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**Necessary Beings: An Essay on Ontology, Modality, and the Relations Between Them**, by Bob Hale. Oxford: Oxford University Press, 320 pages, 2013, ISBN 9780199669578 (hbk).

In *Necessary Beings*, Bob Hale brings together his views on the source and explanation of necessity. It is very a thorough book and Hale covers a lot of ground. It contains not only new research but also useful summaries of Hale's views and overviews of the various positions he opposes or develops. Thus it is not only of interest to experts in the field, but it can also serve as an introduction to the topic to readers with a general knowledge of logic and metaphysics. It can be read with little background in the specific topic of the metaphysics of necessity, as a reader unacquainted with the particulars can rely on Hale's clear and accessible exposition and many pointers to further literature.

The core thesis of the book is that ontology and modality are interdependent and equally fundamental and irreducible. Hale explains modality in terms of the natures or identities of things, "what it is to be that thing—what makes it the thing it is, and distinguishes it from every other thing." (132) Each thing  $\alpha$  has a nature  $\Phi$  peculiar to it, and "truths about it are necessary [...]  $\Phi\alpha$  tells us *what it is for  $\alpha$  to be the thing it is*" (133). A thing could not have lacked its nature, but could have had different properties that are not part of its nature. This leaves space for possibilities. Hale presents an essentialist theory of modality, set out in chapter 6: propositions are metaphysically necessary in virtue of the natures of things, and propositions are metaphysically possible in virtue of not being ruled out by those natures.

Metaphysics and ontology are further intertwined due to Hale's Fregean approach to the questions of what kinds of things there are, presented in the "Ontological Preliminaries". There are objects, properties, relations and functions, where the distinction is made linguistically in terms of the differences in expressions of a language that can be used to refer to things of different kinds. Hale follows Frege in drawing ontological distinctions on the basis of syntactic ones within the expressions of a language. Roughly, an object is the kind of thing that is typically referred to by a proper name, a property the kind of thing that is typically referred to by a predicate, a

relation typically by a relational expression, a function typically by a functional expression. To avoid power of actual languages, Hale appeals to the irreducible and fundamental nature of modality. It is not the existence of expressions in actual languages that matter, but it suffices that there could be expressions of the relevant kind. By modalising the syntactic criteria, exemplified by “objects are the kind of things that could be referred to by a singular term”, “we can avoid an objectionable relativity of ontology to the contingencies of actual languages by means of an essentially *modal* explanation of what objects, properties, etc., are—an explanation which transcends the contingent limitations of actual languages by drawing upon their possible extensions.” (20)

After a discussion of difficulties with ‘the concept *horse*’ that Frege’s original proposal faced and modifications by Dummett and Wright, Hale presents his solution: “objects can be defined as those things which can *only* be referred to by singular terms, properties as those things which can be referred to by predicates, relations those which can be referred to by relational expressions, and so on.” (31) Properties can be referred to by predicates, such as ‘is wise’, as well as by singular terms, such as ‘wisdom’, but “these alternative modes of reference to properties are not on a level—predicates are logically prior to singular terms for properties.” (31) The metaphysician’s ‘Socrates has the property wisdom’ is derivative of the more ordinary ‘Socrates is wise’.

Hale’s Fregean approach to ontology motivates an abundant conception of properties: a property is anything that could be referred to by a meaningful predicate, no matter how heterogenous. However, due to the linguistic constraints, it is not so abundant as to allow for properties of infinite complexity. Any property has to be *finitely specifiable*. Chapter 8 discusses an important consequence for the semantics of second-order logic: “we should interpret second-order variables as ranging over properties and relations, understood as individuated intensionally in accordance with the abundant conception.” (193) Thus Hale rejects the standard semantics for second-order logic. His reasons are already clear from the monadic case. Monadic second-order variables range over the power set of the elements of the domain. If the domain is infinite, its power set contains infinitely large arbitrary subsets of the domain. These could not be

specified by a condition expressible in a language: neither is there a general predicate true of all and only the objects in those sets, nor can we list them all. In Hale's alternative semantics the second-order variables only range over the *definable* subsets of the domain. The chapter finishes with a defence of impredicative comprehension axioms.

