WAYS OF BEING AND LOGICALITY*

Existence lies at the heart of metaphysics; and at the heart of contemporary thought about existence lies an almost universally accepted doctrine. Fundamentally, existence is univocal: there is only one way of being. Against this, ontological pluralists contend that there are multiple ways of being. Contemporary ontological pluralists such as Kris McDaniel[1] and Jason Turner[2] broadly subscribe to Ted Sider's metametaphysics, whereby our best theory of the world describes the world's objective structure or carves reality at the joints.[3] The world's objective structure, pluralists believe, contains ontological joints: there are not just fundamentally different types of beings, but fundamentally different ways of being.

There are many ways to be an ontological pluralist. The main version we will consider is what Berto and Plebani call *quantificational* pluralism: "there is more than one way of being or existing, thus more than one meaning for quantificational expressions."[4] If we assume that a way of being should be captured by a fundamental quantifier, ontological pluralism entails quantificational pluralism. This neo-Quinean principle is widely accepted; indeed, the connection between being and existential quantification is current orthodoxy, for pluralists and non-pluralists alike. It is in the background for Berto and Plebani given the 'thus' in the above quote. But the claims are

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[1] Kris McDaniel, "Ways of Being," in David J. Chalmers, David Manley, and Ryan Wasserman, eds., *Metametaphysics* (Oxford: Oxford University Press, 2009), pp. 290–319; Kris McDaniel, "A Return to the Analogy of Being," *Philosophy and Phenomenological Research*, LXXXI (2010): 688–717; and Kris McDaniel, *The Fragmentation of Being* (Oxford: Oxford University Press, 2017).

[2] Jason Turner "Ontological Pluralism," this JOURNAL, CVII (2010): 5–34; Jason Turner, "Logic and Ontological Pluralism," *Journal of Philosophical Logic*, XLI (2012): 419–48; and Jason Turner, "Ontological Pluralism," in Rikki Bliss and J. T. M. Miller, eds., *The Routledge Handbook of Metametaphysics* (London: Routledge, 2021), pp. 184–95.

[3] Ted Sider's metametaphysics, in *Writing the Book of the World* (Oxford: Oxford University Press, 2011), is an extension of David Lewis's in "New Work for a Theory of Universals," *Australasian Journal of Philosophy*, LXI (1983): 343–77, and *On The Plurality of Worlds* (Oxford: Blackwell, 1986), itself indebted to works by Gary H. Merrill and W. V. Quine. For references to historical forms of ontological pluralism, see McDaniel, *The Fragmentation of Being, op. cit.*, pp. 2–3.

[4] Francesco Berto and Matteo Plebani, *Ontology and Metaontology: A Contemporary Guide* (London: Bloomsbury, 2015), p. 60. Turner, "Ontological Pluralism," *op. cit.*, p. 185, also discusses quantificational pluralism.

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distinct and quantificational pluralism will be our focus. Unless stated otherwise, it will be this view that we intend by 'pluralism' in what follows.[5]

A fundamental language, according to Turner, is one "where every (undefined) expression is supposed to 'carve reality at the joints'—to correspond to some ultimate structure of reality."[6] The pluralist we shall focus on holds that the world contains two fundamentally different ways of being: abstract existence and concrete existence. (Other alleged ways of being will be introduced later.) By their lights, our best theory, therefore, must be built on a language containing two different *specific* existential quantifiers, which we may formalize as '$\exists_A$' and '$\exists_C$'.

An immediate worry is that pluralism is merely a notational variant of the standard, monist view.[7] The familiar quantifier '$\exists$' in its unrestricted interpretation ranges over both abstract and concrete entities, and the familiar predicates 'x is abstract' and 'x is concrete' apply to some objects but not others. On the face of it, the monist can happily echo everything the pluralist says. When the pluralist uses a specific quantifier, the monist uses a generic quantifier, and restricts it using a predicate. So when the pluralist says that abstract objects exist, they will assert '$\exists_A x(x = x)$', whereas the monist will assert '$\exists x(Ax \wedge x = x)$'. The monist views the pluralist as using *restricted* quantifiers, and there does not seem much of interest to choose between them.

Pluralists contend, however, that their view is superior because it avoids misleading notation. They maintain that their specific quantifiers allow them to better capture the world's ontological structure. For according to the broadly Siderian metametaphysics to which they subscribe, this structure of the world should be reflected in the quantificational structure of the fundamental language. The monist uses only one fundamental quantifier, '$\exists$', and thereby presents the ontological structure of the world as containing just one way of being. The pluralist uses multiple fundamental quantifiers, '$\exists_A$' and '$\exists_C$', and thereby presents this structure as containing more than one way of

[5] If they find our arguments in the rest of this paper persuasive, ontological pluralists may thus wish to explore a potential escape route: reject the neo-Quinean thesis that leads them to quantificational pluralism.

[6] Turner, "Logic and Quantificational Pluralism," *op. cit.*, p. 421.

[7] Peter van Inwagen offers a clear articulation of monism in "Meta-Ontology," in *Ontology, Identity, and Modality: Essays in Metaphysics* (Cambridge, UK: Cambridge University Press, 2001); and Peter van Inwagen, "Being, Existence, and Ontological Commitment," in David J. Chalmers, David Manley, and Ryan Wasserman, eds., *Metametaphysics* (Oxford: Oxford University Press, 2009), pp. 472–506. McDaniel ("Ways of Being," *op. cit.*, sections II–III) discusses the notational-variance worry, as does Turner, "Ontological Pluralism," *op. cit.*, section IV.

being. The two pictures cannot, however, both be correct. A crucial part of the pluralist's debate with the monist is, therefore, over which existential quantifiers to accept as fundamental.

It is difficult to find a dialectically neutral position from which to determine whether the monist's or pluralist's quantifiers are fundamental. A more tractable question is which of the quantifiers is *logical*. The familiar, non-specific, existential quantifier is universally regarded as logical. The debate between monists and pluralists can thus be seen as turning on whether we should also count the pluralist's specific quantifiers as logical.

In section I, we consider how the pluralist's quantifiers fare against the standard invariance test for logicality. We pose a dilemma for pluralists. There are two ways they can apply this invariance test: unrestrictedly or restrictedly. If it is unrestricted (section I.1), the specific quantifiers are rendered non-logical. If it is restricted (section I.2), the specific quantifiers are logical but this is bought at a high price. Neither gives the pluralist everything they need. In section II, we consider the first of two potential pluralist replies, which is to challenge the proposed test for logicality. In section III we turn to the second reaction, which is to question whether the existential quantifier must be logical. Section IV concludes, in favor of monism.

