realiser-realised. Indeed some kinds, like water and H₂O, stand in identity relations to one another. So these various relations are the basis of the 'structure of kinds' referred to in the title. But it is properties which have ontological heft, for example by being the causal relata.

The property-kind distinction allows Funkhouser to give us two different angles on the distinction between determination and realisation. First, in terms of properties. An object

which is scarlet and thus red, and thus coloured, has a single property which does all of those jobs. The one trope belongs to all three kinds, and indeed every trope must belong to some entirely determinate kind, a specific colour shade in this case. In contrast, an object which is in a given brain-state and thus a given mental state, has two different properties, i.e. a trope which belongs to a brain-state kind and a trope which belongs to a mental-state kind such as pain.

Second, in terms of kinds. A major contribution of Funkhouser's book is the development of his notions of property spaces and determination dimensions. 'Colors, let us assume, are distinguished from one another only by their hue, brightness and saturation... If our assumption is correct, then *color* is a kind with three determination dimensions.' (p.26) Taking these dimensions to define a space, we can locate individual colour tropes at points within that space, and we can consider various subsets of the space. The kind *red*, for example, has a property space which is a subset of the colour space; in its turn the space associated with the kind *scarlet* is a subset of the red space. Instances of both crimson and scarlet are located within the red space, but at some distance from one another, vindicating the thought that crimson things and scarlet things are both red but in somewhat different ways.

Matters are different for realisation. Realised kinds and realiser kinds do not share their determination dimensions. Suppose that pains are distinguished from one another in phenomenological terms, for example through their differing intensities, and degrees of sharpness/dullness. And suppose that brain-states are distinguished from one another in terms of neuroscientific qualities which cut across these phenomenological terms. Then we have two property spaces, specified by different determination dimensions.

Either way, it is the properties (tropes) which are ontologically more fundamental than the kinds. Indeed, Funkhouser attributes essences to individual properties, identified via their locations within property space, i.e. their values on the determination dimensions. Property spaces are 'theoretical constructs', and whilst one might accept this and also accept a separate category of real kinds, Funkhouser opts to identify kinds with property spaces, making kinds into mere theoretical constructs too.

I struggled to see why one and the same property could not be located within two different property spaces, located both with respect to intensity and sharpness and with respect to neuroscientific qualities, for example. (Admittedly, one superficial reason for my struggle was the paucity of the index). I think the explanation must be connected to the idea that the essence of a property is given by its value on the various determination dimensions, but the non-identity claim doesn't seem to follow immediately from the essence claim. Why couldn't one and the same property be both essentially so-intense, so-sharp, and so-and-so qualified in neuroscientific terms? Property identity here would be compatible with Funkhouser's sensible denial of kind-identity.

More generally, I would have welcomed engagement with the broader philosophical literature on kinds in science: for example, none of John Dupré, Ian Hacking, or Rachel Cooper feature in the bibliography. Whilst such literature is often framed in terms of 'natural kinds', some issues seem relevant to Funkhouser's project, for example the question of whether scientific kinds are always neatly and hierarchically nested, as discussed by Muhammed Ali Khalidi and, more recently by Emma Tobin. Likewise, I was struck by the complete absence of both E.J. Lowe on kinds and Andrew Melnyk on realisation physicalism, and by the swift dismissal of Jessica Wilson's work on determinables.

Then again, there is much to be said for a short, focused book which concentrates on presenting its own positive view, allowing readers to draw comparisons as they please. Eric Funkhouser has made a careful, original and incisive case for his theories of determination and realisation, one which should certainly be taken seriously in future work in this area.