Hale informed me that he claimed erroneously that certain results carry over from the non-standard Henkin semantics to his semantics, namely that if the second-order domains are taken to comprise just the definable subsets of the first-order domain, the usual categoricity proofs for second-order arithmetic and analysis, which go through under the standard semantics, fail, and compactness, completeness, and the Löwenheim-Skolem Theorems are provable just as they are under the non-standard Henkin semantics. Hale explained in correspondence that his semantics agrees with the standard one and "diverges from the more general Henkin semantics, in one crucial respect: once the first-order domain is fixed, there is no freedom of choice over the second-order domains. It is this feature of the standard semantics which, at bottom, underpins proofs of categoricity for arithmetic and analysis, and explains why the proofs of completeness, compactness, and Löwenheim-Skolem, which can be given assuming Henkin semantics, fail when the semantics is standard." Hale is publishing a paper which explains and rectifies the mistake, forthcoming in a special issue of *Synthese*, edited by Gila Sher and Otavio Bueno, on logics between first- and second-order. The relevant sections will be amended in the forthcoming paperback edition of the book.

The resulting conception of objects is fairly, but not quite so abundant: it is not sufficient for an object to exist that there could be a singular term that refers to it. Hale imposes "the small but important extra demand that (actual or possible) singular terms figure in some true atomic contexts." (40) So there are numbers, but no round squares or mythical creatures. Chapter 7 discusses which things exist necessarily. Hale argues that purely general properties, those that could be referred to by "*purely general* predicates—predicates which embed no singular terms" (166), exist necessarily. Thus purely general natures exist necessarily. They are natures of necessary beings. Such are, for instance, the natures of logical functions, but

also “natural” properties that are not object dependent, such as being an aardvark. Any purely general property of first level gives rise to further necessarily existing properties of second level. “The natures of such pure first-level properties and relations will themselves be pure second-level properties, whose necessary existence is again guaranteed.” (170) And so on. Other beings, such as the cardinal numbers, “exist necessarily because their existence is a consequence of the existence of certain functions and certain properties which themselves exist necessarily.” (177) Concerning other prominent beings that have been pronounced to exist necessarily, Hale assures us at the very outset of the book that his argument “does not lend itself to a proof of [God’s] necessary existence.” (5, footnote 7). One might, however, be forgiven to speculate whether the *summum bonum quo superius non est* can be described by a purely general predicate.

Not all things exist necessarily. In chapter 9 Hale puts forward his essentialist theory of contingent beings. For there to be contingent beings, it must be possible that “some of the natures that actually exist might not have existed, and that there could exist or might have existed some natures over and above any natures there actually are.” (222) The natures of contingent beings are “impure” or “mixed”: they are not purely general, but refer to particular objects. “Such impure properties depend for their existence upon the existence of the objects involved in them.” (223) If these objects are contingent, the existence of the nature, too, is contingent. In chapter 11, Hale argues for the necessity of origin for living things: “each living thing has its own distinctive life cycle, including a certain type of origin, so that being of that kind involves having a certain *type* of origin. [...] each living thing of that kind has the *particular* origin it has.” (278) The nature of Aristotle, for instance, depends for its existence on the existence of his parents. The same is true for them and their parents. And so on. Hale expresses doubt if the necessity of origin can be extended to covering artefacts, too, but he does not say anything about inanimate objects that are not artefacts, like planets, stones or lakes. Maybe the existence of all contingent things ultimately depends on the existence of the actual world, which is plausibly contingent.

In an appendix to chapter 1, Hale rehearses his well-known inferential tests that terms must pass to count as singular. To solve a problem posed by Rumfitt and McCallion, Hale imposes the requirement

that “the test inferences may all be *immediately* recognised as valid by any suitably endowed speakers—that is, recognised as valid *without the need for any intermediate reasoning*.” (45) I expected something more substantial at this point. Individual speakers’ powers of immediate recognition of validity may well vary, but what counts as a singular term cannot similarly vary. We should, in other words, expect an account of immediate inferences, as we might call them. All we know at this point is that they cannot be constituted by a single step in a suitable system of natural deduction, as “proof- and model-theoretic characterisations [of validity and hence inference] presuppose a prior syntactic specification of the language, and so are ruled out in the present context.” (44) I would have liked to read more on this issue. As Hale’s explanation of the difference between objects and other things depends on the possibility of drawing a distinction between singular terms and other expressions, it is vital that such a distinction can be drawn without presupposing the notion of an object. Without a more substantial account of immediate inferences, the central aspect of Hale’s ontological preliminaries is left in a somewhat unsatisfactory state. The issue is reminiscent of an aspect of Peacocke’s conditions for the individuation of concepts in terms of possession conditions, which Hale discusses in chapter 5. Peacocke characterises thinkers as finding certain inferences “primitively compelling” (141). The later discussion, however, makes no connection to the appendix and it is too swift to settle whether Hale might borrow an account of immediate recognition of validity from Peacocke.