I. INVARIANTIST TESTS

An important part of the debate between monists and pluralists concerns the fundamentality of various quantifiers. But disagreements over the fundamentality of various quantifiers seem fairly intractable. It is, after all, difficult to find a dialectically neutral assessment of a quantifier's fundamentality.

A more promising way for the debate to proceed is to focus instead on a quantifier's logicality. A popular and promising test for logicality, namely *isomorophism invariance*, does not appear to be biased toward either monism or pluralism. By applying this test to a quantifier, we can bypass judgments about the quantifier's fundamentality. In particular, if the pluralist's specific quantifiers fail the isomorphism-invariance test, they will fail a necessary condition for being a logical quantifier, and should not be included among the fundamental logical expressions.[8] The isomorphism-invariance test would thus appear to provide us with a dialectically neutral criterion for adjudicating the dispute between the monist and the pluralist.

[8] We discuss the relationship between fundamentality and logicality in more detail in section III.

There are various ways to motivate the isomorphism-invariance test. We will here motivate it by the thought that logic is distinctively *topic neutral* in the sense that logical operations should be insensitive to the particular objects to which they are applied. It has often been said that logic is *formal*, and this understanding of topic neutrality is a good explication of the idea. If we think that logic is topic neutral in this sense, we will want logical operations to be insensitive to the arbitrary switching of objects.[9] It is this idea that isomorphism invariance can be seen to capture.

Now, to the test itself. First, a *permutation* is a function from a set to itself such that no two distinct elements are mapped to the same value (one-to-one) and every element is mapped to by some element (onto). Informally, a permutation "shuffles" the objects.

Invariance tests apply first to the extensions of expressions (objects, sets, and so on) and derivatively to expressions themselves. Consider a domain containing some red and some non-red objects. On this domain, the extension of 'is red' is the set of red objects, hence there will be a permutation mapping some red object to some non-red object. The set of red objects will be *variant* under this permutation so, derivatively, the predicate 'is red' will be variant. Next, consider the identity predicate. On any domain, its extension is the set of ordered pairs $\langle a, a\rangle$ for each element a of the domain and, however the domain is permuted, this set remains the same. For example, in the two-membered domain $\{a, b\}$, the extension of the identity predicate is $\{\langle a, a\rangle, \langle b, b\rangle\}$; under the permutation which maps a to b and b to a, its image is $\{\langle b, b\rangle, \langle a, a\rangle\}$, the set itself. So the identity predicate is *invariant*.

These verdicts look good: 'is red' is a poor candidate for a logical constant, whereas the identity predicate is virtually always accepted as one. Unfortunately, there are problems with limiting our attention to permutations. Consider McGee's *wombat disjunction*,[10] which acts as disjunction on domains containing wombats and as conjunction on other domains. This connective is permutation invariant (for example, any permutation of a wombat-containing domain is a wombat-containing domain), but can act in different ways on different isomorphic domains. We must therefore generalize to consider isomorphisms from the domain onto other domains of the same size. We said that, informally, permutations "shuffle" objects within a domain. Iso-

[9] See John MacFarlane, "What Does It Mean to Say That Logic Is Formal?," PhD diss., University of Pittsburgh, 2000, section III.2, for more on this way of understanding topic neutrality.

[10] Vann McGee, "Logical Operations," *Journal of Philosophical Logic*, xxv (1996): 567–80, at p. 575.

morphisms are more general: we consider not just shufflings of a domain but also ways of swapping its objects with objects in structurally similar domains of the same size. The Tarski–Sher Thesis[11] is then the view that an expression is a logical constant just if its extension, understood appropriately, is isomorphism invariant over all domains.[12] More rigorous and detailed accounts of the isomorphism-invariance test may be given, but for our purposes the above will suffice.

In the case of the existential quantifier, of principal interest here, we can take its extension to be the set of instantiated first-order concepts.[13] In our example, it would be the set consisting of the three sets $\{a, b\}$, $\{a\}$, and $\{b\}$. It is easily checked that the set of instantiated first-order concepts is invariant under isomorphism. If an isomorphism maps a to a' and b to b', the extension of '$\exists$' is mapped to the set consisting of $\{a', b'\}$, $\{a'\}$, and $\{b'\}$, which is the extension of '$\exists$' in the second domain. Thus '$\exists$' is logical.

How does this test apply to specific quantifiers? Here, there are decisions to be made. First, we will only consider a single-sorted approach. This is explicitly the approach taken by Turner,[14] and McDaniel does not consider an alternative. Second, pluralists treat specific quantifiers as respectively ranging over distinct domains of abstract and concrete objects.[15] The isomorphism-invariance test may be applied *restrictedly* to the abstract and concrete domains separately, or *unrestrictedly* to the union of the two domains.

The question, then, is how the test should apply: should the abstract and concrete domains be considered separately (the restricted test), or jointly (the unrestricted test)? Pluralists typically, and sensibly, want to allow sentences that involve reference to entities in both domains. For example, the sentence 'My favorite things include the number 24 and ice cream' is perfectly reasonable.[16] They also typically allow sentences that should not be limited to either domain but quantify over both, such as 'everything is self-identical'.

[11] Alfred Tarski, "What Are the Logical Notions?," *History and Philosophy of Logic*, VII (1986): 143–54; and Gila Sher, *The Bounds of Logic* (Cambridge, MA: MIT Press, 1991).

[12] The Tarski–Sher Thesis is limited to expressions of at most type level 2; this restriction, whether justified or not, will play no role here.

[13] Other approaches to the existential quantifier's extension are possible, but will yield equivalent results. See Stanley Peters and Dag Westerståhl, *Quantifiers in Language and Logic* (Oxford: Oxford University Press, 2006), for more.

[14] See for example, Turner, "Ontological Pluralism," *op. cit.*, at p. 12.

[15] On the main form of pluralism under discussion here (abstract versus concrete), these domains are exclusive and exhaustive. That there is such a clean division is tendentious—see Timothy Williamson, *Modal Logic as Metaphysics* (Oxford: Oxford University Press, 2013), pp. 7–8—but that is a separate objection to this form of pluralism.

[16] Of course, on a multi-sorted approach, this sentence is ungrammatical. Again, like our main pluralist targets, we are assuming a single-sorted approach throughout.

That pluralists allow sentences involving quantification over both domains might suggest that the test should apply unrestrictedly. Further, the unrestricted test is a more natural spelling-out of topic neutrality: it captures the idea that logical expressions are indifferent to the natures of *any objects whatsoever*, rather than just those of some kind.

