Reply to Jessica Leech and Andrew Stephenson

virtualcritique.wordpress.com/2019/02/01/reply-to-jessica-leech-and-andrew-stephenson/

Critique February 1, 2019

NICHOLAS STANG I Kant's Modal Metaphysics I Oxford University Press 2016

By Nicholas Stang

Let me begin by thanking Andrew Stephenson and Jessica Leech for such detailed, insightful, and thought-provoking comments. Writing a book is a lonely business, and one is never sure that the product of one's labours will find a receptive audience, much less a sympathetic one. In Andrew and Jessica, *Kant's Modal Metaphysics* (henceforth *KMM*) has found both and I thank them warmly for it.

Reply to Stephenson

1. Introduction

Stephenson begins with a detailed and cogent summary of relevant points (§§1–3) to provide the reader necessary context, and then dives into the critique in §4. In the final section (§5) he considers whether, contra my interpretation, Kant may in fact be ontologically committed to mere possibilia.

In §§4–5 he raises two critical issues for my reading of ontotheism and of Kant, namely, (1) whether my argument that ontotheism as such is committed to possibilism succeeds and (2) whether my argument proves too much, by committing Kant to possibilism (contra my own interpretation). I wish that I could say I had a 'knock-down' response to Stephenson on either score; I do not. On both points I find myself either needing to make some concessions or admit at least uncertainty as to the ultimate dialectical score. Stephenson's own explanation of the underlying logical issues is so clear that I shall assume it as background in what follows, rather than re-explain what Stephenson has already explained so expertly.

2. From Logicism to Possibilism?

(a) Free logic

Let me begin by clarifying what I mean when I say things of the form 'ontotheism is committed to *p*'. I do not mean merely that the doctrine I have identified as ontotheism—that God exists in virtue of his essence—*logically entails* that *p*. I mean instead that the relevant historical figures who embrace ontotheism face overwhelming dialectical pressure to endorse *p,* on pain of otherwise embracing something at odds with the metaphysical motivations behind ontotheism or with their other metaphysical background assumptions. With respect to (1), the issue is how to square (what I argue are) the following commitments of ontotheism:

A. *Essentialism*. God is not the only being with essential properties.

B. *Essence-Necessity Link*. Beings with essential properties have those properties necessarily.

C. *Uniqueness*. God is the only being that exists necessarily.

The difficulty arises when we consider the following three claims.

(1) Caesar is essentially human. [Instance of A]

(2) If Caesar is essentially human, Caesar is necessarily human. [From (1) by B]

(3) Caesar does not necessarily exist. [From C]

The problem is that on at least one standard way of understanding existence, (1) and (2) entail the negation of (3). In the book I claim that the ontotheist who wants to accept (A)–(C) (which I take to include *all* relevant historical ontotheists) must embrace a restricted existence predicate that applies to only a subset of the objects in the domain of quantification. Stephenson thinks this is too fast; the ontotheist has other options. He may be right. Let's look at those other options.

One possibility would be to accept a *free* logic, specifically a non-universal positive free logic: one in which some non-negated atomic sentences involving empty singular terms are true. Stephenson is absolutely right that the other options within the family of free logics are not attractive. In a *universal* free logic no sentence of the form $\exists x\mathrm{F}x$ is a theorem, which would be inconsistent with at least a specifically *logicist* version of ontotheism (on which God's existence is logically necessary). By contrast, a *negative* free logic—in which atomic sentences involving empty names are false—is unappealing, for it would mean that atomic sentences 'about' non-existent objects are false. In the modal case, it would entail that the atomic sentence that predicates 'human' of Caesar is false in worlds where Caesar does not exist (where there is no object referred to by 'Caesar'). So I agree the ontotheist interested in free logic should look to *positive* free logic.[1]

One obtains a positive free logic from classical predicate logic by introducing a predicate 'E!*x*' (intuitively: *x* exists or '*x*' is not an empty name) and restricting the rules of universal generalisation and instantiation accordingly:

(*UG**) If $\Gamma \vdash Fa$ & $E!a$ then $\Gamma \vdash \forall xF(x/a)$, where Γ is a set of sentences, *a* does not occur in Γ, and *x* does not occur free in F

(*UI**) $\forall xFx$, $E!a \vdash F(x/a)$[2]

This has the effect of restricting quantifiers to non-empty names (to existing objects). But how then will the ontotheist make universal claims about all beings as such, whether they exist or not? Claim (2) above is not supposed to be a one-off claim about Caesar and humanity; it is an instance of a more general metaphysical principle: essential properties are had necessarily. The ontotheist might attempt to express this principle as follows:

(2*) $\forall x$(*x* is essentially F → *x* is necessarily F)

But given (UI*) this can only be instantiated by assigning existing objects as values to *x* (non-empty singular terms). This will make it useless when the ontotheist wants to instantiate it with respect to God and prove that, since God essentially exists, he necessarily exists. In order to instantiate it, he must first prove that God exists (that 'God' is not an empty name).

The ontotheist, then, in order to make claims about the link between essential predication and existence that apply to all terms, whether or not they refer to objects, must in effect have two quantifiers. One is the 'light-weight' quantifier in (2) that takes terms as values whether they denote objects or not, and obeys classical rules:

(*UG*) If $\Gamma \vdash Fa$ then $\Gamma \vdash \forall_L xF(x/a)$, where *x* does not occur free in F

(*UI*) $\forall_L xFx \vdash F(a/x)$, where *a* is a new constant

The ontotheist might, for instance, offer a substitutional reading of this quantifier. The ontotheist could then distinguish between this 'lightweight' classical quantifier and an ontologically heavyweight classical quantifier $\forall$ (which takes objects as values), in terms of which he defines the existence predicate:

(*Ex.*) $E!x = {\sim}\forall y{\sim}(y{=}x) =_{def} \exists y(y{=}x)$

What then is the relation between the ontologically lightweight quantifier $\forall_L$ and the existentially heavyweight quantifier $\forall$ in terms of which the existence predicate $E!(x)$ is defined? The whole point of pursuing this line of thought was to allow for essential predications involving terms that do not denote existing objects, so the lightweight quantifier must be logically weaker than the heavyweight quantifier:

(∀) $\forall_L x Fx \rightarrow \forall x Fx$, but not vice versa

(∃) $\exists x Fx \rightarrow \exists_L x Fx$, but not vice versa[3]

which entails that

(5) $\exists_L x{\sim}E!x$.