In chapters 2 and 3, Hale defends the claims that we must recognise some absolute necessities and that they cannot be explained in non-modal terms. Hale “refurbishes” an argument by McFetridge that we must believe that some forms of inferences are necessarily truth-preserving and defends his views against a Quinean sceptic about necessity. Quinean worries are less prominent than they used to be, so I suspect most readers will be content with Hale’s conclusions. Hale expresses “doubt that there could be a definitive proof that there *cannot* be a reductive explanation of modality” (69), but he makes a good case for his conclusion by assessing a varied diet of attempts to reduce or explain modality in terms of something else: combinatorial views, supervenience on the non-modal, projectivism and non-cognitivism. Conventionalism, the view that necessity has

its source in contingent matters of conventions of use and meaning, is rejected in chapter 5. Hale strengthens arguments by Dummett and Quine to draw the conclusion that this cannot be the case with any necessities, and neither can they be the product of truth in virtue of meaning.

Having argued (a) that we can make a distinction between singular terms and other expressions, (b) that there are necessary propositions, (c) that they cannot be reduced to anything else, Hale proceeds to his account necessity. In chapter 4, Hale defines absolute necessity in terms of counterfactuals and quantification over propositions:  $p$  is absolutely necessary if and only if, no matter what else would be the case, it would still be true that  $p$ :  $\Box p =_{\text{def}} \forall s (s \Box \rightarrow p)$ , where “the quantifier  $\forall s$  is to be understood as *absolutely unrestricted*—as ranging over all propositions whatsoever.” (99) Hale discusses two further characterisations of absolute necessity—as the limit of relative necessity and as the absence of competing possibilities—and argues that all three are equivalent. Hale acknowledges that “some logicians and philosophers hold that propositional quantification [...] is ill-formed and makes no sense, on the ground that  $s$  in  $\forall s$  has to be taken as a name- or individual-variable, whereas at its subsequent occurrence, it must be taken to hold place for a sentence (and so not a name).” (98, footnote 1). I agree with Hale, who rejects this opinion: just because English, or any other natural language, for that matter, if that were the case, does not allow for non-nominal quantification does not mean that we cannot make sense of it.

The issue is, however, to some extent irrelevant. Hale could have avoided using propositional quantification by defining  $\Box p$  as  $\neg p \Box \rightarrow p$ . Hale does not say explicitly which logic of counterfactuals he favours, but we can reconstruct what he has in mind. Hale rejects possible worlds semantics and develops an alternative in terms of possibilities or “ways things, or the world, might be.” (228) Whereas possible worlds require that any proposition is determinately either true or false at a world, Hale’s possibilities allow for incompleteness: possibilities may leave certain questions open, so that some propositions may not get a truth-value at a possibility. To accommodate incompleteness in his semantics, Hale modifies the clauses for the connectives and the definition of validity slightly so as to allow for formulas to be undefined at possibilities, but the result is very close to

the standard semantics. As it stands, there is something wrong with Hale's falsity conditions for the counterfactual. I assume that there is a 'and for all  $w_0$ , if  $wRw_0$  and  $v_{w_0}(B)=1$ , then' missing before 'for some  $w$ ' on page 239. So the conditions should read:

$$v_w(B \Box \rightarrow C) = 0 \text{ iff there is a } w_0 \text{ with } wRw_0 \text{ and } v_{w_0}(B) = 1 \text{ and for all } w_0, \text{ if } wRw_0 \text{ and } v_{w_0}(B) = 1, \text{ then for some } w' \text{ such that } Sww'w_0, v_{w'}(B) = 1 \text{ but } v_{w'}(C) = 0$$

Despite the crucial difference, Hale's framework is close enough to Lewis's—acknowledged as “the standard semantics [...] for conditionals” (129, footnote 19). It validates the axioms of Lewis's system V, where  $(\neg p \Box \rightarrow p) \supset (s \Box \rightarrow p)$  is valid. Thus Hale's definition of absolute modality turns out to be equivalent to what Lewis calls the *outer modality*. Hale intends the logic of absolute modality to be S5. The outer modality of a conditional logic is S5 if the models satisfy the condition Lewis calls *uniformity*: the unions of all spheres around each world are identical. Finally, Hale assumes that the spheres are *weakly centred*: each world  $w$  is surrounded by a sphere of worlds as close to  $w$  as itself. (237) Assuming the counterfactual is weaker than the strict conditional of S5, Hale's implicit conditional logic corresponds to Lewis's VWU.