Fortunately, however, we do not need to take a stance. Instead, we pose a dilemma: however the test is applied, the pluralist faces problems. This again has a dialectical payoff: the monist will want the test to apply to the union of the domains whereas the pluralist might prefer keeping the domains distinct, but we do not need to choose. We take the two possibilities in turn.[17]

I.1. The Unrestricted Test. The first horn of the dilemma is straightforward: if the test is applied unrestrictedly, the specific quantifiers are not logical. To see this, consider a model with two entities in its domain: an abstract one a and a concrete one c (and no others). There are different ways that we could assign an extension to the specific quantifiers but, irrespective of exact implementation, the same result is obtained.

On one way of doing things, the specific quantifier '$\exists_C$' denotes the set consisting of all and only first-order sets with at least one concrete member. So in this example, '$\exists_C$' denotes $\{\{a, c\}, \{c\}\}$, as the first-order sets with at least one concrete member are $\{a, c\}$ and $\{c\}$. If we permute the objects of the domain by mapping a to c and c to a the permuted denotation of '$\exists_C$' becomes the set with elements $\{c, a\}$ ($=$ $\{a, c\}$) and $\{a\}$. Since $\{a\} \neq \{c\}$, the denotation of '$\exists_C$' has shifted under the permutation, from $\{\{a, c\}, \{c\}\}$ to $\{\{a, c\}, \{a\}\}$. This is to say that '$\exists_C$' is *not* isomorphism invariant.

Alternatively, we might want the specific quantifier '$\exists_C$' to denote the set of all and only non-empty first-order sets with only concrete members. With the same setup as the previous paragraph, '$\exists_C$' would denote $\{\{c\}\}$. With the same permutation as before, the permuted denotation becomes $\{\{a\}\}$, so the denotation has shifted. Again, '$\exists_C$' is *not* isomorphism invariant.

A similar argument can of course be run for '$\exists_A$', as well as other pairs of specific quantifiers (assuming their extensions are non-empty in some domains). The moral is that the alleged logicality of the pluralist's quantifiers does not mesh with the standard test of logicality.

I.2. The Restricted Test. The restricted test deems both specific quantifiers logical, since it tests the logicality of each quantifier over domains

[17] The dilemma here is distinct from that posed in Trenton Merricks, "The Only Way to Be," *Noûs*, LIII (2019): 593–612; and strengthened in David Builes, "Pluralism and the Problem of Purity," *Analysis*, LXXIX (2019): 394–402.

consisting only of abstract or of concrete objects, respectively. In the unrestricted test, the extension of the specific quantifiers could be disturbed by mapping an abstract object to a concrete one and vice versa. But on the restricted test there are no such cross-domain mappings. Instead, we only consider isomorphisms from the concrete domain to others of the same size, and similarly for the abstract domain.

The specific quantifiers pass the test when applied to their own domains in the same way that the familiar existential quantifier does when applied to the union of these domains. This is of course entirely unsurprising: the test has been amended to ensure the specific quantifiers pass. As well as providing a less plausible test for logicality understood as topic neutrality, proponents of the restricted test also face three lines of objection.

I.2.1. Logical Predicates. The first is that the test applied this way also renders other expressions logical. In particular, it renders the predicates '*x* is abstract' and '*x* is concrete' logical. Why? '*x* is abstract' applies to all the entities in a domain of abstract objects so, however we map one such domain into another such, it will still apply to all the domain's objects. Similarly for '*x* is concrete'. The monist obviously denies this, since they will countenance mappings that swap abstract and concrete objects.

If the pluralist applies the isomorphism-invariance test restrictedly, therefore, the specific quantifiers are indeed logical, but so are the abstract and concrete predicates.[18] That no predicates with these extensions are logical is, however, a firm commitment of logical practice. Moreover, given their metametaphysics, pluralists want their primitive logical vocabulary to be their fundamental, joint-carving vocabulary. Admitting '*x* is abstract' and '*x* is concrete' among their logical vocabulary implies that these predicates are joint-carving. But pluralists are hesitant to include specific predicates among their fundamental vocabulary. Turner writes that

> predicates are ideologically cheaper than quantifiers. Quantifiers, in some sense, run deeper than predicates. Quantifiers give us a realm of things, and predicates let us divide that realm. But quantifiers seem to 'come first': only after we have our domain of things, provided by the quantifiers, can we start dividing them up with our predicates.[19]

In the context of Heidegger's pluralism, McDaniel discusses the proposal to take the specific predicates as fundamental, but says that it

[18] That this application of isomorphism invariance renders the predicates in question logical is also pointed out by Bruno Whittle, "Ontological Pluralism and Notational Variance," *Oxford Studies in Metaphysics*, XII (2020): 58–72, at pp. 65–66.

[19] Turner, "Ontological Pluralism," *op. cit.*, p. 30.

> seems inappropriate, since this procedure assimilates attributing a way of being to a thing to predicating a property of that thing. *Being* is not a kind of overarching property, exemplified by everything. . . . Ways of being are not merely special properties that some entities have and that others lack, and so are not most perspicuously represented as predicates.[20]

It is important, therefore, for the pluralist to avoid the logicality of their specific predicates. But if they want an invariance test to judge their quantifiers as logical, these predicates must likewise be judged logical.[21]

We have chosen abstract/concrete pluralism as our example. But pluralists have touted many other different ways of being as well: merely possible versus actual existence, temporal versus atemporal existence, past versus present existence, divine versus non-divine existence, and so on.[22] The more ways of being there are, the more logical predicates are countenanced. Since the pluralist road, once taken, leads to far more distinctions than the abstract/concrete one, the logical notions proliferate, and the problem blows up correspondingly.

Finally, we preview a point we shall return to in section III. Turner's response to the notational-variance charge is to insist that 'Everything exists abstractly or concretely' is a logical truth for the pluralist but not for the monist. This response requires that the specific quantifiers be logical and the corresponding predicates not. The restricted test poses problems for this combination: it delivers that the specific quantifiers are logical but also that the corresponding predicates are logical. Of course, the unrestricted test offers no help here either, since it denies the logicality of both. The pluralist's hoped-for judgments, that the specific quantifiers are logical and the corresponding predicates are not, is not offered by either test.

I.2.2. Ambiguity. A second problem with applying the invariance test restrictedly is that it delivers that many expressions are ambiguous between abstract and concrete precisifications. Of course, pluralists will not be fussed by this ambiguity in the case of 'exists': they insist that the increased ideology is worthwhile since it allows a more perspicuous presentation of reality's joints. The problem is that the same ambiguity will affect the other primitive logical constants.

The predicate '*x* is identical to *y*' will similarly become ambiguous between abstract identity and concrete identity. The restricted test

[20] McDaniel, *The Fragmentation of Being*, *op. cit.*, pp. 23–24.

[21] In section III, we return to the issue of whether McDaniel has other means of denying these judgments.