From one point of view, this is exactly what I argued in *KMM* the ontotheist is committed to. From another point of view, though, it is something quite different: it does not say there are non-existent objects, it says there are singular terms that do not refer to objects (or it allows substitutional quantification using such terms). But, insofar as the latter reading is correct, to that extent the lightweight quantifier $\exists_L$ (and its dual $\forall_L$) are *unsuitable* to express metaphysical generalisations like (2*). Principles like (2) and (2*), as well as the original B, within an ontotheist metaphysics, are not intended to be claims about singular terms and atomic sentences involving them. They are intended to be claims about *beings, essences,* and *necessity.* One way to get at the issue is to ask what makes (1) true. The ontotheist thinks that (1) is made true by Caesar's essence (just as 'God is essentially omnipotent' is made true by God's essence). But if we take seriously the idea that 'Caesar' in (1) does not refer to an object, Caesar (because it is an empty name), then we can ask: why does the essence of Caesar have anything to do with the truth of (1)? Why should the essence of Caesar make it the case that something distinct from Caesar, namely *the name of Caesar*, figures in a true atomic sentence?

The free logic Stephenson has suggested on behalf of the ontotheist allows him to escape commitment to non-existent objects but only at the cost of depriving their logic of the power to express the ontotheist metaphysics. For consider the whole part of our language involving contingently non-empty singular terms and essentialist atomic sentences involving them (i.e. sentences of the form '*a* is essentially F' where '*a*' is a contingently non-empty singular term). Stephenson has cleverly found a language in which to express these claims (non-universal positive free quantified modal logic), but a language divorced from the underlying metaphysics. The reason 'Caesar' is contingently non-empty while 'God' is necessarily non-empty is the essence, respectively, of God and Caesar. But the essence of God grounds facts about God, not about 'God'; the essence of Caesar grounds facts about Caesar, not about 'Caesar'.

The ontotheist might deny this and claim that it is the essence of 'Caesar' that grounds the truth of (1). But, by parity of reasoning, prior to proving that God exists, we must apply the same principle to the essentialist premise of the ontological argument ('God essentially exists') and say that this is made true by the essence of the name 'God'.[4] From this we can quickly prove the existence of God:

(4) God essentially exists. [analogue of (1)]

(5) If God essentially exists → he necessarily exists. [analogue of (2)]

(6) ∴ God necessarily exists.

(7) ∴ God exists.

But whereas we wanted to derive God's existence from his essence, we have in fact derived it from claims made true by the essence of 'God'. I have already argued this for (4). Claim (5) is just the divine version of (2); prior to proving that God exists, we need to give a neutral treatment of (5) that does not presume his existence, so we shall have to say about it what we said about (2): it is made true by the essence of 'God' or by the nature of singular terms in general. The very nature of singular terms (whether empty or not) makes it the case that if an essentialist atomic sentence involving a singular term is true the corresponding *de re* necessary atomic sentence involving that term is true. We shall then have derived (7) entirely from facts about the essence of 'God', the nature of singular terms, and trivial logical inferences (e.g. from (6) to (7)). This is something, but it is not *ontotheism*. It is a metaphysical picture that would be appealing to none of Descartes, Leibniz, Wolff, or Baumgarten. So I do not think that introducing free logic will help the ontotheist escape their commitment to an ontology of non-existing objects.

(b) Modal logic

But the discussion of free logic is of secondary importance to a yet deeper issue raised by Stephenson. He gives a short argument, of the sort made famous by Timothy Williamson (I borrow Stephenson's numbering to avoid confusion):

(1) $\exists y\ (y=x)$

(2) $\Box\exists y\ (y=x)$

(3) $\forall x\ \Box\exists y(\ y=x)$

and then points out that while there are ways of getting around it, they require controversial logical resources that I have given no reason to think the logicist (much less the ontotheist) must endorse.

I may be confused about the dialectic at this point but I don't see how this affects my interpretation. I have argued that the ontotheist must accept a restriction of the existence predicate. I'm not sure how the derivability of (3) affects my point, since on my reading the ontotheist should *embrace* (3); from his point of view, (3) says merely that for every object *there is*, necessarily *there is* that object. Existence is not at issue. From a Kantian point of view (on my reading), (3) says that every object *de re* necessarily exists. I think that Kant *rejects* this principle, for reasons I do not go into in *KMM* (where, for the sake of simplicity, I largely bracket Kant's views on *de re* modality)[5] but which will be easy for readers to discern. One thing Stephenson might have in mind with the short Williamson-style argument for (3) is to put pressure on me: where, according to Stang's reading of Kant, does this proof go wrong? My inclination would be to say that, from a Kantian point of view, it goes wrong because, making the variable binding explicit, it validates the Converse Barcan Formula:

(*CBF*) $\Box \forall x\, \mathrm{F}x \rightarrow \forall x\, \Box \mathrm{F}x$

While superficially plausible, CBF, notoriously, entails that everything that exists *de re* necessarily exists. This is a conclusion Kant would (correctly) reject as a claim about logical necessity because Kant does not think anything exists with *de re* logical necessity, not even God. Kant would also reject it as a principle about 'metaphysical' necessity, for God is the only being that exists with *de re* metaphysical necessity. This by itself does not answer Stephenson's question: which step in the proof would (my version of) Kant reject? The answer to that question depends on details of the larger logical system in which this argument is embedded, for, depending on the system, the problematic step will either be the first (from (1) to (2)) or the second (from (2) to (3)), or both. Absent a further fleshing-out of the logic Stephenson proposes, I cannot say more.

Stephenson then makes an intriguing proposal:

> Couldn't the Leibnizian simply reject quantified modal logic altogether? In particular, couldn't they object to Stang's introduction of modal operators? After all, logicism is the view that metaphysical modality is exhausted by logical modality. And it might seem that ordinary non-modal logic already has the resources for expressing logical possibility and logical necessity, namely in terms of logical consistency and logical truth respectively. It is really only the deniers of logicism that need fundamentally new resources, like modal operators, to express their claims, since it is they who think that there are extra-logical possibilities and necessities.

This again strikes me as *either* a dead-end for the Leibnizian logicist *or* as reducing ultimately to the view I already suggested in the book. Stephenson's proposal is that the logicist should use 'necessity' according to this definitional equivalence:

(*Def.*) $\Box p = \vdash p$

The turnstile $\vdash$ is a meta-linguistic expression that indicates that a sentence is a theorem in the object language. By identifying necessity with theorem-hood the logicist would effectively be making necessity a meta-linguistic notion. The logicist would be able to *display* or *express* the fact that *p* is necessary in the object-language (by giving a proof that *p*) but would not be able to *state* in the object-language itself that necessarily p. On this proposal, $\vdash\vdash$ p is not even a well-formed formula, much less a theorem.

But the logicist, unlike the logician, also needs to make modal claims in the object language *not* flanked by the turnstile.