The question is whether we understand counterfactuals better than necessity or even just as well. This may reasonably be denied. In Lewis's semantics and on Hale's, too,  $((A \Box \rightarrow B \ \& \ \neg(A \Box \rightarrow \neg C)) \supset ((A \ \& \ C) \Box \rightarrow B))$  is valid. Thus 'Had Russell not met Whitehead, he would have written *Principia Mathematica* on his own.' and 'It is not the case that, had Russell not met Whitehead, he would not have found another collaborator.' entail 'Had Russell not met Whitehead and found another collaborator, he would have written *Principia Mathematica* on his own.' Yet, this is not obvious and as a quick, albeit non-representative, survey on social media confirms, some competent reasoners don't think it does, most are at least puzzled and hardly any say straightforwardly 'yes'. Lewis's semantics may not be the best one for counterfactuals and different ones have been proposed. Even though Hale's semantic differs in that he favours possibilities over possible worlds, this does not translate into a semantics that validates different principles from Lewis's. Formalisation of conditionals is very difficult and there is a significant amount of disagreement. Contrast this with our under-



standing of necessity. It is relatively straightforward to get someone to accept the principles that what is necessary is true and what follows only from necessary propositions is itself necessary and thus to accept S4. Alternatively, instead of the second principle, we could adopt the principle that something's being necessary is not contingent. Appealing to Hale's position that "modal facts are not contingent" (84), so that also something's being possible is not contingent, we can motivate S5. It may be that necessity, possibility and contingency can only be understood together as what Dummett would call a "local holism". It may be that we have to live with the fact that S4 and S5 simply formalise different notions of necessity, without being in a position to single out one as "the true" one. But the opportunities for debate and disagreement seem less dramatic than in the case of conditionals or counterfactuals. Even tying counterfactuals by philosophical decree to Lewis's or Hale's semantics rather than speakers' intuitions doesn't hold much promise: I understand necessity, possibility and contingency much better than the relation of 'closeness' between possible worlds or possibilities that is supposed to motivate the semantics.

As languages are finite, the Fregean approach to ontology implies that the nature of a thing is "finitely specifiable": the nature of a thing is "a small finite selection [of necessary truths] which together capture everything that is essential to being that thing". (153) This counts even for what one might consider the most complex things of them all: possibilities. The natures of possibilities, too, "are always *finitely specifiable*—that is, they can each be given by a finite description." (229) I expect some philosophers will find that controversial. They may prefer to say that possibilities are not things or reject the Fregean approach to ontology. Hale's view, however, has an interesting connection to an extension of standard modal logic proposed by Arthur Prior. We extend the language by introducing a new kind of propositional letters  $n_1, n_2 \dots$  called *nominals*, each interpreted as true in exactly one possible world. Nominals can be thought of as describing possible worlds in their entirety. A proposition  $p$  is true in a possible world described by  $n$  if and only if in all possible worlds, if  $n$  then  $p$ . Where  $\Box$  is the *universal modality*, i.e. truth in every world in the model, if the model assigns the nominal  $n$  to the world  $w$ , for any  $w'$ ,  $v_w(B) = v_{w'}(\Box(n \supset B))$ .

This much carries over to Hale's possibility semantics. Hale's metaphysics motivates adopting a *hybrid* modal logic. Where  $n$  is a nominal, to formalise a classical hybrid modal logic, it suffices to add two axioms and a rule governing the nominals to S5:

1.  $\Diamond n$
2.  $(n \& p) \supset \Box(n \supset p)$
3. If  $\vdash n \supset A$ , where  $n$  does not occur in  $A$ , then  $\vdash A$

Every world is possible; if a world  $n$  and proposition  $p$  are jointly true, then it is necessary that  $n$  implies  $p$ ; if it is provable that  $A$  is entailed by  $n$  independently of the choice of  $n$ , then  $A$  is provable. The formalisation ensures that  $\Box$  is the universal modality, which although identical to S5 in its non-hybrid fragment, is stronger than S5 necessity in that it entails S5 necessity, but is not entailed by it. As  $\Box(n \supset p) \vee \Box(n \supset \neg p)$  is a theorem in the resulting logic, which means that the worlds are complete, this axiomatisation will not do for Hale's purposes, however. It is an interesting project for further research to formalise a hybrid modal logic for Hale's semantics of incomplete possibilities.

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**The Routledge Companion to Philosophy and Music**, edited by Andrew Kania and Theodore Gacyk. Routledge, Oxon and New York, 2011, 654 páginas (+ 26 p. Prefácio, etc.). ISBN 978-0-415-48603-3

A filosofia da música tem tido uma história singular. Presente já nos alvares da filosofia, a abordagem da música por Pitágoras ficou célebre e Platão dedicou-lhe um espaço surpreendente na *República*. Ao fim de mais de dois milénios, em que o interesse filosófico pela