[22] McDaniel, *The Fragmentation of Being*, *op. cit.*, pp. 23–24.

bans the mapping of concrete objects to abstract ones and vice versa, so the extensions of abstract and concrete identity will be invariant. The generic identity predicate is then ambiguous between these two. Now pluralists might argue that, since abstract and concrete are two distinct ways of being, we should not be surprised that there are two corresponding notions of identity.[23] They might find this plausible, or at least tolerable; yet the problem spreads further in a way they cannot so readily accept.

In particular, the same ambiguity will affect other primitive logical constants. We do not usually think of logical constants such as truth-functional connectives as having extensions in a straightforward sense. For the purposes of applying an invariance test, we can, however, associate extensions with them. For example, we may think of the extension of an *n*-ary connective C on domain D as a function from an *n*-tuple of sets of variable assignments over D to a set of such assignments.[24] Intuitively, if the input is the *n*-tuple of sets of assignments satisfying $\phi_1, \ldots, \phi_n$, then the output is the set of assignments satisfying $C(\phi_1, \ldots, \phi_n)$. In this way, we may assign any propositional connective such as '$\neg$' an extension.

On the restricted application of isomorphism invariance, however, we will justify the logical nature of abstract negation, '$\neg_A$', and concrete negation, '$\neg_C$'. They pass the restricted test in an analogous way to the specific quantifiers, or abstract and concrete identity. So 'not' in the sentence '10 is not prime' (about the primeness of an abstract number) turns out to be a different constant from 'not' in 'Ben is not tall' (about the height of a concrete person). Again, there is no suggestion that the pluralist wants this, and it strikes us as deeply implausible. Even if we are willing to accept an ambiguity in '$=$', the reasons to do so do not carry over to negation and other truth-functional connectives.

The ambiguity introduced into the use of truth-functional connectives also raises problems for the application of the pluralist's view. It may be appropriate to apply abstract negation to '10 is prime' and concrete negation to 'Ben is tall'; but how about a mixed case, such as '10 is prime and Ben is tall'? Perhaps this sentence's negation should be '10 is not_A prime or Ben is not_C tall', the negation of a conjunction being the disjunction of the specific-negated disjuncts. But what about the unsubscripted connective 'or' in that sentence? It disjoins a statement about the abstract with a statement about the concrete: so is it 'or_A' or 'or_C' (or neither or both)?

[23] *Ibid.*, pp. 51, 168.

[24] As in McGee, "Logical Operations," *op. cit.*, for example.

We will come back to this last question in section III.2. For now, note that it would not be enough to devise an ingenious way to apply negation systematically to a language with atomic sentences exclusively about the abstract or exclusively about the concrete. For we can combine concrete predicates with abstract terms (for example, 'The number 3 is green') or abstract predicates with concrete terms (for example, 'New York is a prime number') in a way that, though initially strange sounding, is arguably meaningful and negation-apt.[25] Moreover, how are we to negate mixed sentences such as 'My favorite things include the number 24 and ice cream'? These problems, of course, only multiply when we consider that the same ambiguity will affect all truth-functional connectives.[26]

I.2.3. Overgeneration. A third problem for the restricted test is that it will cause *overgeneration* in the pluralist's extension of logical truths by deeming logical sentences which intuitively are not.[27] We will consider two cases, the first based on finitude and the second on other forms of pluralism than abstract/concrete.

Suppose there are only finitely many concrete entities, say 10^{100} for argument's sake. When the isomorphism test is applied restrictedly, the first-order-logic rendering s of 'There are no more than 10^{100} concrete entities' is then made up entirely of logical terms and is true in every restricted model, since no such model can have more than 10^{100} concrete entities in its domain. So s is a logical truth. And if, fortuitously, there are in fact infinitely many concrete entities, then although s is no longer a logical truth, it owes its non-logicality to empirical contingency. Either way, logic depends on the empirical.[28]

Pluralists might retort that models are supposed to correspond to ways the world might be. Since there could be more concrete objects than there are, we should be allowed to include as legitimate mod-

[25] See Ofra Magidor, *Category Mistakes* (Oxford: Oxford University Press, 2013). Magidor herself argues that both 'The number 3 is green' and 'New York is a prime number' are simply false (and their negations true).

[26] McDaniel entertains many different forms of pluralism in *The Fragmentation of Being, op. cit.*, including identity pluralism, as well as causal pluralism (p. 168), compositional pluralism (pp. 57–99), grounding pluralism (pp. 248–51), and modal pluralism (pp. 73–75), among others. He may be willing to likewise be a negation pluralist but, for the reasons we have given throughout section I.2.2, we take it to be an unattractive position.

[27] Here we are understanding 'logical truth' in the usual post-Tarskian way as truth in all interpretations.

[28] See John Etchemendy, *The Concept of Logical Consequence* (Stanford, CA: CSLI, 1990), for a version of this third problem in a different context. The problem does not affect the account of logical consequence with unrestricted domains. If, as is standard, the domains can be the size of any set in the hierarchy, the finitude objection is avoided.

els those with concrete *possibilia*, of which there are many more than 10^{100} (or any finite number). To this counter-objection, our response is twofold.

First, the counter-objection depends on strong commitments in the philosophy of modality. It is natural to suppose that possibilia, assuming they exist, are *not* concrete because they are neither in our spacetime nor any other, and nor are they part of the causal nexus. It is perhaps only on a controversial metaphysics of modality such as that of Lewis[29] that possibilia are more naturally classified as concrete.[30]

To take the dialectic further, pluralists could borrow some moves from nominalists in the philosophy of mathematics; but these face well-known and widely accepted criticisms. For example, pluralists could adopt a primitively modal account of logical consequence and logical consistency.[31] On this view, logical consistency is not reducible to truth in a model (as standard), but is primitive. This would be a substantial commitment for the pluralist to take on, and there is no hint in any pluralist writings that they lean toward it. Further, it is open to telling objections. Very briefly (this is not the place for a detailed rehearsal), it increases the ideology of the theory, by accepting as primitive the operator 'It is logically consistent that'. Moreover and more importantly, so-called modalism, which trades in talk of possible worlds for primitive operators, be it in metaphysics or logic, is methodologically regressive (think of how Kripke semantics advanced modal logic); and it also faces well-known problems of expressiveness.[32]

Second, assuming the number of concrete objects (actual or possible) is not extraordinarily large, then if second-order logic is logic there will be second-order logical truths of the kind 'There are no more than κ concrete objects' for some cardinal κ.[33] Whatever the empirical facts, the restricted semantics entails a radical revision of what the logical truths are or might have been.[34]

[29] Lewis, *On the Plurality of Worlds, op. cit.*, pp. 81–86.