(4) It is contingent that *p.*

How then does the logicist state (4)? Intuitively, by stating that

(4*) p & $\sim\vdash p$

But (4*) is not even well formed because its first conjunct is in the object-language and the second conjunct is in the meta-language. The best the ontotheist can do is *express* the contingency of *p* by never offering a proof of it. But she can never *state* that contingency in the object language. Nor, arguably, can the logicist state the contingency of *p* in the meta-language itself. The best she can do is to state something like this:

(4**) '*p*' is T & $\sim\vdash p$

While this may have the same intuitive truth-conditions as (4) and (4*), it does not, intuitively, have the same semantic content, for the first conjunct does not assert *p* but asserts *of* that p that it is true. To directly *state* that *p* is contingent would require a language that includes *both* the original object-language and the meta-language. Let us allow the ontotheist such a language and introduce an operator C(*p*) that is definitionally equivalent to (4*). We could then introduce a modal operator '□' as follows:

(5) $\Box p =_{\text{def}} p \,\&\, \sim C(p)$

We can now ask the logicist all of the same questions as before in this new language (composed from the original object- and meta-languages). The dialectic returns, as far as I can tell, to exactly the place we left it above.

A lot of the trouble for the logicist arose because of the connection between essential predication and necessary predication. Stephenson considers the differences among three different candidate formulations of that connection:

(6) *a*'s essence grounds *a*'s being F → □(E!*a* →F*a*)

(6*) *a*'s essence grounds *a*'s being F → (E!*a* →□F*a*)

(6**) E!*a* → (*a*'s essence grounds *a*'s being F →□F*a*)

The question now is which, if any of these, Kant would endorse. On my interpretation, even the Critical Kant is no enemy of real essence or *de re* necessary predication. Stephenson points out, quite correctly, that, on my reading, Kant can only endorse (6), for the other two claims entail that if any object's essence grounds one or more of its properties, that object necessarily exists. Stephenson writes:

> Thinking that Kant can avoid Stang's argument because his view of existence suggests (6) specifically starts to look suspiciously *ad hoc*.

I do not see why it is *ad hoc* to prefer a principle over its cousins because they entail untoward consequences it does not. In the next sentence, Stephenson writes:

> This only strengthens the previous suspicion that what is really doing the work in Stang's argument is the logic rather than logicism or ontotheism.

For reasons given, I do not think this is quite right about my discussion of logicism and ontotheism; I have argued that a different choice of logic will not help. But I am significantly more concerned that this is true of my interpretation of Kant, to which Stephenson then turns.

3. Which Logic is Kant's?

The simple version of the problem Stephenson points out in §5 is that the following three claims are inconsistent:

(1) Something exists = $\exists x(x=x)$.

(2) It is not logically necessary that something exists.

(3) It is logically necessary that $p = p$ is a theorem of first-order predicate logic with classical quantifiers (henceforth, FOL).

The problem of course is that $\exists x(x=x)$ is a theorem of FOL so, contra (1) and (2), it is logically necessary that something exists. One natural move—to reject (1) by defining 'exists' using a restricted existence predicate—is contrary to the letter and spirit of my whole interpretation of Kant. Rejecting (2) is likewise not an option, since I have argued that it is a commitment of Kant's, both in the 1760s and in the Critical period as well.

The only option remaining is to reject (3). In Kantian terms, this means making a distinction between pure general logic (henceforth, PGL) and FOL. What logical system, then, should we identify with Kantian PGL? Some readers will balk at this question and wonder why we should identify *any* contemporary logical system with PGL. Since Kant, necessarily, was familiar with none of these logical systems it is (at least potentially) anachronistic to identify PGL with any of them. But, despite the looming danger of anachronism, I think we should seriously entertain the question of which logical system best approximates to Kant's conception of PGL. After all, we want to know what inferences are, and are not, validated by Kantian PGL for the very non-anachronistic aim of knowing whether Kant's own arguments are valid *by his own standard*. Even if there is no unique answer to the question "which system is PGL?" there are contemporary systems that cannot be PGL. Stephenson, for instance, has given a compelling argument that, whatever PGL is, it is not FOL.

Whatever system PGL is, it is not a theorem of that system that anything exists. If we follow my interpretation and identify the claim that something exists with $\exists x(x=x)$ this means that PGL allows for 'empty' domains. This means that PGL must be what is called an 'inclusive' or 'universal' logic.[6] Universal logics are usually discussed in the context of free logic, but, as I argued at length in *KMM*, Kant cannot accept a free logic. So what we need is a logic that does not confer theorem-hood on $\exists x(x=x)$ but, once we have a non-empty domain, behaves, otherwise, classically. The idea would be that the only way to introduce constants (which denote objects, given that we have rejected free logic) into the language is extra-logical; no claim involving a constant and no claim with a non-negated existential quantifier taking widest scope can be a theorem. But once we have introduced constants, the quantifiers obey classical rules. With respect to the existential quantifier, interestingly, the classical rules can be maintained as is:

(*EG*) $\mathrm{F}a \vdash \exists x \mathrm{F}x$

(*EI*) $\exists x \mathrm{F}x \vdash \mathrm{F}a$, where a is a new constant.

These rules can be maintained because nothing of the form of their left-hand sides can ever be a theorem. There is no purely logical 'input' to these rules; they merely concern logical relations among claims, once constants (objects) have been introduced into the discourse. But classical universal instantiation must be rejected for it allows us to introduce constants purely logically. Instead, we restrict UI to constants that have already been introduced, as follows:

(*UI**) $\forall x\mathrm{F}x$, G$a \vdash$ Fa where G is any predicate.

Classical universal generalisation allows us to generalise from proofs about 'new' constants. This is allowed within our system, as long as there is at least one object:

(*UG**) If Γ, G$a \vdash$ Fb then Γ, G$a \vdash \forall x\mathrm{F}(x/b)$, where Γ is a set of sentences and b does not occur in Γ.

Without any constants, (UI*) and (UG*) are logically inert; they cannot be employed. When we introduce at least one constant, then (UI*) and (UG*) together allow us to prove classical (UI) and (UG).[7]

I think this is a good candidate for Kantian PGL. 'Introducing constants' (provided we are rejecting free logic) is equivalent to introducing objects into our domain. In Kantian terms, introducing objects into our domain is relating the predicates (concepts) whose combinations we study in PGL to objects via intuition. This does not need to mean that we relate our objects to specific empirically given objects. Prior to naming individual objects given to us through empirical intuition, we can study what logical relations obtain among our judgements in virtue of those judgements being related to objects of intuition *überhaupt*. While this is not exactly Kantian transcendental logic, it is closely related. It is a specification of PGL. It studies the logical rules that apply when our quantifiers are no longer allowed to range over empty domains, but it is not about how it is possible for our predicates to apply specifically to spatiotemporal objects. It is reasonable to expect that this 'intermediate' Kantian logic would be shared by any discursive intellect, even one that has non-spatiotemporal sensible intuition. Any intellect that must be given objects and then think about them must, in thinking about objects, obey the laws of this logic. Once there are objects in the domain, this logical system reduces to classical FOL. What is more, the Kantian inferences I reconstruct in *KMM* are valid in the system I have just sketched, for they were all inferences among existentially loaded claims (claims involving constants or non-negated existential quantifiers). So I think I can identify Kantian PGL as this logical system, while retaining the logical reconstructions in the book.