[30] The problems for Lewisian possible worlds are well known. If you are happy with them, however, then this is another potential source of ontological pluralism. For example, see McDaniel, *The Fragmentation of Being, op. cit.*, section II.5.4, for a discussion of how a development of the Lewisian project may lead to ontological pluralism.

[31] As in Hartry Field, "Metalogic and Modality," *Philosophical Studies*, LXII (1991): 1–22, in the service of his nominalism: Hartry Field, *Science without Numbers* (Princeton, NJ: Princeton University Press, 1980).

[32] For a textbook account of the problems with modalism, see Joseph Melia, *Modality* (Cambridge, UK: Acumen, 2003), chapter 4.

[33] An example might be the first inaccessible.

[34] As Byron Simmons observes, the (monistic) nominalist who cashes out logical truth in the standard fashion—as a sentence that is true on all domains and on all

We conclude that the counter-objection is hard to sustain, and that our criticisms stand. The pluralist makes logic depend on the empirical, and this implausibly affects what logical truths there are.

So much for finitude. A second potential source of overgeneration for pluralist logical truth can be seen by considering other ways of being than abstract versus concrete. McDaniel, for example, cites divine versus non-divine existence, and we agree this is a prime candidate: it is hard to imagine a greater difference in way of being—should such ways exist—than that between God and other entities.[35] Since under monotheism the domain of divine existents contains exactly one thing—God—the sentence 'There is a divine existent' becomes a logical truth.[36] The reason is as above: restricted domains for the divine existence quantifier '$\exists_G$' include no other entity than God, so that this quantifier becomes a logical constant. '$\exists_G x(x = x)$' is true in all these domains, hence is a logical truth. But even the more impassioned proponents of the Ontological Argument take the existence of a divine being to be not a logical but a conceptual truth. And of course the overwhelming majority of philosophically minded theists think God's existence, far from being a logical truth, is *not* a conceptual truth.[37]

We have seen two sources of overgeneration for the pluralist who adopts the restricted test. They do indeed get the logicality of the specific quantifiers, but their concept of logical truth will overgenerate in at least these two ways.

II. FIRST REACTION: ABANDON INVARIANTISM

We have seen that the standard test for logicality—isomorphism invariance—favors monism over pluralism. The pluralist must either

reinterpretations of its non-logical constants—will also be subject to these overgeneration problems, since they believe in only concrete entities. Presumably, that is a reason for the nominalist to reject the standard account of logical truth (and consequence) and adopt Field's modalism—though as we have seen that too is highly problematic.

[35] Especially on the usual theistic view that God created all other entities. McDaniel, "A Return to the Analogy of Being," *op. cit.*, pp. 693–94, recognizes the theological motivation as one of three key historical motivations for pluralism.

[36] Similarly for polytheistic views; for example, 'No more than three divine entities exist' will be a logical truth for tritheists.

[37] If empty domains are allowed, a slight amendment of the argument just given is in order. Admitting empty domains, it is now 'There is at most one divine existent' that becomes a logical truth, since the restricted domain is either empty or contains God. And this sentence is an instance of overgeneration, for the same reason as in the main text. Note that monists will typically wish to allow empty domains, to avoid making 'there is at least one thing' a logical truth. Alternatively, they might embrace this sentence's logical truth, but argue that the logical existence of *something or other* is much more palatable than that of *God*.

concede that the specific quantifiers are not logical (on the unrestricted test), or accept a raft of implausible claims about logic (on the restricted one). In this section and the next, we consider two possible ways in which pluralists might react.

II.1. Objections to Invariance. The first reaction is to find fault with the invariantist test for logicality. Troubled by their quantifiers' failure to pass this test (on the unrestricted version) or its consequences for their view (on the restricted one), pluralists may lay the blame on the test rather than the quantifiers. A better test, they might urge, will underwrite the quantifiers' logicality. Clearly, the onus would be on them to come up with an improvement. Since the literature in the philosophy of logic offers little by way of help here, pluralists will have to roll up their sleeves and formulate and motivate new tests from scratch.

The isomorphism-invariance test, in spite of its popularity and plausibility, has received challenges in the literature. The pluralist might appeal to such challenges. Here it is worth briefly reflecting on the sorts of criticism the account has come up against. First, isomorphism invariance is generally taken as at least *necessary* for logicality. Nevertheless, some of our arguments in section I have relied on the *sufficiency* of the test, for example, when we argued from the isomorphism invariance of 'x is abstract' or '$\neg_A$' (on the restricted test) to the logicality of those expressions. And the sufficiency of the isomorphism-invariance test has been questioned in the literature on logicality.[38] So is our reliance on the sufficiency of isomorphism invariance for logicality problematic?

Let us consider the sorts of counterexamples to sufficiency that have gained some traction. First, and best known, expressions with mathematical content have been offered as counterexamples. An example is the quantifier '$\exists_{>\aleph_0}$' ('there exist uncountably many'), which is isomorphism invariant but perhaps not logical, since it is in some sense mathematical, and mathematics is not logic. We have elsewhere argued that this counterexample fails. To briefly sketch one of our responses, it is familiar and widely accepted that, in first-order logic, quantifiers such as '$\exists_{>10}$' ('there exist at least 10') are logical, since they are definable using the familiar quantifiers, connectives, and

[38] In, for example, McGee, "Logical Operations," *op. cit.*; Denis Bonnay, "Logicality and Invariance," *The Bulletin of Symbolic Logic*, XIV (2008): 29–68; and Solomon Feferman, "Set-Theoretical Invariance Crieria for Logicality," *Notre Dame Journal of Formal Logic*, LI (2010): 3–20. See Owen Griffiths and A. C. Paseau, "Isomorphism Invariance and Overgeneration," *Bulletin of Symbolic Logic*, XXII, 4 (December 2016): 482–503; and Owen Griffiths and A. C. Paseau, *One True Logic: A Monist Manifesto* (Oxford: Oxford University Press, 2022), chapter 3, for responses.

identity. The logicality of '$\exists_{>\aleph_0}$' is no more mathematical, and no more problematic, than '$\exists_{>10}$', merely less familiar. The standard logical constants of first-order logic are accepted by virtually everyone, including pluralists like Turner and McDaniel, as logical. And if we accept those constants, we should also accept '$\exists_{>\aleph_0}$'.[39]

Importantly though, even if you are not convinced by this sort of defense, it is clear that none of the examples discussed in this paper—for example, '$\exists_A$', '$\neg_A$', 'x is abstract', and their concrete counterparts—have any substantial *mathematical* content. Alleged counterexamples like '$\exists_{>\aleph_0}$' come about, roughly, because isomorphisms preserve cardinality. And it is cardinality that allegedly smuggles in mathematical content. Plainly, nothing like that is true of the examples we have discussed. Anyone who leans toward a semantic criterion of logicality but is worried about isomorphism invariance for this sort of reason will therefore adopt a criterion that rules out '$\exists_{>\aleph_0}$' as logical but rules in the pluralist's problem cases (on the restricted test).

The literature also contains intensional counterexamples to isomorphism invariance.[40] The thought is that tests like isomorphism invariance are sensitive only to the extensions of expressions. As a result, anything coextensive with a logical constant will also be deemed logical. McGee[41] offers the example of *unicorn negation*:

$\mathcal{U}\phi =_{df} \neg\phi \wedge$ there are no unicorns

Because there are no unicorns, the second conjunct in the definition is always true and unicorn negation is coextensive with negation. And because negation is a logical constant, unicorn negation is. But unicorn negation should not be a logical constant, since it is in some sense 'about' unicorns and logical constants should not be about unicorns.

In response to this objection, the invariantist can always bite the bullet and say that the extension is all they are interested in. A more robust, and plausible, response is offered by Gil Sagi.[42] Very briefly, Sagi claims that the invariantist should only worry if the logicality of unicorn negation yields logical truths that are either contingent or *a posteriori*; but, she argues, neither is the case. Most importantly

[39] We have spelled out this argument in detail in Griffiths and Paseau, "Isomorphism Invariance and Overgeneration," *op. cit.*; and Griffiths and Paseau, *One True Logic*, *op. cit.*, chapter 9.

[40] See, for example, Timothy McCarthy, "The Idea of a Logical Constant," this JOURNAL, LXXVIII (1981): 499–523.

[41] McGee, "Logical Operations," *op. cit.*

[42] Gil Sagi, "The Modal and Epistemic Arguments against the Invariance Criterion for Logical Terms," this JOURNAL, CXII (2015): 159–67.

though, this again is not the sort of objection that could be leveled at the expressions considered in this paper. The problems we have offered with accepting something like '$\neg_A$' as a logical expression are that it does not fit well with the pluralist project, leads to an ambiguity in '$\neg$', leads to an unattractive proliferation of logical constants, and generates too many logical truths. But the problem with '$\neg_A$' as logical has nothing to do with its intension. Isomorphism invariance is motivated by logic's generality or topic neutrality. These are the reasons we might worry about a logical constant's being 'about' unicorns: 'unicorn' has a particular subject matter and does not apply to everything equally. But, if you are a pluralist, '$\neg_A$' is perfectly general and topic neutral.

To sum up, the pluralist is attempting to avoid our arguments by rejecting isomorphism invariance as a test for logicality, but their rejection is unconvincing. The test is generally accepted as necessary for logicality. And, while its sufficiency has come under attack, the alleged counterexamples simply do not apply here. So, for the sorts of expressions under discussion in this paper, the literature on isomorphism invariance offers no reason whatsoever to doubt that isomorphism invariance is both necessary and sufficient for logicality.

II.2. Inferentialism. The objections considered so far have directly targeted the standard invariantist criterion of logicality. Another approach would be to endorse a rival account of logical constanthood, *inferentialism*, founded on the idea that meaning is use. A typical inferentialist, for example, maintains that the meaning of the sentential connective 'and' is given by its introduction and elimination rules. Inferentialism is broadly speaking a *syntactic* account of logical constanthood and consequence, and invariantism a *semantic* one.

In the case of the specific existential quantifiers, we could offer the following introduction rules:

$$\frac{\begin{array}{cc}\vdots & \vdots \\ Ft & t \text{ is abstract}\end{array}}{\exists_A x F(x)} \qquad \frac{\begin{array}{cc}\vdots & \vdots \\ Ft & t \text{ is concrete}\end{array}}{\exists_C x F(x)}$$

and the corresponding elimination rules (with the obvious side conditions, square brackets indicating discharging):

$$\frac{\begin{array}{cc} & [t \text{ is abstract}] \\ & [Ft] \\ \vdots & \vdots \\ \exists_A xFx & \varphi\end{array}}{\varphi} \qquad \frac{\begin{array}{cc} & [t \text{ is concrete}] \\ & [Ft] \\ \vdots & \vdots \\ \exists_C xFx & \varphi\end{array}}{\varphi}$$

Of course, that it is possible to provide rules for these quantifiers is not sufficient for their *logicality*. Following Prior's example of *tonk*, we usually think that the rules must also be in *harmony*.[43] There are many different understandings of harmony in the literature but, fortunately for the pluralist, the above rules pass all such tests we are aware of. Clearly, anything that follows from an application of a specific elimination rule would already have been available for an application of the corresponding introduction rule, so the rules have the appropriate balance.

Nevertheless, there are problems with adopting inferentialism to defend pluralism. First, there is no hint in pluralists' writings that they lean toward a syntactic approach to logic and the logical constants rather than the more usual semantic one. The dominant account of logical consequence, for example, is model-theoretic (that is, semantic) rather than proof-theoretic (that is, syntactic), and everything pluralists say is in accord with the former.[44]

The second problem mirrors the first problem with the semantic approach. On this approach, the predicates 'is abstract' and 'is concrete' must also be taken as logical. It cannot be otherwise if they are to feature in the specific quantifiers' formal specification. For the reasons set out in section I.2.1, this should make the pluralist uncomfortable.

The third criticism is of the inferentialist approach itself. Inferentialism about the logical constants was popular a few decades ago but has suffered a reversal of fortune since. The many reasons include: (a) its generalization to the rest of language—inferential role semantics—has proved problematic; (b) as noted, inferentialism does not mesh with the generally semantic approach taken in linguistics and logic; (c) no clear inferentialist criterion for logicality has emerged; and (d) it is generally recognized that one can use a logical constant in a deviant or non-standard way while perfectly grasping its sense, through ignorance, error, philosophical cussedness, or for some other reason.[45]

We conclude that inferentialism remains a less attractive approach to the logical constants than isomorphism invariance and, in any event, fails to deliver the pluralist what they need.

[43] Arthur Prior, "The Runabout Inference Ticket," *Analysis*, XXI (1960): 38–39.

[44] In one place, Turner, "Ontological Pluralism," *op. cit.*, p. 14, mentions both a semantic and an inferential criterion, but, as a referee reminded us, only as two accounts of "what it takes for an expression to count as a *quantifier*." The criteria are of quantification rather than logicality.

[45] See Timothy Williamson, *The Philosophy of Philosophy* (Oxford: Blackwell, 2007).

III. SECOND REACTION: FUNDAMENTALITY AND LOGICALITY

How else might pluralists react to the arguments in section I? They might accept the isomorphism-invariance test as a test for *logicality* but deny that it reliably informs us about *fundamentality*. We will tackle this response in two parts: first considering its application to the unrestricted test, then to the restricted test.