The elephant in the room, of course, is a potential weakness of my whole approach in *KMM*: reconstructing arguments from the history of philosophy using modern logical resources they did not possess. Stated baldly in this fashion, this practice can sound perverse. How could Leibniz's (or Kant's) arguments possibly depend on logic that would not be invented for over a century? But recall that logic, as a formal discipline, is meant to systematise and formalise inference-patterns that are pre-theoretically intuitively *valid*. One of the reasons we accept, for instance, the inference rules of FOL (insofar as we do) is that they allow us to give a systematic account of inference patterns involving 'for all' and 'for some' that we intuitively recognised as valid before we could formalise them. For instance, it is not hard to find philosophers prior to the invention of FOL engaging in stretches of reasoning with the following pattern:

(4) For every x such that Fx there is a y such that R(x, y)

(5) Fa

(6) There is a y such that R(a, y).

Reasoning with this pattern has been ubiquitous in mathematics since its inception. Notoriously, the validity of such inferences cannot be captured within traditional syllogistic, because (4) involves nested quantifiers. Likewise, one of the reasons we accept the inference rules of modal logic is that they allow us to give a systematic account of inference patterns involving 'possibly' and 'necessarily' that we intuitively recognised as valid before we could formalise them. If, in reconstructing arguments of past philosophers, we were to restrict ourselves to logical resources they possessed, we would be convicting all philosophers prior to Frege of logical infelicities on a massive scale.

Leibniz, despite his brilliance as a formal logician, does not typically formulate his arguments in one of his own formal systems. And it is well that he did not; none of Leibniz's own formal logical systems is powerful enough to capture many of the inferences he (quite correctly) regards as valid (e.g. (4)–(6)). The question, then, is this: in reconstructing Leibniz's ontological arguments should we foist upon him FOL (and then claim that FOL consequences of premises needed in such arguments are among implicit commitments) or should we try to formalise such an argument in one of Leibniz's preferred 'intensional' logics? In *KMM* I opted for the former, in part for simplicity (Leibniz's intensional logic is unwieldy and unfamiliar to readers). But I did so partly because I don't think that formulating his ontological argument in his preferred logical system would avoid the basic point.

Leibniz's logical writings include a dizzying variety of sketches for different logical systems. The one most relevant for our purposes here is found in a variety of his writings (e.g. Leibniz 1966:112–18) and explained ably in Adams (1994:57–63). The basic idea of this system (which I shall just call Leibnizian Intensional Logic, LIL) is to express generality not *extensionally* in terms of objects (as FOL does) but *intensionally* in terms of concepts. First, some background. The containment of one concept by another will be taken as primitive for the purposes of this sketch of LIL. Intuitively, we can think of the contained concept as a 'part' of the containing concept. I shall assume that concept-containment is transitive and reflexive (every concept contains itself as an improper part). A concept is said to be *consistent* just in case, for all concepts F, it does not contain both F and ~F. A concept is said to be *complete* just in case it contains, for every concept F, either F or ~F. For our purposes, we only need to consider logically affirmative judgements:

(*Universal*) *All Fs are G* = F contains G = all consistent concepts that contain F contain G.[8]

(*Particular*) *Some F is G* = there is some consistent concept F* that contains F and contains G.

(*Singular*) *x is G* = the unique complete and consistent concept of *x* contains G.

The question is, how, within this logical system, Leibniz can prove anything of the form 'there is an *x* such that G*x*'? The natural alternative for Leibniz is something like this:

(7) *There is an x such that Gx* $=_{\text{def}}$ there is a complete and consistent concept that contains G.

Even if we grant the Leibnizian assumption that there are complete consistent concepts not instantiated by any existing objects (e.g. God's concepts of non-actual possible worlds), (7) does not entail by itself Possibilism because the quantifier expression on the left hand side is defined in terms of the 'conceptual' quantifier on the right-hand side. (7) defines quantification over objects *in terms of quantification over concepts* and thus by itself has no ontological consequences about which objects there are. 'There is an *x*' is introduced as a new piece of symbolism and defined to be equivalent to a claim about concepts; (7) by itself does not force an objectual interpretation, as opposed to a substitutional reading, of the quantifier (on which variables are to be substituted with names of individual concepts).

Using (7), Leibniz can prove relatively easily that there is a God: <*God*> is a complete and consistent concept, so there is a God. How will Leibniz prove that God exists? I don't want get into too many of the technicalities of *KMM*, so let us grant him the easiest possible model: existence is one of the infinite perfections contained in God's concept. So by Singular there is a God that exists: <*existing*> is contained in the complete concept, <*God*>.

But while Leibniz's logic is intensional (purely conceptual) his metaphysics is *not*. Leibniz's view is not that God is a concept, but that God is a substance, all of whose predicates are contained in his concept. (Likewise for any substance.) For Leibniz to get from (7) to any claim about God—rather than about <*God*>—he needs (what is now known as) a 'comprehension principle' connecting concepts to objects, as well as to fix the objectual interpretation of the quantifier '∃'. One thing Leibniz might do is restrict objects to existing objects, as follows:

(CP.1) $\exists x Fx \leftrightarrow$ there is a complete and consistent concept that contains F and <*exists*>.

(CP.1) will not generate mere possibilia. The only concepts to which we can attach an existential quantifier, according to (CP.1), are the concepts that are completely determinate and contain <*existence*> as a predicate.

Notice further that (CP.1) is a bi-conditional: it entails that if there is an object that is F then there is a complete and consistent concept that contains F and <*exists*>. But containing <*exists*> in his complete (and consistent) concept is what distinguishes God as the *ens necessarium* from all other beings. So, on pain of violating Uniqueness from Section 2 (and committing heresy), Leibniz must deny that any other complete concept contains <*exists*>. In particular, no complete concept of a finite substance contains <exists>, so by (CP.1) there are no finite substances. Now Leibniz could, of course, claim that God and finite substance exist 'in different senses' and, of course, in some sense of 'in different senses' this is clearly his view (God exists *per se*; finite substances exist *per quod*). But the point of introducing the idiom 'there is an object' was to allow Leibniz to go from talking about concepts to talking about objects, in particular, about individual substances. It would defeat this point to deny that God is an object in the relevant sense or that the quantifier expression '∃' can take finite substances as variables, for then we would have to introduce a new quantifier that took both God and finite substances as values, and we would be back to the logic I assumed in *KMM*.