III.1. The Unrestricted Test. As mentioned in section I.2, the unrestricted test for logicality is in certain respects more natural for the pluralist. The generic quantifier '$\exists$' passes this test with flying colors, but is not fundamental, for pluralists. Conversely, the specific quantifiers '$\exists_A$' and '$\exists_C$' are fundamental, as the pluralist sees it, but not logical because they fail the unrestricted test. So there are logical but non-fundamental quantifiers; and fundamental but non-logical quantifiers.

Pluralists might try to make these commitments more palatable by arguing that not all logical vocabulary should be regarded as fundamental. All truth-functional connectives are logical, but pluralists might not want to count all of them as fundamental. In particular, disjunctive notions ('grue', 'quus', and the like) are not fundamental, and there will surely be disjunctive logical notions, at least given an invariance test of any stripe: an example might be a binary connective which acts as conjunction over finite domains and material implication over infinite ones. Since pluralists take '$\exists$' as the disjunction of '$\exists_A$' and '$\exists_C$', they may argue that '$\exists$' is too disjunctive a notion to be fundamental.

For the sake of argument, let us grant this point: suppose that for the pluralist some logical notions (such as '$\exists$') are not fundamental, because they are definable in terms of others (such as '$\exists_A$' and '$\exists_C$'). Perhaps the point even extends to '$=$', which our pluralist might define from '$=_A$' and '$=_C$'. But that does not let pluralists off the hook, as the specific quantifiers' non-logicality remains problematic. So the question is: could these quantifiers plausibly be fundamental but not logical? The answer is no, as we now argue in four ways.

A. The first point to note is that pluralists themselves take the quantifiers as both fundamental and logical. Turner, for example, considers the relationship between logicality and fundamentality in some detail.[46] As he sees it, in a fundamental language, logical consequence must track metaphysical consequence. It is an objective matter, he thinks, whether such metaphysical entailments obtain. The conjunction of these two theses, Turner writes, entails that if Γ logically en-

[46] Turner, "Logic and Ontological Pluralism," *op. cit.*, section I.

tails ϕ, then Γ metaphysically entails ϕ. And, if these sentences are expressed in a fundamental language, the converse also obtains. In a fundamental language, the logical facts reflect the metaphysical facts. The expressions we hold fixed in the fundamental language, therefore, had better be the expressions we treat as primitive logical constants in that language—for Turner, at any rate. Similarly, McDaniel describes the world as containing *logical joints*, which the specific quantifiers should aim to match.[47]

B. Second, not only do pluralists take the quantifiers as both fundamental and logical, but they face some dialectial pressure to do so. The issue is whether pluralism is a mere notational variant of monism. Turner's claim that it is not[48] has been challenged by Whittle.[49] Central to this debate is the sentence:

E Everything exists abstractly or concretely.

This is a logical truth for the pluralist but not for the monist, which Turner contends is a genuine disagreement between them. For the monist, *E* would be formalized, on the obvious interpretation, as:

M $\forall x(Ax \vee Cx)$

M is not a logical truth for the monist, since there are interpretations of '*A*' and of '*C*' on which it is false—for example, assign aardvarks to '*A*' and capybaras to '*C*' over the domain of all animals. The pluralist, however, would offer something like the following as their formalization of *E*, taking the pluralist's universal quantifiers as defined in terms of their existential quantifier:

P $\forall_A x(\exists_A y\ y = x \vee \exists_C y\ y = x) \wedge \forall_C x(\exists_A y\ y = x \vee \exists_C y\ y = x)$

In words: Everything abstract is identical to something abstract or concrete, and everything concrete is identical to something abstract or concrete. The sentence has to be expressed in something like this way, since the universal abstract quantifier ranges over only the abstract domain, and the concrete quantifier over only the concrete domain. It is a logical truth for the pluralist, since '$\forall_A x \exists_A y\ y = x$' and '$\forall_C x \exists_C y\ y = x$' both are.

Pluralists want their view to be genuinely distinct from monism, and not merely notationally variant. On Turner's account, this is the case

[47] McDaniel, *The Fragmentation of Being*, *op. cit.*, section I.3.
[48] Turner, "Logic and Ontological Pluralism," *op. cit.*, section II.
[49] Whittle, "Ontological Pluralism and Notational Variance," *op. cit.*

only if P is a logical truth, and M is not. Whittle[50] has questioned pluralism on precisely this point. As he points out,[51] the pluralist only gets this combination of verdicts if the specific quantifiers are logical and the predicates '*x* is abstract' and '*x* is concrete' are not. If they judge these predicates to be logical, then M is also a logical truth, which pluralists do not want. This, then, is a further reason for the pluralist to demand the logicality of their quantifiers.

Turner[52] has responded to Whittle's criticism. Very briefly, he argues that M and P are logically true in different ways. But the details of his reply need not detain us, as they do not change the general moral for our purposes. In their response to the notational-variance worry, pluralists rely on the logicality of the quantifiers.

C. Third, any doubts about the logicality of fundamental expressions does not apply to the sorts of expressions under discussion here. For example, we might think that an expression such as '*x* is a spacetime point' is a fundamental expression—essential to fundamental theories—but a poor candidate for logicality. Even if we think this, however, the sorts of expressions that the pluralist is claiming to be logical are *quantifiers*, which are the sorts of expressions generally accepted as logical. The arguments of this paper do not assume that *all* fundamental expressions are logical. We have supposed only that expressions such as identity, the truth-functional connectives, and the universal and existential quantifiers should, for the pluralist, be logical as well as fundamental.

D. Indeed, and this is the final point, in the broad Lewisian-Siderian framework within which pluralists operate, existential quantifiers *are* logical as well as fundamental. Sider certainly regards notions such as identity and the existential quantifier as both joint-carving/fundamental and logical. He is unequivocal on this point, and justifies it compellingly in terms of the epistemology of fundamentality. For as he puts it, "the way to tell which notions carve at the joints is broadly Quinean: believe in the fundamental ideology that is indispensable in our best theories."[53] If indispensability to our best theories is the test of fundamentality, then quantifiers sail through, as Sider notes.[54] He reiterates this elsewhere, noting that he takes first-order quantification theory (with identity) as fundamental,[55] and takes validities of

[50] *Ibid.*
[51] *Ibid.*, pp. 63–64.
[52] Turner, "Ontological Pluralism," *op. cit.*
[53] Sider, *Writing the Book of the World*, *op. cit.*, p. 188.
[54] *Ibid.*
[55] *Ibid.*, p. 292.

first-order quantification theory as logical.[56] More generally, he comments that "we cannot get by without logical notions in our fundamental theories."[57]

We side with Sider. It is, we suggest, a conceptual truth about logic or something very much like it, that logical notions appear in our fundamental theories, and are therefore fundamental. If any notions are utterly general and apply in all spheres, including the sphere of the fundamental, logical notions are. Of course, pluralists such as Turner and McDaniel do not follow Sider in every respect, as is evident from their rejection of monism. But if they are to part ways with him over the epistemology of fundamentality (not something they have hinted at), Sider's *Writing the Book of the World* will need rewriting. The epistemology of fundamentality then becomes a wide-open question.