So Leibniz cannot accept (CP.1) in its form as given. If he wants to hold onto the idea that the objectual quantifier '∃' expresses existence then he needs to think that the left-hand side of (CP.1) is strictly stronger than the right-hand side:

(CP.2) There is a complete and consistent concept that contains F and <*exists*> → $\exists x\mathrm{F}x$.

But that would defeat the spirit of an intensional logic of concepts for now, not only would the object-involving language (the language that involves objectual quantifiers) not be strictly identical to the intensional language (the language only involving concepts), it would be expressively *stronger* than it. There would be claims formulable in the object-involving language that could not be expressed in the purely concept-involving intensional language (for the reasons given above). LIL would be too impoverished to express Leibniz's own metaphysics.

The natural solution for Leibniz is not to deny the bi-conditional in (CP.1) but to remove a restriction from its right-hand side:

(CP.3) $\exists x\mathrm{F}x$ ↔ there is a complete and consistent concept that contains F ~~and <*exists*>~~.

But this will entail that there are infinitely many possible worlds, etc. because there are complete and consistent concepts of them. Expressed in the intensional language this will have the consequence that, for some concepts F:

(CP.4) $\exists x(\mathrm{F}x \,\&\, {\sim}\mathrm{E}!x)$ ↔ there is a completely determinate concept that contains F that does not contain <*exists*>.

Expressed in the object-involving language, this has the consequence that

(7**) $\exists x{\sim}\mathrm{E}!x$.

In other words, the very same claim, I argued, using different logical resources, Leibniz is committed to.

The moral of this little detour through Leibniz's logic is that it *is* sometimes acceptable to use later developments in logic to uncover the implicit commitments of a previous philosopher's theory, *especially* when that philosopher's own logical theory is incapable of validating the inferences they need to complete their arguments. In particular, I think that in *KMM* it was acceptable to formulate Leibniz's arguments in FOL because, in doing so, I did not commit Leibniz to anything his own intensional logical theory could have avoided commitment to (because, I have argued, that intensional logic is not powerful enough to express Leibniz's metaphysics without CP.3).

Finally, to go back to the proposal that Kantian PGL is a universal free logic, Stephenson raises the worry that no matter how 'existentially neutral' Kantian logic is, the model theory will wind up making substantive ontological commitments because it (or at least the standard model theory for free logic) will assign elements of a set designated as the 'outer domain' as values for empty terms (while the non-empty terms will receive elements in an overlapping set, the 'inner domain', as their values). I have argued that Kantian PGL is not a free logic, but similar worries arise about applying modal operators to Kantian PGL, or the FOL that arises (as I have suggested) when we introduce objects into our domain. The standard model theory for variable-domain modal logic will assign distinct sets as the domain of quantification for each index or possible world. So Stephenson's concern—the model theory will have ontological commitments of which I want to acquit Kant—cannot be avoided merely by rejecting free logic.

However, the distinction between syntax and semantics, much less the assumption that the semantics will take the form of a model theory, is not something to which Kant need be committed. It would be very unnatural for Kant to think of PGL in terms of an uninterpreted symbolism, which must then be provided with a meaning by an essentially mathematical assignment of objects to its constants, sets to its predicates, etc. There is an uninterpreted symbolism of pure general logic; it is the schematic machinery of (essentially) Aristotelian syllogistic, with variables for concepts and judgements. But this uninterpreted symbolism is not provided with its 'intended' interpretation by the provision of some set-theoretic or otherwise mathematical objects (logic depending on mathematics in this way would be profoundly un-Kantian) but by *thought itself*. Pure general logic is thought's thinking of its own rules, independently of any content (relation to objects) whatsoever. It is neither the syntax, nor the model-theoretic semantics, nor both taken together. Its commitments are what thought, just in virtue of thinking through those rules, must think.[9] In contemporary terms, its 'commitments' (and whether any of them are 'ontological' in any sense) are to be determined in the 'object-language' itself, that is, the language of thought. No step-up to a meta-level or to a model theory is required, or relevant, for that matter.[10]

Stephenson could apply against me a lesson I extracted from my discussion of Leibniz above: it is acceptable practice to use later developments in logic to ascertain the implicit commitments of earlier theories. But this would only apply here, if, in giving a logic, Kant is committed to having a model theory for it. Why might we think that? Well, we use model theory to introduce a notion of *truth* for a formal language; most importantly, we want to be able to prove that the language is consistent (no contradictions are theorems) and complete (all truths are theorems). But in the case of pure general logic, there is no relevant notion of truth that could generate this interest in a model theory. Kant defines truth as "the agreement of a cognition with its object" (A58/B82). Note that he restricts truth here to cognition, which is to say, to a relation between concepts and objects given in intuition. This means that truth, as Kant defines it here, cannot arise for pure general logic; pure general logic knows nothing of the objects of cognition, the object's agreement with which constitutes what Kant calls 'truth'. The only notion of truth available in pure general logic is purely internal to thought itself—what violates the laws of thinking is 'false' and what follows solely from the laws of thought (what thought generates out of itself) is 'true' in at least the following minimal sense: if it follows from the laws of thought alone that *p* then *p*.[11] But this means that 'truth', in pure general logic, is just a matter of agreeing with or violating the laws of thinking itself. This notion of truth, in other words, is a purely formal one and does not require supplementation by some other language or theory. Truth in transcendental logic is, obviously, a quite different matter and I shall not attempt to address that here.

Finally, there is the question, intelligible entirely within contemporary terms, whether an object-level theory is 'ontologically committed' to the objects quantified over in its model theoretic semantics. This is obviously a vastly complicated topic, but my own view is: no! This response is already running quite long, so I shall simply refer readers to authors who have made this case more compellingly than I ever could.[12]

Reply to Leech

Jessica Leech's very insightful comments focus on my reconstruction of two key steps in Kant's argument for the existence of a unique real ground of the real element of all possibility in *Beweisgrund*. The key claims within that argument are:

(i) It is absolutely necessary that something exists.

(ii) There is an absolutely necessary being.

(iii) It is unique.

(iv) It is simple.

Leech criticises my reconstruction of the arguments for (ii) and (iv).