III.2. The Restricted Test. That was the more natural, unrestricted test. We can be more brief on the restricted version. Recall that this delivers the pluralists' desired verdict of logicality for the specific quantifiers, but unfortunately also renders a whole host of other specific expressions logical. A potential response here would be to say that, although these latter expressions pass the test, they should not be accepted as logical because they can be regarded as *defined*. If they can be defined using other, more basic notions, there is a case to be made that they are not themselves fundamental.

Something very much like this response can be read into a discussion by McDaniel.[58] As we have seen, he wants the logicality of the specific quantifiers ('$\exists_A$', '$\exists_C$') but not the specific predicates ('is abstract', 'is concrete'). McDaniel may claim that, although isomorphism invariance is necessary for logicality, it is not sufficient. What is also needed is *fundamentality*. The specific quantifiers pass the restricted test but so do the specific predicates. Nevertheless, the specific predicates can be seen as *defined* in terms of the quantifiers in something like the following way:

x is abstract: $\exists_A y(x = y)$
x is concrete: $\exists_C y(x = y)$

So the specific predicates are non-logical, as desired, because they are defined.

Unfortunately for pluralism, this response does not deal with the objections we raised for the unrestricted test in section I.2. To take

[56] *Ibid.*, p. 293.
[57] *Ibid.*, p. 216.
[58] McDaniel, *The Fragmentation of Being*, *op. cit.*, section I.3.

them in reverse order, the problem of overgeneration (section I.2.3) remains and is unaffected by defining some putatively logical terms in terms of other logical terms. Any putatively logical term defined by means of other genuinely logical ones is still not up for reinterpretation when assessing the logicality of a sentence featuring it. In particular, assuming there are no more than 10^{100} concrete entities, the first-order-logic renfering of the sentence 'There are no more than 10^{100} concrete things' becomes a logical truth; similarly for the sentence 'There is a divine existent'.

The problem of ambiguity (section I.2.2) also still seems to be with us: on the restricted test, all logical notions split into multiple pairs, one per dichotomous way of being. So we have abstract and concrete truth-functional connectives, for example, '$\neg_A$' and '$\neg_C$' for negation, connectives over the possible and the actual domains, over the divine and non-divine domains, and so on. Following McDaniel's definitional approach, can the pluralist at least limit the damage by arguing that these connectives are definable and hence not fundamental? To focus on negation, can the specific negations be defined in terms of the specific existential quantifiers? The problem is that there is no known way to define negation in terms of existential quantification, and hence no way to do this for their specific counterparts. Of course, negation can be defined in terms of other truth-functional connectives, and an idle existential quantifier can be thrown into this definition at will; for example, define '$\neg_A p$' as '$(p \uparrow p) \wedge \exists x(x = x)$', where '$\uparrow$' is the Sheffer stroke. But there is no reason to suppose the Sheffer stroke more fundamental than negation, or indeed to suppose any truth-functional connective more fundamental than any other. This is why Sider[59] allows that fundamental notions may contain some redundancy (both conjunction and disjunction, both the universal and existential quantifier, and so on). So even if definability/non-fundamentality is used to reduce the pluralist's logical expressions, it will not reduce them to an attractively small or plausible collection.

Let us return now to the specific predicates 'is abstract' and 'is concrete' (section I.2.1), which McDaniel defined in terms of the specific abstract and concrete quantifiers, respectively. An amendment to McDaniel's discussion that initially seems minor, but which points to a deeper issue, is called for. On the restricted test, the generic notion of identity splits into abstract identity and concrete identity. Generic identity is used in both McDaniel's clauses above, yet since it too is defined in terms of the specific forms of identity, the clauses should

[59] Sider, *Writing the Book of the World*, *op. cit.*, p. 218.

be seen as staging posts to a final definition, in which generic identity is defined away. Alternatively, 'x is abstract' could be defined more directly in terms of abstract identity as '$\exists_A y(x =_A y)$', and similarly for 'x is concrete'.

So far so good. McDaniel's response seems promising for the specific predicates 'is abstract' and 'is concrete' because they can be defined in terms of the specific quantifiers (and identity). But can the pluralist successfully define any putatively logical *generic* notions in terms of specific ones? We first broached this issue in section I.2.2, and it is now worth drilling deeper. Take the generic existential quantifier '$\exists$', which on the pluralist view we are contemplating is defined in terms of the specific quantifiers, presumably as '$\exists_A \vee \exists_C$'. That definition uses the generic disjunction '$\vee$', so how is that defined? Presumably, as '$\vee_A \vee \vee_C$'. But that definition itself uses generic disjunction, which we wish to define in terms of specific notions. Clearly, we are off on a regress. And definitional circles, such as defining specific disjunctions in terms of generic disjunction and vice versa (given some other notions), are not permissible under this approach, which in logic equates the fundamental with the undefined.

Informally stated in its full generality, the problem is this. To define a generic notion, the pluralist will wish to combine its first specific (for example, abstract) counterpart with its second (for example, concrete) one. But the operator that effects the combination, typically disjunction or conjunction, must be generic. So the combining operator must itself be defined in turn, and a regress beckons.

Our conclusion is that we can make fairly good sense of the idea that the specific predicates are defined, using something like McDaniel's method. But, as we have seen, the remaining problems for the restricted approach stand. Moreover, we are skeptical that pluralists can succeed in defining any generic notions out of purely specific ones.

IV. CONCLUSION

The debate between the ontological monist and pluralist is about which quantifiers are fundamental. Assuming they are logical, the debate then turns on whether the pluralist's quantifiers are logical. Isomorphism invariance is the best known means of answering such questions, and provides a dialectically neutral way to settle the debate. It ultimately settles it in favor of the monist. For the pluralist can apply the test in either a restricted or an unrestricted way. On the unrestricted application, their quantifiers fail the test. On the restricted, abstract and concrete predicates turn out to be logical, which at least Turner and McDaniel explicitly rule out; other logical expressions are in turn ambiguous, and the approach overgenerates logical truths. The two reactions we examined in section II and section III do not give the pluralist a way out. We conclude that pluralists must radically rearticulate the nature of logic if their view is to get off the ground.

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