(ii) There is an absolutely necessary being

Leech complains that my reconstruction of Kant's argument for (ii) relies on Kit Fine's technical notion of an *aggregate*. However, Leech offers no alternative explanation of what licenses the inference from (i) to (ii). In and of itself, this is fine; Leech is playing 'offence' here and is under no obligation to offer her own interpretation of Kant's argument on all points. But note that Kant claims at BDG, AA 2:79 that "it is absolutely impossible that nothing at all should exist" (which I take to be equivalent to the claim: it is absolutely necessary that something exists) and then at AA 2:83 that "there exists an absolutely necessary being". Yet, after having argued at AA 2:83–4 that this absolutely necessary being is unique, he feels obliged to argue additionally at AA 2:84 that "the necessary being is simple", in a paragraph that begins: "that nothing composed [*zusammengesetzt*] of many substances can be an absolutely necessary being is apparent from this […]."[13] I take this to be good evidence that, whatever argument is supposed to take Kant from (i) to (ii), he takes it to leave open the possibility that the unique absolutely necessary being is a "composite" (*Zusammengesetztes*), which I shall take to mean a being with parts, a whole. What would follow from the non-existence of this being is very much on Kant's mind; he has just argued that if this being were not to exist, nothing whatsoever would be really possible.

Now when we talk about the non-existence of a whole we have two options (at least) in how we conceive of the relation between the non-existence of the whole and the non-existence of the parts. We can conceive of the whole *strictly*, so that the annihilation of *any* of its parts is sufficient for the annihilation of the whole; or we can conceive of it *non-strictly*, so that annihilation of *all* of the parts is necessary for the annihilation of the whole; alternately, we can conceive of intermediate kinds of composites, where perhaps the annihilation of a majority of the parts (or the annihilation of significant parts, or essential parts, etc.) is necessary for the annihilation of the whole. Which kind of composite is Kant concerned with at AA 2:84? Neither? Both? The answer to this question is wrapped up in the answer to a previous question: what is Kant's argument for (ii)? The answer I argue for in the book is this: if we treat all existing grounds of real possibility as 'one entity', then the cancellation of that entity would cancel all real possibility. In other words, the being whose absolute necessary existence is asserted at AA 2:83 is the collection or union of all the grounds of real possibility. But there are many ways of 'collecting' a plurality of objects into one. In particular, we need to decide on the relation between the existence of this 'whole' object and its parts. The reason to think this being exists absolutely necessarily is that its non-existence would involve the non-existence of *all* of its parts, hence would be absolutely impossible. This means, then, that we must conceive of the 'collecting' object as what I earlier referred to as 'non-strict': it is annihilated *only if* all of its parts are annihilated. Although Kant does sometimes talk about aggregates he is never fully precise about what the relation between the parts and the whole is; in particular, he is never fully precise whether the annihilation of all of the parts is necessary for the annihilation of the whole. This was why I referred to Kit Fine's notion of an aggregate, which renders precise the whole-part relation that, on my reconstruction, Kant needs in order to complete his argument.

I hope this short rehearsal of the arguments from Section 5.3.iv of *KMM* assuages Leech's worry about anachronism. The idea that Kant derives (ii) from (i) by 'treating' all of the grounds of real possibility 'as one being' or 'collecting' them into 'one being' arises from a straightforward reading of the text and philosophical questions that arise from that reading. That I refer to a notion in contemporary metaphysics to reconstruct Kant's argument would be problematic only if an overall better reconstruction of this transition in the argument were available (Leech does not supply one, nor is she obliged to) or if the notion relied on resources unavailable to Kant. But now I ask the reader: is it plausible that Kant was incapable of conceiving of a whole that is annihilated *only if* all of its parts are annihilated? I take it the answer is 'no', even if he did not have a technical term for such a whole.

In addition to all of the reasons given in the book, I shall just add some additional textual evidence that Kant thinks of the move from (i) to (ii) as involving 'collecting' all of the grounds of real possibility 'into' a single being. Immediately after arguing that there is such an absolutely necessary being (one whose annihilation cancels all real possibility), Kant writes: "Thus far it is apparent that the existence of one or more things itself lies at the foundation of all possibility" (AA 2:83, emphasis mine). Now this could be a look forward to Kant's argument, in the next section, that there is no more than one absolutely necessary being. Or it could be an acknowledgement that the absolutely necessary being whose existence he has just proven may be "one or more things itself", i.e. a whole composed of all of the grounds of real possibility. If the latter, it would make perfect sense for Kant to go on, a few pages later, to argue that this absolutely necessary being cannot be "composed of many substances".

(iv) It [the unique absolutely necessary being] is simple

The second point Leech raises concerns my reconstruction of Kant's argument for (iv). Before I continue to discuss Leech's criticism of my reconstruction, and her own alternative reconstruction, I want to make a note about the dialectical situation. Kant's argumentative burden at this point in *Beweisgrund* is to argue against the Pluralist view—on which the job of grounding all really possible predicates is 'parcelled out' among a plurality of distinct substances—without just begging the question. So the standard for a reconstruction of Kant's arguments in *Beweisgrund* is not merely fidelity to the text but fidelity, so to speak, to the dialectic: giving a non-question-begging argument against the Pluralist. Since, as I argue in *KMM*, some of the moves Kant explicitly makes in these passages do straightforwardly beg crucial questions against Pluralism, I take my task as an interpreter to be: what might Kant have taken to license him in rejecting the Pluralist position? This may require considering arguments not explicitly found in the text, as long as they rely on premises (and modes of argument) we have reason to think Kant and the Pluralist might accept.

Back to the reconstruction of the argument. Leech suggests we reconstruct the argument for (iv) more straightforwardly than I do, as follows:

(1) Let Ω be a GARP, made up of distinct parts $x_1 \ldots x_n$, where each x_i is a GSRP.

(2) If $x_1 \ldots x_n$ are distinct, then for each x_i, it is possible that x_i doesn't exist and the remaining parts $x_1 \ldots x_{i-1}$, $x_{i+1} \ldots x_n$ exist.[14]

(3) ∴ For each x_i, it is possible that x_i doesn't exist and remaining parts $x_1 \ldots x_{i-1}$, $x_{i+1}, \ldots, x_n$ exist. [1,2]

(4) If some x_i is a ground of some real possibilities, its non-existence cancels some real possibilities (those it grounds).

(5) ∴ It is possible that some real possibilities are cancelled, while some real possibilities are not cancelled. [3,4]

(6) Every real possibility has some ground.

(7) ∴ There is some ground for the possibility that x_i doesn't exist, and thereby some ground for the possibility that some real possibilities, but not all, are cancelled. [3,5,6]

(8) For any *x*, *x* cannot ground the possibility of its own non-existence.

(9) ∴ x_i cannot ground the possibility that x_i doesn't exist. [8]

(10) ∴ Some GSRP x_k in GARP grounds the possibility that x_i doesn't exist. [1,6,9]

(11) ∴ x_k grounds the possibilities grounded in x_i. [Transitivity of grounding]

(12) ∴ x_i is not a GSRP (x_k ultimately grounds the real possibilities that we took to be grounded by x_i). [11]

(13) ∴ Any part of Ω which is a distinct GSRP is not a GSRP. [1–12]

(14) ∴ Ω has no distinct parts that are GSRPs. [1–13, *reductio* on 1]

First of all, note that on her reconstruction Kant's argument begins with the assumption that there is a GARP which is composed of one or more GSRPs (or identical to one of them). While this is not identical to my interpretation from above (I claim, further, that the GARP is a non-strict whole or 'aggregate' of the GSRPs), I still wonder how, on Leech's reading, Kant gets from (i) (it is absolutely necessary that something exists) to (ii) (something exists absolutely necessary) in such a way that leaves open the possibility that this absolutely necessary being (the GARP) is composed of a plurality of GSRPs without something like my story.

Back to the main argument. In general terms, Leech reads this as an argument about the real grounds of the possibility of the non-existence of an individual GSRP that partly composes the whole GARP (the 'aggregate' of them to use the term Leech objected to earlier). But I am unclear on the textual warrant for doing so. In Leech's paraphrase, we find this:

> But then this means that it is really possible for A not to exist, and hence for the possibilities that it grounds to fail to exist: "one would have to suppose that it is in itself possible for inner possibility to be negated or cancelled". What could ground this possibility? (It is really possible, so it has a ground.) Not A. A couldn't itself ground the possibility of its own non-existence. For then, in case that possibility became actual, there would be something grounding the possible non-existence of A that did not exist, i.e. which was nothing. But, "it is absolutely unthinkable and contradictory that something be nothing". So, if A really could fail to exist, then this possibility must be grounded in something else, say B. But if the a-possibilities depend on the existence or non-existence of A, and if the possibilities for the existence or non-existence of A are grounded in B, then surely the a-possibilities are after all grounded in B, not A. So it is B, the "ultimate ground" for all of those possibilities, that is in fact the GARP.

The corresponding passage in Kant is this:

> For if one then thought that some inner possibilities could be cancelled, while others, given through other parts, remain, one would have to suppose that it is in itself possible for inner possibility to be negated or cancelled. [a] But it is absolutely unthinkable and contradictory that something be nothing, and this means that cancelling any inner possibility eliminates all that is thinkable. [b] It is apparent from this that the data for all that is thinkable must be given in the thing whose cancellation is the negation of all possibility; therefore, that which contains the ultimate ground of any inner possibility contains the ground of all possibility whatsoever, and this ground cannot be divided into distinct substances. (BDG, AA 2:84–5)

But I don't see any reason to think that Kant is here concerned with the ground of the real possibility of the non-existence of the individual GSRPs (the x_i's in Leech's reconstruction). As far as I can tell, the relevant evidence is the two underlined sentences and neither of them supports that interpretation. Sentence [a] is most naturally read as claiming: it is absolutely impossible that something possible ("something") be impossible ("nothing"). But this claim—closely related to the characteristic axiom of S5—plays no role in Leech's reconstruction. (In *KMM* I argue that a principle like this will not help Kant make dialectical progress against the Pluralist.) Nor does [b] seem to be concerned with grounding the real possibility of the non-existence of a GSRP; it seems, *prima facie*, to be claiming that the ground of all real possibility must be a being whose non-existence cancels all real possibility (i.e. the conclusion of the whole argument).

So I don't see how Leech's reconstruction matches the text. By itself, that is fine. As I remarked above, I think we have to consider what additional argumentative resources Kant might be able to appeal to, when the argument presented in the text is weak (as, I take it, Kant's argument at this point in *Beweisgrund* is.) This means that in evaluating a reconstruction of Kant's argument (mine or Leech's) we must ask two kinds of questions. First, are the premises of the candidate reconstruction premises to which Kant is entitled in *Beweisgrund*? Second, is the candidate reconstruction a 'successful' argument, i.e. would it help Kant in the specific dialectical context of arguing against the Pluralist? With respect to the first issue (its acceptability to the historical Kant) I want to note one point. In order to derive (7) from (3), (5), and (6) Leech needs to include the non-existence of a ground within the scope of what requires a real ground of its possibility. But in *Beweisgrund* Kant is at least primarily, if not solely, concerned with the real grounds of the real possibility of *predicates* (what is contained in concepts) and argues at length at the beginning of the book that existence is not a real predicate. While the real possibility of predicates is not unrelated to the real possibility of existence—I think the real possibility of predicates is the real possibility of their instantiation, i.e. the real possibility of there *existing* an object with those predicates—there is some difficulty in extending this to the real possibility of the non-existence of a given x_i. The possibility of the non-existence of some x_i does not consist in the possibility of x_i lacking (or having) some predicate, but in the possibility of x_i being cancelled all together. The logical form of the supposition that x_i is cancelled is $\sim\exists x Fx$ (existential judgements are inherently general) so the possible non-existence of x_i ultimately consists in the possible non-instantiation of some predicates, perhaps the essential predicates of x_i. In other words, more work needs to be done in explaining how Kant's principle that all real possibilities must be grounded can be extended to grounding the real possibility of the non-existence of an object.

The more serious issue with Leech's reconstructed argument is that it is either ineffective against the Pluralist (as well as potentially self-undermining) or invalid. Leech appeals to the transitivity of grounding:

(*Transitivity*) If x grounds y and y grounds z then x grounds z.

She uses this to derive line (11)—that x_k grounds the real possibilities grounded by x_i because it grounds x_i. But she in turn derives from this line (12): "x_i is not a GSRP (x_k ultimately grounds the real possibilities that we took to be grounded by x_i)." But there is a tension here. If x_k grounds x_i and thereby (by transitivity) grounds the possibilities immediately (or less mediately) grounded in x_i then *by hypothesis* x_i is a ground of some real possibilities. Then what licenses Leech in concluding that x_i is *not* a GSRP in the first place? It appears that Leech is appealing to a background principle that is ambiguous between two readings, one in the main clause and the other in the parenthetical:

(12.a) If x_k grounds x_i then x_i is not a GSRP.

(12.b) If x_k grounds x_i then x_i is not an ultimate GSRP.

Claim (12.a) is in some tension with Transitivity for it entails that the antecedent of that conditional is never true; usually one adopts Transitivity in order to generate grounding-chains, not destroy them. Leech takes it as obvious that Kant holds Transitivity; I agree with her, so I shall not question that assumption. What reason is there to think that Kant accepts (12.a) *given* that he does accept transitivity? Given a background commitment to transitivity, (12.a) is a very strong principle indeed and I see no reason to attribute it to Kant. What is more, Kant's argument is intended to show why the Pluralist position is wrong. But why would a Pluralist who accepts (12.a) and Transitivity grant Kant line (2)? The idea of the Pluralist position, recall, is that God's work in grounding all real possibilities is parcelled out among a plurality of distinct substances, the GSRPs. Kant claims that he has proven that the GSRPs cannot be individually necessary in the previous section, but upon careful inspection (as I argue in *KMM*), he has argued for a weaker claim there: there cannot be more than one *absolutely* necessary being (a being that grounds all real possibilities). But, as I argue in *KMM*, there might (for all Kant argues) be a necessary being that is not absolutely necessary, e.g. a being that cannot not exist, but which grounds only some real possibilities. But that is precisely what the Pluralist (or at least the one who accepts S5) believes about each x_i: it exists necessarily, but only grounds some real possibilities. So I do not see how Leech's reconstruction, if it involves (12.a), would constitute a successful argument against the Pluralist position.

If we take Leech's line (12) as (12.b), though, the argument is invalid. It does not entail that x_i is not a GSRP; it entails that x_i is not an ultimate GSRP. We can then run the same argument with respect to x_k and get the same conclusion: x_k is not an ultimate GSRP. The resolute Pluralist will claim that this shows that the GARP (the 'aggregate' of all the GSRPs) consists in an ascending chain of GSRPs. This was the point of appealing to a finitist version of the PSR (no infinite chains of grounds): at this point, Kant could make dialectical progress against the Pluralist by claiming that there cannot be infinite chains of grounds. The chain of GSRPs must terminate in a single absolutely necessary being, a GARP that is not a plurality.

Let me conclude by, again, thanking Stephenson and Leech for their excellent and detailed criticisms of *Kant's Modal Metaphysics*.

Received: 18 January 2019.

❧

Notes:

[1] What about Descartes, the representative anti-logicist ontotheist (i.e. he does not identify necessity with logical necessity)? I think the problems I raise for deploying free logic within ontotheist metaphysics also apply to Descartes. See McDaniel (2018) and my reply in Stang (2018).↩

[2] These are equivalent to the corresponding modifications in existential generalisation (*EG*) and existential instantiation (EI):

(*EG**) F*a*, E!*a* $\exists x$F(*a/x*)

(*EI**) Γ $\exists x$F(x) then Γ F*a* & E!*a*, where Γ is a set of sentences and *a* is a does not occur in Γ.↩

[3] Where $\exists_L x$Fx is defined in the usual way: $\exists_L x\text{F}x =_{def} \sim\forall_L y(y \neq x)$.↩

[4] And note that, at this point in the dialectic, the imagined 'ontotheist' cannot say that it lies in the essence of 'Caesar' to name Caesar (of 'God' to name God), for then they will be admitting that there is a Caesar and that there is a God, whether or not they exist (whether or not these names refer).↩

[5] Stephenson himself has recently developed a powerful account of Kant's views on *de re* modality; see Stephenson (ms.).↩

[6] See Quine (1960) as well as Williamson (1999).↩

[7] Note that this will require us to break the duality of the universal and existential quantifiers.↩

[8] The underlined clause is not made explicit by Leibniz. I include it in order to bring out the continuity among the truth-conditions for the different kinds of judgement.↩

[9] 'Must' is intended to be neutral between a normative reading (we ought so to think) and a constitutive reading (thinking as such obeys these rules). For a powerful case in favour of the constitutive, and against the traditional normative reading, see Tolley (2006).↩

[10] In this respect, Kant's conceptions of logic is closer to Frege's, and quite unlike contemporary descendants of the 'meta'-theoretic approach to logic pioneered in the early twentieth century. See Goldfarb (1979) for details.↩

[11] I am not claiming that Kant would apply the term '*wahr*' in this sense, merely that an intelligible notion of logical truth can be constructed within his system. Cf. AA 24: 84, 91, 388, 391.↩

[12] E.g. Burgess (2012:127–8).↩

[13] "Daß kein Zusammengesetztes aus viel Substanzen ein schlechterdings nothwendiges Wesen sein könne, erhellt auf folgende Art."↩

[14] For premise (2) Leech has "If $x_1 \dots x_n$ are distinct, then for each x_i it is possible that x_i doesn't exist and the remaining parts $x_j \dots x_k$ exist". However, if we remove x_i from $x_1 \dots x_n$, what we get is $x_1 \dots x_{i-1}, x_{i+1} \dots x_n$. Consequently, I have slightly tweaked the formulations throughout, without, I think, materially affecting Leech's argument.↩

References:

Adams, R. M. (1994), *Leibniz: Determinist, Theist, Idealist* (Oxford: Oxford University Press).
Burgess, J. (2012), 'Kripke Models', in A. Berger (ed.), *Saul Kripke* (Cambridge: Cambridge University Press), pp. 119–40.
Goldfarb, W. (1979), 'Logic in the Twenties: The Nature of the Quantifier', *The Journal of Symbolic Logic* 44(3): 351–68.
Leibniz, G. W. (1966), *Leibniz: Logical Papers*, trans. and ed. G. Parkinson

(Oxford: Clarendon Press).
McDaniel, K. (2018), 'Nicholas Stang's Kant's Modal Metaphysics', *Kantian Review* 23(3): 461–72.
Quine, W. V. (1960), 'Quantification and the Empty Domain', *The Journal of Symbolic Logic* 19:177–9, reprinted in Quine (1966), *Selected Logic Papers* (New York, Random House), pp. 220–3.
Stang, N. (2018), 'Reply to Critics', *Kantian Review* 23(3): 473–87.
——— (forthcoming), 'Kant's Concept of an Object', *European Journal of Philosophy*.
Stephenson, A. (ms.), 'Existence, Modality, and Imagination in Kant: Lessons from Barcan'.
Tolley, C. (2006), 'Kant on the Nature of Logical Laws', *Philosophical Topics* 34(1–2): 371–407.
Williamson, T. (1999), 'A Note on Truth, Satisfaction, and the Empty Domain', *Analysis* 59(1): 3–8.

♕

Nick Stang is Associate Professor of Philosophy at the University of Toronto, Canada. His primary research interests are metaphysics and its history, mainly German philosophy. He currently works on a book project on the relation between Kant's critique of metaphysics and contemporary analytic metaphysics, with the tentative title 'How is Metaphysics Possible? Kant's Question and Three Attempts at an Answer'.

Website